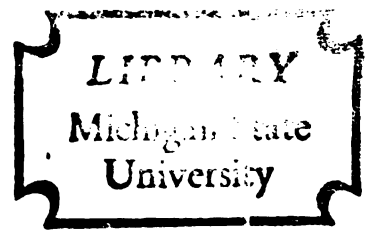


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COMPUTER APPLICATIONS IN MARKETING:
AN ANALYSIS OF CORPORATE EXPERIENCES

By

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ABSTRACT

**COMPUTER APPLICATIONS IN MARKETING:
AN ANALYSIS OF CORPORATE EXPERIENCES**

by Robert M. Kaplan

American Industry is now in the early stages of a Second Industrial Revolution, more accurately called "the Computer Revolution". This new technology will affect all areas of commerce. To date, the impact of the computer has been felt only lightly in marketing, yet in this function its potential contribution is great.

The objectives of this research are to:

1. delineate present uses of computers in marketing (state of the art),

2. investigate company experience in using computers in marketing,
3. hypothesize about potential uses for computers in marketing.

These objectives are accomplished by surveying over one hundred corporations considered as progressive users of EDP in marketing. Different questionnaires were developed and sent to the senior marketing executive and data-processing executive in each firm. The replies are analysed according to whether the responses were from: (a) industrial goods' producers; (b) consumer goods' producers; (c) manufacturers of industrial and consumer goods; or (d) middlemen.

Marketing executives claim EDP has been used in marketing an average of 6.7 years, while data-processors indicate an average of 5.3 years. The replies from marketers show an average of four applications each and the data-processors 2.9 applications. The different applications are grouped into five areas and 17 categories:

I. SALES MANAGEMENT

1. Sales Analysis

2. Sales Management Analysis
3. Sales Territory Analysis
4. Service Policy Analysis

II. PHYSICAL DISTRIBUTION MANAGEMENT

1. Physical Distribution Analysis
2. Distribution Channels Analysis
3. Inventory Management Analysis

III. MARKETING MANAGEMENT

1. Planning Analysis
2. Forecasting Analysis
3. Marketing Management Analysis
4. Advertising Analysis

IV. FINANCIAL MANAGEMENT IN MARKETING

1. Distribution Costs Analysis
2. Pricing Analysis
3. Credit Administration Analysis
4. Financial Analysis

V. RESEARCH

1. Marketing Research Analysis
2. Operations Research Analysis

Each application is analysed for:

- i) ranking by number of users and average time used,
- ii) types of individual analyses included,
- iii) degree of satisfaction experienced,
- iv) availability of library programs,
- v) significant differences between the means for each sub-sample (at a 95% confidence level).

The applications ranking highest in number of users are: Sales Analysis and Inventory Management Analysis. Those ranking lowest are: Operations Research Analysis and Distribution Channels Analysis. The applications used longest are: Sales Analysis and Inventory Management Analysis, while those used the shortest period of time are Pricing Analysis and Advertising Analysis. The coefficient of correlation between the two methods is 0.90.

In three major decision areas about computers a marketing executive is involved: computer acquisition, key data-processing personnel and marketing applications. The marketers indicate that in 40% of the companies they are involved directly in one or more of these decision

areas and in 50% they are involved indirectly. The data-processors gave the figures for the involvement of marketers as 39% for direct involvement and 36% for indirect.

The administrative problems caused by using EDP in marketing are: lack of communication between departments, insufficient understanding by personnel in one department of another's activities, EDP system too small, over-optimism about costs, printout received too late to be useful, changes required in jobs, and top management not sufficiently knowledgeable to use information generated. Some solutions to these problems are suggested.

The steps being taken to acquaint marketers with the potential of EDP are: educational programs (internal and external to the company), encouraging employee self-education, and exposing personnel to EDP as their job requires.

Generally, marketing uses a computer administered by the financial function, as well as drawing upon the EDP personnel of this central department. In most cases there is no charge for either of these services. Marketing's use of computers represents about 10% of the total running time,

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and the programs for marketing applications represents 13% of all the programs.

The standards used to evaluate marketing applications are: cost savings, time savings, improvement in information, assistance in decision making, and aid to competitive position.

Areas for future use of EDP in marketing as suggested by the respondents include Market Forecasting, Planning, Marketing Research and Operations Research. Potential areas they do not mention are: Marketing Information Systems, New Product Planning, Selling to Vendors' Computers, and Rote Marketing. However, these areas will require the use of more advanced simulation and mathematical model techniques than are commonly used today.

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CHAPTER I

INTRODUCTION

I. PURPOSE OF THE STUDY

The rate of technological advancement is undoubtedly exponential and the next stage in that advance will be dominated by the computer. This research is devoted to an examination of the uses and the effects of the computer on the marketing function of corporations.

More specifically, its purpose is to:

1. delineate the present uses of computers in the field of marketing (the state of the art);
2. investigate, analyse and evaluate company experience in using computers in marketing;
3. hypothesize about some potential uses for computers in marketing.

II. RAISON D'ETRE

"In none of the major functions of American business has the impact of the computer been so lightly felt as in marketing. Yet in none of the major functions is its potential contribution so great."¹

"In the next five years it is expected that the computer will do more to advance the field of knowledge in marketing than man has been able to do in the last fifty years."²

III. SIGNIFICANCE OF THE RESEARCH

Because the use of electronic data-processing (EDP)³ in marketing is so new (about 10 years old), and the

¹ Alderson and Shapiro, editors, Marketing and the Computer, Prentice Hall, 1963, a quote from Richard F. Neuschel, p. 408.

² Edwin H. Sonneken, President, American Marketing Association. From a speech delivered to the 3rd National Intercollegiate Marketing Competition held at Michigan State University, East Lansing, Michigan. April 10, 1965.

³ The terms electronic data-processing and computers will be used interchangeably in this paper and the terms will be considered as synonymous. Technically, in hardware, there can be a difference between EDP and computers, but for purposes of this research this difference will be ignored.

potential so great, its scope of application has caught the fancy of both practitioners and researchers. However, since the use of EDP for other than paperwork cost reduction is still relatively unfamiliar to most marketers (for reasons to be explained later), this study has been developed to evaluate actual corporate experience and through this give counsel in planning, organizing, developing, implementing and controlling the use of computers in marketing. But, while of unquestionably great potential for marketers, EDP has begun to suffer from exaggerated claims. This research also sorts out speculation from accomplishment, and theoretical suggestions from practical uses.

Much activity has been taking place in applying computers in marketing; more executives are becoming aware of the advantages of using EDP in this area; computer manufacturers are constantly experimenting with new uses for their equipment; and companies presently using computers are trying to develop more and better applications to strengthen their competitive positions. But the members of these different groups have been involved in their own pursuits and no one has yet attempted to consolidate and synthesize this myriad of separate endeavors.

The first stated purpose of this study is to delineate the state of the art. This is done by compiling an inventory of currently used applications. Such a list will help marketers to realize more of the potential of their "electronic brains". It will also allow people to find out what is being done by others, thus promoting a cross-fertilization of ideas.

Another important reason for delineating the present state of the art is to show where the potential areas for future development lie. Much time, energy and money is spent by numerous organizations in "rediscovering the wheel". This effort could be better invested on other unsolved mysteries if the "inventor" knew that his present problem had previously perplexed others and that it had been overcome in some prescribed manner. Real frontiers can only be rolled back when it is known where they exist. And what are frontiers to one man may have been the previous conquest of another.

The second purpose of this research is to analyse numerous companies' experiences in applying EDP in marketing. From the findings, generalizations are developed regarding

the organizational relationships between the marketing and data-processing departments. The use of EDP has given rise to serious intraorganizational conflicts. These conflicts are not restricted to the ones commonly known between marketing executives and the new generation of systems executives. They also include such questions as how many data-processing centers a company should have and to what extent EDP will alter traditional responsibilities for planning and decision-making. This research evaluates what can be learned from the accumulated experiences of businesses using EDP in marketing and analyses these from the viewpoint of marketers concerned with similar situations.

The third major purpose of this research is to hypothesize about and examine some of the potential uses for EDP in marketing. This objective can be achieved only after the first two purposes are accomplished; however, it is equally important since it will assist in directing future efforts to develop applications. Once the current state of the art is defined and the administrative problems analysed, future uses can be developed more easily and quickly because the areas for research will be delineated and the organizational problems exposed. These prognostications

are organized into two groups -- first the more immediately feasible and economical, and then those of longer-term feasibility which generally have a higher potential payoff.

It should be mentioned that, although the emphasis in this research is on the use of EDP in marketing, EDP is not an end in itself. Computers and computer-based business systems are worthwhile only when they facilitate the management process. Most of the available literature on the uses of EDP in marketing is extremely esoteric and the authors generally have lost sight of the fact that the management audience is not composed of trained system analysts, programmers, or computer technicians. These managers, in most cases, do not understand the jargon and the advanced mathematics employed to describe the many applications. This situation is reason enough to show that management needs an analysis of EDP uses in a language which it can understand. Consequently, the specific audience for this research is the intelligent-but not computer-trained-marketing managers.

IV. BACKGROUND

In Scotland in the year 1769 Thomas Watt invented the steam engine. A few years later people realized the potential of this device for reducing man's toil. Soon others started making machines which utilized this non-human power to produce various goods, and so the Industrial Revolution was born. We are presently witnessing another type of revolution which some have called a "Second Industrial Revolution"⁴, but which is probably more accurately described as the "Computer Revolution". This Computer Revolution parallels the earlier Industrial Revolution in the following ways: people are suspicious because of the unemployment it may create; commercial application is lagging behind technological development; a new breed of specialists is developing; and man is able to accomplish feats hitherto entirely beyond his power. Just as the Industrial Revolution of the 18th and 19th centuries enabled man to extend his muscle strength through the use of mechanical and power-driven machines, man will now be able to extend his intellectual or brain power through the use of electronic computers.

⁴ For Example, in "Keeping Pace with the Computer Age" by Richard C. Christian in the Journal of Marketing. Vol.30 July, 1966. p. 59.

Some people claim that the computer "has a more beneficial potential for the human race than any other invention in history"⁵ and that it is the "most sophisticated and powerful of the tools devised by man"⁶.

The computer as we know it today was born in 1946 at the University of Pennsylvania's Moore School of Engineering. It was called the ENIAC (Electronic Numerical Integrator and Calculator). This was identified as the first electronic computer. There were, however, many important preceding events all of which contributed to the possibility of the ENIAC.

In 1812, Charles Babbage, a professor of mathematics at Cambridge University in England, developed and built a machine called the Difference Engine which could make calculations needed for trigonometric and logarithmic tables. This was a first step towards the modern computer but unfortunately his invention was too far ahead of its time for its full range of capabilities to be developed.

⁵ Burck, Gilbert, et. al. The Computer Age, Harper & Row, 1964, p. 1. A quote of Ray Eppert, President, Burroughs Corp.

⁶ Time, April 2, 1965. p. 84.

The switching network in a computer is very complex and the logic of a complicated program very difficult to analyse. This could not have been developed on a bi-polar basis (electrical current "on" or "off") without the development of rules and symbols which provide for calculating the truth or falsity of statements. It was George Boole who developed a systematic method for mathematical representation and analysis which he published in his book The Laws of Thought in 1854. This work in symbolic logic thus provided an analytical basis for computer design.

Although not a component of an electrical computer, the founding of data-processing similar to the type done in a computer was developed by a Frenchman, Joseph M. Jacquard in 1745. He designed a method of using holes in cards to control the selection of threads in weaving designs. But the originator of modern machine readable punch cards was Herman Hollerith, who developed the idea of the punched card and designed the related census machine while working for the Bureau of the Census in the 1880's. This method was first used on the 1890 U. S. Census of Population. The Hollerith card had 80 columns and 12 rows and is the basis for the similar card requiring rectangular holes used in data-processing today. Another type of punched card was

developed and used in the 1910 Census by James Powers. This used round holes and was 90 columns wide, but the principle for all punched cards is the same as that used by Jacquard.

In 1937 a Harvard professor, Howard Aiken, designed a machine that would automatically perform a sequence of arithmetic operations. This machine was constructed by IBM, and completed in 1944; it was originally developed to trace the paths of trajectories for the Navy. The machine, called the Mark I, was a mechanical calculator and is considered the immediate predecessor of automatic electronic computers.

It was not long after the development of ENIAC that its commercial feasibilities became apparent. The Bureau of the Census was the first to use an electronic computer in the solution of a business data-processing problem. This was in 1951. But the General Electric Company was the first commercial enterprise to use a computer for business analyses. This was in 1954, when it took delivery of a Sperry-Rand Univac at its Louisville plant.⁷ Since then, about 25,000 computers⁸ have been installed by American industry.

⁷ Burck, Gilbert et al., op. cit.

⁸ Christian, Richard C., op. cit.

Much has happened regarding the computer during the score of years since its invention. In technology, great advances have been made. Business is no longer forced to develop means for adopting scientific computers to its own needs, but rather, a wide range of high-speed, large-memory systems has been designed for solving commercial data-processing problems. With these advances, the growing promise of the computer has led businesses in increasing numbers to consider the substantial financial investment generally required for the use of an EDP system. The challenge now facing management lies in utilizing the capacity of this new tool, for up to the present the capabilities of the hardware (the physical machinery of a computer system) have consistently surpassed what was required to analyze business systems.

Progress in the application of EDP in business is continuous, but has not been uniform in all functional areas. The evolution of utilization generally parallels employment by certain departments. Most computer installations are used initially on routine, repetitive accounting tasks, which formerly were done manually or mechanically. Companies seem to put accounts payable, accounts receivable, and payroll onto

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a new installation immediately -- and with good reason. This work is already quantified, specific objectives are known, the programs are among the easiest to develop if they have not been done so already by computer manufacturers, and the comptroller is usually in charge of the EDP department. Eventually, the usage is expanded to include other routinized work for the accounting and financial executives.

After this introductory stage, the application of EDP is increased beyond just the savings of time and money to improving the quality of information available to managers. At this point production executives, and in many cases engineering and research directors begin to participate in using the computer. These people are usually more quantitatively oriented than marketing executives and they are able to make more immediate use of the new equipment. Around this time marketers also begin to employ EDP, usually drawing upon both levels of usage attained to date (faster and cheaper analyses and better information). However, the amount of computer use by marketing is nowhere near the volume or sophistication required by other functional executives.

The next level of sophistication in EDP usage for business is in simulating complex business systems and in employing mathematical formulations (models) for analysing business alternatives (Operations Research). However, this is a very young branch of computer application and probably when these techniques are developed more fully, computers will be used to assist in marketing to a greater extent.

Following this evolution of using EDP in companies, three broad levels for computer applications in marketing can be hypothesized (the sequence will understandably be influenced by the costs and ease of implementation in using a computer).

1. Using computers to record and process routine transactions, such as sales, inventory records, etc. which were done previously by clerical staff.
2. Using computers to facilitate better use of marketing information by developing it more quickly, by having it more comprehensive, and by providing new facts.
3. When simulation and advanced mathematical techniques (e.g., Operations Research) are more fully applied on computers, many alternatives for action will be evaluated, and used in decision-making.

But why has marketing not used computers more fully in areas where the techniques are already developed and used in other functions?

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The reasons are five-fold. First, most marketing executives do not have the necessary background or quantitative understanding to deal with the computer. Second, many variables in marketing are still very difficult to quantify because of lack of understanding about relationships among them. (Even if this could be done conceptually there is still a lack of data to make it operational). Third, many marketing managers have been hesitant to exchange information about computer applications in marketing for fear of giving away a competitive advantage. Fourth, there is presently a paucity of marketing personnel with adequate knowledge of computers. And fifth, the computer is generally under the direction of a financial executive.

This research considers the first, third, and fourth of the above reasons. It deals with the first by treating the subject in a non-technical manner and by using language which the afore-mentioned intelligent but not technically trained executive can understand. Theory is avoided whenever possible and esoteric terms are explained as they are used.

The limitation caused by hesitancy to exchange information is dealt with by reporting what companies have done and are now doing in marketing with EDP.

The fourth reason, the lack of trained personnel, takes a substantial period of time to correct. But it is hoped that through this study marketing people will appreciate the potential of EDP, and some competent computer people will see the vast vistas open to them in marketing.

v FOCUS

This study focuses on the applications of electronic data-processing in marketing. Data-processing is defined as: "A series of planned actions and operations upon information to achieve a desired result. The operations are performed according to precise and strict rules of procedure. The procedures and devices used are what constitute a data-processing system. Recently, 'data-processing' has become a generic term for 'computing'".⁹

Marketing, as used here, in the standard definition given by the American Marketing Association, is: "the performance of business activities that direct the flow of goods and services from producers to consumers or users".¹⁰

⁹ Leeson, D.N., and Dimitry, D.C., Basic Programming Concepts and the IBM 1620 Computer. Holt, Rinehard and Winston, 1962.

¹⁰ p.1
Alexander, R.S., et al. Marketing Definitions, American Marketing Association, Chicago, 1960, p. 15

VI FIELD OF INQUIRY

In order to examine the present applications of computers for marketing, several sources of information were examined. These include:

1. Preliminary discussions about the topic with selected individuals:
 - (a) systems engineers of computer manufacturers,
 - (b) academicians,
 - (c) consultants,
 - (d) data-processing executives,
 - (e) marketing executives
2. A survey of the relevant literature in both the marketing and the data-processing fields:
 - (a) books,
 - (b) periodicals and professional journals,
 - (c) monographs or occasional papers,
 - (d) dissertations.
3. A survey of:
 - (a) business associations,
 - (b) computer manufacturers,
 - (c) consulting firms,

- (d) EDP service centers,
- (e) selected academicians.

4. A survey of the senior marketing and data-processing executives in each of the companies selected for inclusion in the sample.

VII INTEREST IN THE STUDY

Interest in this study was indicated by the fact that practically all the responding companies requested a copy of the findings which they felt would be useful in furthering their use of EDP in marketing. Also, some of the companies unable to complete the questionnaire asked for a copy of the final report. A sample of quotations from non-usable as well as usable responses is listed below, along with a brief description of the respective companies. Some of these quotations also indicate the type of replies that were not suitable for inclusion in the analysis.

- (i) Reply received from a major creamery company.

"We are returning your questionnaire unfilled. Our company's use for computers to date has been limited to the accounting and payroll functions and some limited use on feed formulations. Our marketing department is now working with our computer staff on the use

of computers, but the project is still in its infancy and I think it would be irrelevant to try and answer your questions at this time. We appreciate your letter and we are sorry we can't help you right now."

- (ii) An excerpt from the letter by a large producer of grocery store type products.

"As a company we are in the infant stages of computer use in marketing. We recognize the importance of this tool in marketing and are taking steps to educate ourselves about its use. In this regard we will certainly appreciate a copy of your findings."

- (iii) Received from a major national company producing industrial products.

"Your letter to Mr. ... concerning the use of a computer in marketing was most interesting. We are just getting into this application of our computer and, therefore, we do not feel we are in a position at the present time to supply intelligent answers to your questionnaire.

"Your questions will be most helpful to use, however, as an excellent guide for determining the value and use our computer can provide to us in this field.

"We are indeed sorry that we are unable to fill out your questionnaire and help you in your research. We are also extremely sorry that as a consequence of this inability, we will not be eligible to obtain a copy of your findings. This should prove very interesting and enlightening.

"If you felt you could send us a copy of your final report, though we have not met your requirements, we would be most appreciative."

- (iv) From a letter by the Vice-President of Marketing for a fully integrated forest products company with sales close to one billion dollars annually.

"While we would like to be helpful in your survey as requested in your letter to Mr. ... the company is just now embarking on an extensive program for use of the computer in its marketing and management activities. It is impossible for us, right at this moment, however, to provide you with any meaningful data in response to the questions in your survey."

Further, many companies wished to remain anonymous, but sent a covering letter with their completed questionnaire specifically identifying themselves, in order to receive a copy of the findings, which they felt would be extremely useful to their operations. A typical excerpt of this type is:

- (v) From a letter by a large paper manufacturer.

"We have not signed the questionnaire because we are not interested in identifying the source of the specific information. Nonetheless, we would like to have a copy of the findings."

VIII ORDER OF PRESENTATION

The methodology and research design used in this study are described in Chapter II. Also included here is a discussion of the more important limitations associated with the results.

In Chapter III, "Synthesis of the Literature", an analysis of the public writings about computer applications in marketing is presented. This chapter results from examining the literature of both marketing and data-processing.

Chapters IV and V contain the data about the analysis of the replies to the questionnaire designed for the marketing executives. Chapter IV is limited to information regarding the length of time companies have used a computer and the experiences they have had with specific applications. In Chapter V the analysis of the organizational and administrative relationships between the marketing and data-processing departments is presented.

Chapters VI and VII include analyses similar to those of the two previous chapters, except that here the basis for the data is the replies received from the questionnaire designed for and sent to the data-processing executives.

Chapter VIII contains a comparison of the findings from the marketing executive's and data-processing executive's questionnaires.

In Chapter IX a summary of the findings is presented along with some conclusions and prognostications about computers in marketing.

CHAPTER II

METHODOLOGY AND RESEARCH DESIGN

The manner in which the research data was generated and analysed is presented in this chapter as well as a discussion of the more important limitations associated with the results.

I LITERATURE SEARCH

The first step in developing this research study was to review the relevant literature both in marketing and in data-processing. This was done to provide the author with background information about the field of enquiry, to study the literature in the field, and to assist in developing the sample. The applications that have been reported form the basis for Chapter III. The assistance gained in regarding suggestions about which corporations to include in the sample is delineated in the next section of this Chapter.

II DEVELOPMENT OF THE SAMPLE

It was felt that the experiences of at least 100 corporations should be analysed, and that these corporations

should be among the most progressive users of computers for marketing purposes. Also, considering that EDP is generally under the control of a financial executive, these experiences should be evaluated from both the marketing and data-processing points of view. Several sources were used to find out which corporations could be considered the "most progressive".

First, a letter was sent to 29 computer manufacturers asking what companies they considered leaders in using EDP for marketing. Only seven of the manufacturers returned useful replies suggesting about 50 companies. The other computer manufacturers either did not reply or stated that they were makers of computers for scientific work only.

One computer manufacturer, IBM, in addition to suggesting numerous companies, also recommended for consideration firms which are members of voluntary user groups. These groups are organized for companies having similar type computers to facilitate exchange of information about computer experiences and programs. Three user groups were recommended, but only one, "SHARE", was willing to cooperate in the study. The "SHARE" user group showed considerable interest and even supplied addressed labels of their membership. Unfortunately, many of

the members were university computer centers, scientific or engineering research houses, consultants, government agencies or companies which use a computer for only "non-marketing" applications. But fifty-eight of the over 200 member companies were suitable for inclusion in the sample and cooperated by supplying the requested information.

Next, the major "business" associations¹ were canvassed for names of firms they considered progressive in the area of the study. The responses from the associations were not very encouraging as most either were not aware of their membership's activity regarding computers in marketing or were not willing to expose member companies to an outside research study.

The third group solicited for suggestions as to companies fitting the required description were consulting firms. Only a few leads were developed as most consulting companies did not wish to divulge the activities of their

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The business associations canvassed were:

1. American Management Association,
2. Marketing Science Institute,
3. American Marketing Association,
4. National Industrial Conference Board,
5. Advertising Research Foundation.

clients. A number of selected academicians were also asked to suggest companies for inclusion in the sample, but very few recommendations were given, mainly because the academicians had an association with the companies in a consulting capacity and did not wish to comment on their clients' activity. Also, there was a timing factor, as the letters to academicians were sent early in the summer, and perhaps many of them were away. By the time they returned in September the sample was already selected and the questionnaires sent out.

The next group from which suggestions were requested was EDP service centers. Only a limited number of recommendations were generated in this manner, probably because the service centers were not familiar with their clients' internal marketing applications.

Marketing and data-processing literature, the last area explored, developed numerous leads.

From all these sources, 258 companies were chosen as the sample. The public relations officer of each was sent a letter so that the author might acquire some preliminary data. This included the type of company, how long they had used a

computer, who were the senior marketing and senior data-processing executives (in order to write them personally), what the divisions within the company were, what types of computers they used, and similar background information.

If a reply was not received from the public relations department of a company within a month from the date of mailing, a follow-up letter was sent and then much of the requested data were received. In cases where the needed information was not supplied, secondary sources were searched for the relevant data. The main secondary sources were Standard and Poors' Directory of Corporations, corporate annual reports and the Security and Exchange Commission's library files. A dossier was then compiled about each company for checking and classifying returns.

The next step was the development of two forms of questionnaires, one for the senior data-processing executive, and one for the senior marketing executive in each of the selected companies. This was done and pretested on eight companies via personal interviews. The results were analysed, and some questions changed, deleted or added.

The final forms of the questionnaire along with personally-addressed letters and return envelopes were then sent to the appropriate executives in the 258 companies. A copy of the letter and questionnaire sent to the senior marketing executives are included in Appendix A to this Chapter, while those sent to the data-processing executives are presented in Appendix B. If replies were not received within a month, a follow-up letter and questionnaire were sent to delinquent firms, and another three weeks were allowed to pass before the non-responses were considered "lost". One hundred and thirty marketing executives replied, of whom 104 gave usable responses; 112 data-processing executives replied, and 108 responses were usable.

III CATEGORIZATION OF THE COMPANIES

The companies in the sample were grouped to allow comparison of and tests for significant differences in the responses. The categories used were:

1. Manufacturers of consumer goods (produced commodities and finished products which are bought and consumed or used by the general public rather than by industry);²

² Clark, D.T. and Gottfried, B.A. Dictionary of Business and Finance. Thomas Y. Crowell Company, New York.

2. Manufacturers of industrial goods; (producers of those products and commodities which are bought and consumed or used by industry, rather than by the general public); ²
3. Middleman (retailer or wholesaler): (a company which performs a function between the producer and consumer of goods); ²
4. Some combination of any of the above three categories.

These categories were chosen because companies in each have some common marketing problems which are different from those faced by other companies. For example: producers of industrial goods have a unique problem because the demand for their products is derived from the demand for consumers' goods; middlemen face a peculiar problem in demand creation because very often manufacturers of the goods they handle are trying to create demand for their products while the middlemen are trying to create demand for their specific stores.

The companies replying to the marketing executives' questionnaire were as follows:

- (i) industrial goods' manufacturers ... 29 companies
- (ii) consumer goods' manufacturers 25 companies

- (iii) industrial and consumer goods'
manufacturers 32 companies
- (iv) retailers, wholesalers, industrial
and consumer goods' manufacturers.. 8 companies
- (v) retailers and wholesalers 4 companies
- (vi) retailers, wholesalers and
consumer goods' producers 3 companies
- (vii) retailers, wholesalers and
industrial goods' producers 3 companies

Because relatively few firms are in the last four categories, they are combined in the analysis under "integrated middlemen", as retailing and wholesaling is a common activity.

The companies replying to the data-processing executives' questionnaire were as follows:

- (i) industrial goods' manufacturers ...27 companies
- (ii) consumer goods' manufacturers34 companies
- (iii) industrial and consumer goods'
manufacturers24 companies
- (iv) retailer and wholesaler 3 companies
- (v) retailer, wholesaler and consumer
goods' producers 7 companies
- (vi) retailer, wholesaler, industrial
and consumer goods' producers13 companies

Again, because of the relatively few responses in the last three categories, in which the common ingredient is retailing and wholesaling, they were grouped under "integrated middlemen",

IV ANALYSIS OF THE RESPONSES

All the usable responses from both forms of questionnaires were coded, punched on cards and analysed via a multivariate tabulation program. A number of cross-references were made for each questionnaire form according to the type of company responding and in the case of the marketing executive form, according to whether the questionnaires were completed by a marketing department or a data-processing department employee. This latter cross-tabulation was made as many marketing executives did not fill in their questionnaire but rather depended upon a data-processor to do it.

Table I shows the tabulation of the replies to the marketing executives' questionnaire for the types of companies responding and departments' employee completing it. Here it can be seen that over 50% of the identifiable responses were

Chapter II - Table I

Analysis of Replies to the Marketing Executives' Questionnaire
According to
Type of Company Responding and Department Employee Completing it.

DEPARTMENT	TOTALS NUMBER RESPONDING	%	INDUSTRIAL GOODS' MFG.	CONSUMER GOODS' MFG.	INDUSTRIAL AND CONSUMER GOODS'MFG.	INTEGRATED MIDDLEMAN
Respondents	104	100	29	25	32	18
Marketing Executive	38	37	11	10	13	4
Data-Processing Executive	40	38	12	10	10	8
Not Identified	26	25	6	5	9	6

were completed by data-processing employees. One could speculate that a communications problem exists in these cases. This lack of communication probably has resulted in the marketing department's employees not having adequate knowledge or confidence about computer usage, and hence, perhaps causing them to refrain from much use of a computer.

This dependency does, however, provide the opportunity for comparing answers to the same questions from each department, and meaningful differences are highlighted in the following chapters.

For the quantitative questions on both questionnaire forms, the means and standard deviations were calculated. The Students' "t" test was used to see if there were any significant differences in the answers from the various groups. A 95% confidence level is used in this study as the standard for considering whether the differences are significant.

V CLASSIFICATION OF THE APPLICATIONS

Many replies included as separate computer applications analyses that are really part of a more general marketing

application. For example, sales by product, market, census tract, or brand were listed by some as separate analyses but are considered in this study as part of the general application, Sales Analysis. Also, some companies considered forecasting by market, volume, price, and customer as different applications, but these are grouped under the general application, Market Forecasting. Because of the overlap of numerous analyses, and because many replies referred to the same type of application by various names, the applications listed by the respondents were reclassified. Seventeen categories were delineated under five broad marketing areas. Each specific application within the 17 categories is explained in Chapter IV.

These areas of applications are as follows:

1. SALES MANAGEMENT

This group of applications is defined as those analyses made on a computer that pertain to the management of sales and the sales force, and about which the sales manager should have intimate knowledge of the data generated in order to perform his job correctly. The specific applications included here are:

- (i) Sales Analysis,
- (ii) Sales Management Analysis,
- (iii) Sales Territories Analysis,

(iv) Service Policies Analysis.

2. PHYSICAL DISTRIBUTION MANAGEMENT

This general area refers to those computer analyses pertaining to the movement and storage of goods. The specific applications are:

- (i) Distribution Channels Analysis,
- (ii) Physical Distribution Management Analysis,
- (iii) Inventory Management Analysis.

3. MARKETING MANAGEMENT

The applications included here refer to uses of a computer for analyses about areas other than sales management with which marketing managers would be concerned, and not included in the other general headings. This is also somewhat of a sundry category. Such specific applications include:

- (i) Marketing Planning Analysis,
- (ii) Market Forecasting Analysis,
- (iii) Marketing Management Analysis
(specific applications),
- (iv) Advertising Analysis.

4. FINANCIAL MANAGEMENT IN MARKETING

This general group of applications involves the use of a computer for analyses about monetary considerations in marketing. Included in this group are such applications as:

- (i) Distribution Costs Analysis,
- (ii) Pricing Analysis,
- (iii) Credit Administration Analysis,
- (iv) Financial Analysis of Marketing.

5. RESEARCH

Here the applications of a computer all have to do with research activities in marketing in which a company may be involved. The specific applications are:

- (i) Marketing Research Analysis,
- (ii) Operations Research Analysis.

Some of the above categories are not mutually exclusive. For example, parts of Sales Territory Analysis could be considered in Marketing Research Analysis. There are also questions regarding the groupings of some of the classifications - e.g., should Distribution Cost Analysis be included in Physical Distribution Management or in Financial Management of Marketing? These nebulous areas were minimized wherever possible, but because of the nature of market activities some overlap is bound to exist.

The data analysed regarding each application include:

- (i) number of companies using it, the average time used, and the respective rankings,
- (ii) individual analyses included in the more general application,
- (iii) degrees of satisfaction experienced by the users,
- (iv) availability of library or package programs,
- (v) whether the difference in the means between each category (sub-sample) is significant.

This information is included in the write-up of each analysis so that all relevant data about an application is available in one section.

VI LIMITATIONS OF THE STUDY

1. Lack of Cooperation from Corporations

Some companies feel their use of EDP in marketing is a strong competitive advantage, so were reluctant to divulge this proprietary information. Every reasonable attempt was made to secure the cooperation of all firms. They were assured that the information would be confidential and that no firms would be identified in the final report. But despite the assurances, some companies still refused to provide any data.

2. Basis for the Selection of Participants

Because of the large number of companies now using a computer for marketing analyses, not all possible companies or uses were studied. Nor was the sample drawn from all the users on a random basis. Corporations were selected because they were considered leaders in using computers in marketing. Many companies included are members of Fortune's 500 largest corporations. This is probably because their marketing activities are so large and involved that they would seek the use of a computer earlier than would smaller companies. Also, they could afford the large initial investment and operating costs of EDP.

3. Incomplete Information

In computer applications, as in most scientific fields, there are many people trying different approaches to the same subject, but some of these newly developed approaches have not been made public. For example, a company may have been developing or employing a specific application but be unwilling to divulge the information. Similarly, an academician may be working on new techniques but has not yet published

any data about them. Furthermore, many computer companies have done market research studies about the uses of their equipment, but have kept these findings confidential.

4. Approach to the Subject

As mentioned earlier, this study is not a technical analysis of specific applications, nor does it develop the programs for any new applications. Rather, the orientation to the subject is managerial and its aim is to assist top marketing management.

5. Unreliable Information

In some cases the individuals completing the questionnaires could have included wrong information. Some of the questions may have required data unfamiliar to the respondents because the event might have been happening longer than their tenure in a department, or because the data required would have necessitated the respondent to cross traditional department boundaries. An example of the former is the situation where a person claimed that marketing had been using the computer for 15 years. From the literature search, it was

found that computers had been used in business only since 1954³ and this research was conducted 11 years later. An example of the latter weakness in data is the return from a company that does not allow individual department employees to know how the marketing department is charged for computer time.

6. The Use of Statistics

(a) Calculation of Averages

Because it was believed unlikely that companies had been using computers longer than 10 years in marketing, no allowance was made for the replies which indicated more than 10 years. Although some replies did claim usage for a longer time, their answers were included in the bracket, 10 years. In calculating statistics of time used, the midpoints were employed. For example, the value of 3.5 years was used to represent those companies using a computer in marketing between three and four years.

(b) Use of the Students "t" Test

This statistical tool is designed for determining

³ Same reference as footnote 4, Chapter I

the significance of differences between means for random samples. As mentioned above, the basis for choosing the companies was not random. But if the population from which the replies were received is considered as the 258 chosen companies then the use of the "t" test is legitimate.

Also, this statistical tool is intended for use in non-paired samples. Since about 50% of the replies to the marketing executives' questionnaire were from companies also represented in the replies to the data-processing questionnaire, the values received by using a "t" test are more conservative than if the two sub-samples were unpaired.

7. Interpretation of the Term "Computer"

The meaning of this term has been kept as broad as possible. It refers to "an internally stored programmed digital or analog computer or electronic calculator (e.g., IBM 1401, Univac 1004) but not including key driven accounting or book-keeping machines". In the replies reference was made only to digital computers, because most marketing executives are neither

familiar with analog computers nor aware of how they could be employed in marketing.

CHAPTER III

LITERATURE SEARCH

The literature on computers is increasing rapidly, but unfortunately little of it, so far, deals directly with applications in marketing. Most of it is about the development of models, systems analysis, and other Operations Research techniques, and is either highly theoretical or describes non-marketing applications. The few items about marketing are for the most part recondite articles written by and for operations researchers. Therefore, this study, written for laymen, should help bridge this information gap.

The books on computer applications in marketing deal primarily with specific mathematical models useful in marketing. It is almost as an after-thought that computers are mentioned as being useful, even necessary, to do the calculations required. The book Marketing and the Computer¹

N.B. All footnote references are at end of this Chapter.

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is of this nature. The editors have put together papers by 37 authors, dealing not so much with computers in marketing as with models in marketing. For the most part these essays are descriptions of models for some marketing problem or process. The subjects discussed are information and computers, physical distribution analyses, planning, forecasting, marketing games and control systems. But the relevance and usefulness of the computers is largely unexplored. What the book does do is pull together some of the modern management science concepts and techniques as they apply to marketing problems. There is, however, one paper (Chapter II, Part V, pp. 405-422) that deals with the subject of this research, Richard F. Neuchel's "The Nature and Extent of Computer Usage in Marketing Operations and Decision Making". It summarizes a study conducted by McKinsey & Co., management consultants, and the full study is discussed below.

Two examples of books dealing mostly with advanced mathematical techniques are Mathematical Models and Methods in Marketing² and Mathematical Models and Marketing Management³. The former has articles by nine contributors on such areas as: background on the use of models, models of consumer behavior, models for selection of promotional

expenditures, sales forecasting and inventory models. The book is useful in bringing together some previously published works about the topics, and each paper is bracketed by an editorial comment and mathematical appendix. The second book, Mathematical Models and Marketing Management, is divided into three parts. The first is an introduction to mathematical models regarding basic concepts and model-building. In the second part, five case histories show the use of models in various industries and for various areas such as advertising, pricing, and sales force allocation. The third part is about problems in developing and applying mathematical models to marketing. Numerous other books have been published about the use of quantitative techniques and models in marketing but the orientation of these is also towards the application of mathematical tools, and not necessarily towards the use of computers in marketing.

One book,⁴ describing a study that simulated the marketing process, is the result of empirical research of the distribution network for lumber from manufacturers to wholesalers to retailers. The data is analysed at two different points in time. The programs, decision rules, and models

used in this study are available in an appendix -- as well as an indication of the costs (\$100,000.) and time (8 man years).

Many books have been published about Operations Research, and some discuss the use of Operations Research in marketing. They include: Executive Decisions and Operations Research by Millar and Starr⁵, Operations Research Models, by de Roccoferrera⁶, Operations Research in Management, by Eddison, Pennywich, and Rivett⁷. Numerous other books on Operations Research are also available but pertain to Operations Research in business, and not specifically to Operations Research in marketing.

A number of bibliographies have also been published about the use of Operations Research and mathematical models in marketing. The major one on Operations Research is by Batchelor⁸, which is a three volume work (to date) annotating all work published in this field from 1952 to 1962. This bibliography has many references to Operations Research in marketing. Buzzell's bibliography⁹ is a selective one on mathematical methods and their applications to marketing

problems. The "methods" section lists some 90 books and articles, covering such techniques as decision theory, mathematical programming, queing theory and simulation. The "applications" section has about 110 entries on applications of mathematical models to such areas as planning and allocation of sales effort, inventory control, consumer behavior and physical distribution. But to date no bibliography has been published about computer applications in marketing, per se.

The one study most closely related to the topic of this research is that published by McKinsey & Co., management consultants¹⁰. It gives the results from a survey of 27 large companies, who were leaders in their respective 13 industries. The computer applications are not limited to marketing, but cover a number of business functions including: Manpower and Production Scheduling, Sales Forecasting, Inventory Management, Marketing Information, Marketing Management, Material Procurement, and Quality-Control Information. The results from these applications were divided into "above average", and "average" for: cost reduction, operating savings, increased speed, and new operating information. Over two-thirds of

the companies claimed only mediocre results from their use of EDP. Further, the study shows that the "above average" companies have the EDP department one or two echelons down from the chief executive, while the "average" companies generally have it two or three echelons down.

Two studies assess the use of data-processing in industry. One was sponsored by the Financial Executives Research Foundation (FERF)¹², but in this the emphasis is on accounting and financial uses of computers. The other, published by the American Management Association, is Data-processing Today: A Progress Report.¹³ It describes a few computer applications used by large companies. The areas of business covered are: control of chemical processes, production, airlines scheduling, order billing, and sales planning.

Publications describing the use of computers in a managerial way include: How to Live with Your Computer¹⁴, Management Uses of the Computer¹⁵, and "Non-Computer Aspects of Computer Applications"¹⁶. The common theme in these is that before management commits their companies to the use of

EDP, or to specific applications of EDP, the following key questions should be considered: Do the proposed applications provide a worthwhile advantage over the present methods of analysis? What should be the organizational relationships of the data-processing department -- within the framework of the company and within the data-processing department? Do the computer people really know what is expected of them? Is the present data adequate? Who will use the output, and how?

Many articles have been published on the use of EDP in marketing, but most of these, like the books, deal with the background and development of models, or specific mathematical models. Typical articles are: "The Role of Models in Marketing"¹⁷, "The Use of Mathematical Models in Marketing"¹⁸, and "An Appraisal of Markov Brand-Switching Models"¹⁹. But, as one knowledgeable author writes, "Model building in Marketing has been oversold in the past, at least insofar as the state of development of the art has not been equal to some of the publicity",²⁰

A few articles describe specific marketing applications of computers in both the "professional literature" (e.g., Journal of Marketing, Harvard Business Review, and Operations Research) and in the more "popular" type of business publication: (i.e., Business Week, Time, Sales Management, and Industrial Management). Most of the articles describe successes experienced by corporations with one or two specific applications, or they discuss the future effect of computers on marketing.

An example of the success type of article in the "popular" literature is "The Computer's Newest Conquest: Marketing" in Business Week, April 17, 1965²¹. This article gives a very optimistic view on the use of computers in marketing, and makes grandiose statements about results to date. The cases cited are true, but only the successes are mentioned, without much indication of the expense, time and frustration involved. The article gives the impression that EDP is a panacea for marketing problems. And the applications described are only in limited areas of marketing. For example, in Inventory Management for retailers:

". . . at J.C. Penney stores across the country, a chain of events begins that reflects the changing nature not only of retailing but of every other marketing practice.

"The small, punched tickets that have been taken off merchandise sold during the day are dispatched to either New York City or Los Angeles. There the tickets, coded to describe the merchandise to which they were attached until it was sold, are fed into machines that transfer the information to punched cards. From cards, the data can be put on magnetic tape or fed directly into electronic digital computers.

"Every two weeks, a computer will match a store's planned stock level against merchandise sold in that store; and, when a store needs merchandise, the computer will send out an order to buy, along with shipping instructions.

"A retail store doesn't have to be as large as Penney -- 1,700 stores and \$2-billion annual sales -- to use computers in this way to control its stock level and ordering procedures. A score or so of stores around the country are using some variant of the system. In fact, some local chains, such as Woodward & Lothrop in Washington and Goldblatt Bros. in Chicago, use more complex and sophisticated systems to give them daily reports of stocks and sales.

"The importance of what Penney and other companies are doing is simply this: They are turning the computer with its fantastic computational speed into a new marketing tool. It may be just a big adding machine, as is often said, but it adds at a speed that hardly gives a man a chance to have a second thought."

In wholesaling:

"At Beals, McCarthy & Rogers, Inc., a large Buffalo industrial distributor, the combination of computer-managed inventory and Data-Phone ordering in the past

four years has meant a reduction in inventory of \$200,000 and a sales increase of more than \$2-million, according to Frederick L. Davis, the company's marketing manager."²³

And in other uses:

"Too late? Strictly marketing uses of EDP going beyond inventory management, are still uncommon in U.S. business. But those who have sampled its magic are convinced the hour is late for the laggards. In a shockingly matter-of-fact way, a department store man in an Eastern metropolis says: "Our competition is finished; they can't compete with us any more. They started too late with their (EDP) systems and now we are getting so much of the business they'll never be able to afford the system to do the job.

"His competition is about as old, as well-established, and as outwardly prosperous as his own store. But in the age of the computer, the hands on marketing's clock are at half-past eleven -- 30 minutes before the witching hour. The use of EDP is about to become routine in many marketing operations which until now have defied systemization."²⁴

Although the article mentions other applications, the successes cited pertain to Inventory Management. The article states, "It's (the computer) better than a crystal ball",²⁵ and predicts an ideal, completely automated store is on the way through computers and vending machines. The fact is that a number of stores have tried this approach in the past 30 years, and failed, because such automation neglects the most important factor in marketing -- customers

and their feelings.²⁶

The article concludes:

"Gleaming vistas. This (computer usage) opens vistas that gleam so brightly that any marketing man has to shield his eyes to avoid snow blindness. New product performance could be gauged day-by-day and promotion money employed for maximum effectiveness. A product that isn't going to make it could be withdrawn from the market before it hurt either profits or reputation significantly. When you know precisely what is selling where, and when, you can identify your customers, plan future promotions intelligently, simulate all sorts of situations."²⁷

Other equally optimistic articles are appearing more frequently in popular literature, and from these exaggerated claims for computers in marketing are created.

Many of the articles in the "professional" journals also contain prognostications about EDP in marketing, but the tone is more down to earth. Examples of this type are two articles by Richard C. Christian²⁸ in the Journal of Marketing. Christian predicts EDP will cause big changes in marketing such as: automated purchasing, systems buying, reduced personal selling, inter-computer communication, reduced product life cycle, and "digested" trade papers. Similar hypotheses are in an article by Marshall C. Lewis,²⁹

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N.F. Pensiro,³⁰ and others.

However, not all the literature on EDP is filled with only loose generalities. Some articles describe specific applications, and these will be discussed below. But before a company can successfully apply computers in marketing, management should consider business operations as a system of interactions. "The systems approach is fundamental to ... the application of computers".³¹

"Under the systems concept marketing institutions and operation are viewed as complex, large-scale, dynamic action systems. A marketing system is comprised of a group of marketing elements and operations which are interrelated and connected and can be delineated conceptually or physically.

"The characteristic which differentiates a system from a jumble of parts and pieces is that they form a coherent group. Systems thinking, therefore is based on the integration and coordination of marketing activity."³²

There are many published works about systems thinking and its role in analysing business activity. The most comprehensive treatment of the subject is Industrial Dynamics,³³ by Jay Forrester. His model of a marketing system recognizes six basic flows such as: money, materials,

customer orders, and flows of various types of information, all focusing on some points within the system. This systems approach can teach much about the way marketing activity responds to its environment. The logic in the analysis is based on delays in the system and the amplification of the delayed responses in a way that frequently distorts the true meaning of the signal from the market place. Forrester shows how small changes in the rate at which customer orders are received can be built up into the wide fluctuations of a self-generating cycle.

Other published works describing the use of the systems concept in management include Business Systems and the Computer,³⁴ Management Systems and Computer Applications,³⁵ The Art of Designing Management Systems,³⁶ and Real-Time Business Systems.³⁷ How one company uses systems thinking to help its executives analyse a variety of marketing problems is described in "Monsanto Chemical Co: A Total Systems Approach to Marketing".³⁸

Advertising is the most written about area of computer application in marketing. EDP can be used here to

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determine how much should be spent; where it should be spent (media types); within each media type what carriers (magazines) would give maximum exposure, and how many times; and in what issues the advertisements should be placed. But the use of computers cannot tell what copy or specific ad is best. Linear programming is the most commonly used mathematical technique for analysing advertising expenditures, but more recently some heuristic programming is being used (a technique that enables the program to benefit from previous decisions).³⁹ Examples in the literature of linear programming are: "An Exploration of Linear Programming in Media Selection",⁴⁰ "Media Selection by Linear Programming",⁴¹ "Use of Linear Programming to Optimize Media Schedules in Advertising",⁴² and "A Simple Model for Determining Advertising Appropriations".⁴³ Examples of heuristic programming for advertising analysis are in "Practical Media Decisions and the Computer",⁴⁴ "How Practical is the Media Model",⁴⁵ "How Advertising Performance Depends on Other Marketing Factors",⁴⁶ and "A Model for Budgeting Advertising".⁴⁷

Another well-documented area of computer employment in marketing is Physical Distribution Management.

Here some rather startling success stories have been described. The savings made possible because of computer analyses are in the area of inventory, transportation and facilities location. Examples of articles describing the use of EDP in Physical Distribution Management are:

"Simulation: A Tool for Better Distribution",⁴⁸ "Monte Carlo Determination of Stock Redistribution",⁴⁹ "The Computer Takes Over",⁵⁰ "Automation in Marketing",⁵¹ "A Heuristic Program for Locating Warehouses",⁵² and "The Case of 90% Satisfaction".⁵³

New Products planning has also been subjected to computerization. But many companies have not publicized this activity. One program, DEMON, has been written up fairly extensively as it was developed by an advertising agency, (B.B.D. & O.) and the use of it can be purchased by industrial companies. The articles describing this application include "DEMON: A Management Planning and Control System for Successfully Marketing New Products",⁵⁴ "DEMON-New Product Planning: A Case History",⁵⁵ "Plans, Profits and the Marketing Program",⁵⁶ "What DEMON Means to Business

Management".⁵⁷ A good, though esoteric, article about scheduling of new product development by Yung Wong is "Critical Path Analysis for New Product Planning".⁵⁸ And one was written describing a program employed by Abbot Industries for selecting R & D projects on a discounted future profits basis.⁵⁹

Writers have also discussed the application of EDP for sales forecasting. The mathematical techniques used here include time series analysis, correlation and regression analysis, exponential smoothing analysis, and seasonal indices analysis. One monograph and three articles have been written on time series analysis by Robert L. McLaughlin.⁶⁰ Other useful treatises about sales forecasting with computers include "Improved Forecasting Through Feedback",⁶¹ "A Disaggregated Model for the Generation of Sales",⁶² "Electronic Computers & Business Indicators",⁶³ and "Tests and Revisions of Seasonal Adjustments".⁶⁴

About the importance of using computers for planning the late Wroe Alderson says:

"Marketing Management is caught in a dilemma. Churchman⁶⁵ and Forrester⁶⁶ say that you cannot understand the (marketing) process except as a total system. Yet the total system is beyond the grasp of most people in the company since they have spent years specializing in some component sub-system. The answer doubtless lies in new ways of studying total systems. One way is to match inputs with outputs probably with the use of computers to work out all the possible combinations. Another way is to look at marketing campaigns or programs as identifiable outputs. The ability to mount a program is an index of marketing capacity. It may be that the constraints affecting these programs can only be discovered by simulating (by computers) the programs themselves."⁶⁷

Other articles on the use of computers for marketing planning include: "Marketing Models for Long Range Planning",⁶⁸ "Operational Systems for Short Range Planning",⁶⁹ "The Critical Path Method - Marketing Tool for Profit",⁷⁰ and "The Computers Place in Business Planning: A Bayesian Approach".⁷¹

Closely associated with the use of EDP for planning is the development of Marketing Information Systems (MIS). But this application is very much in its infancy. Donald F. Cox and Robert E. Good of Harvard University state in an unpublished paper, "Marketing Information Systems: A Progress Report on the State of the Art 1965", "They aren't

here yet: But they are coming!" Other works about MIS imply that some companies are already successfully employing computers here. These works include: Management Information Systems and the Computer (2 case studies);⁷² "A Basic Marketing Information System - A Case Study in the Economical Use of Computerized Management Information Systems";⁷³ Computer-Based Management for Information and Control;⁷⁴ Computers, Information and Business Decision Making;⁷⁵ "Management Systems and Computer Applications";⁷⁶ "Marketing Information Systems: The Informational Role of Prices";⁷⁷ and "Data Systems that Cross Company Boundaries".⁷⁸

Research activity in marketing has also been subjected to EDP. The earliest write-up of this application found was "The Use of Electronic Computers in Marketing Research"⁷⁹ in 1958. Others include "Interviewing Costs in Survey Research: A Computer Simulation Study";⁸⁰ "Electronic Computers - A Boon to Survey Research";⁸¹ and "The Use of Credit Accounts & Computers in Determining Store Trading Areas."⁸²

The literature on the use of Operations Research in Marketing is difficult to isolate because common Operations

Research techniques are used to make analyses of many different areas of business. For example, Operations Research techniques are used for production management, physical distribution management, and financial planning. However, there are some articles about the general use of Operations Research in marketing. One such article is "A Closer Look at Operations Research",⁸³ in which the author explains that Operations Research is important in today's business because of (a) growth, (b) pace. By using Operations Research, management can integrate the many factors involved in a business system. Also explained in this article is "The Operations Research Approach":

(1) identify the problem, (2) make mathematical model of situation, (3) quantify the problem variables, (4) reduce variables to workable format, (5) manipulate the model, (6) analyse the results, (7) evaluation of potential decisions based on results of analysis. The author explains some of the Operations Research techniques that are feasible in marketing. Similar writings include: "Evaluating Competitive Marketing Strategies through Computer Simulation";⁸⁴ and "Simulation for Decision Making in Marketing".⁸⁵

The experience of a few companies in using EDP for controlling marketing costs has also been recorded, as in the two articles, "Linear Programming for Marketing Cost Reduction",⁸⁶ and "Methods of Measuring Marketing Productivity".⁸⁷ Pricing decisions may also be analysed by EDP. A case study of this is "Bayesian Decision Theory in Pricing Strategy",⁸⁸ in which the author describes how a large chemical manufacturer calculated the most likely profitable price to charge.

Business games are an education tool in marketing which EDP has made practical. Here a marketing situation is simulated, and artificial companies compete in the market. Published reports of this application are: Business Simulation Games;⁸⁹ "Simulators & Games as Education Tools for Decision Making";⁹⁰ and a "Survey of Marketing Games".⁹¹

Models are an integral part of using EDP in marketing. In order to make good decisions about alternative possibilities, consideration must be given not only to models about the internal workings of a company but also to models about how customers will react to certain decisions. Examples of the literature about consumer models are: "A

Mathematical Model of Consumer Behavior",⁹² "Stochastic Process Models of ConsumerBehavior",⁹³ "Computer Simulation of Consumer Behavior",⁹⁴ and "The Dynamics of Brand Loyalty: A Markov Approach".⁹⁵

In conclusion, an exhaustive search of the literature reveals a large number of articles, but they cover only ten areas of marketing. Any additional citations would only refer to applications already mentioned.

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CHAPTER IV

ANALYSIS OF REPLIES TO THE MARKETING

EXECUTIVE QUESTIONNAIRE - PART I

PRESENTLY USED APPLICATIONS

In the next two chapters an analysis of the questionnaires sent to senior marketing executives is presented. This chapter deals with the length of time computers have been used by the marketing function of the responding companies and with the various marketing analyses made (referred to in this study as "computer applications"). The next chapter deals with organizational and administrative problems associated with computer usage in marketing.

I. NUMBER OF YEARS COMPANIES HAVE USED A COMPUTER IN MARKETING

In Table I the distribution of the length of time computers have been used in marketing is shown. The mean number of years is 6.7, and the standard deviation is 2.9 years. The industrial goods' manufacturers have used a computer in

Chapter IV - Table I
Distribution of the Number of Years the Marketing Function has Used EDP

NUMBER OF YEARS USED	TOTALS			INDUS- TRIAL GOODS* MFRS.	CON- SUMER GOODS* MFRS.	INDUS- TRIAL & CONSUMER GOODS* MFRS.	INTE- GRATED MIDDLE- MEN	QUESTIONNAIRES COMPLETED BY		
	NO.	%	% CUM.					MARKETING DEPARTMENT EMPLOYEES	DATA- PROCESSING DEPARTMENT EMPLOYEES	DEPARTMENT NOT INDICATED
Number of Respondents	104	100	-	29	25	32	18	38	40	26
1 Year or less	1	1	1	-	-	-	1	1	-	-
> 1 but ≤ 2	4	4	5	3	1	-	-	2	2	-
> 2 but ≤ 3	3	3	8	1	-	1	1	-	1	2
> 3 but ≤ 4	12	11	19	4	4	4	-	6	5	1
> 4 but ≤ 5	12	11	30	3	3	6	-	4	4	4
> 5 but ≤ 6	16	16	46	7	4	2	-	4	9	3
> 6 but ≤ 7	12	11	57	3	1	5	3	5	4	3
> 7 but ≤ 8	11	11	68	2	2	2	5	5	4	2
> 8 but ≤ 9	7	7	75	-	5	2	-	2	1	4
> 9 but ≤ 10	4	4	79	1	1	-	2	-	3	1
10 years or More	21	20	99	4	4	10	3	8	7	6
Did not answer	1	1	100	1	-	-	-	1	-	-
Mean	6.67	-	-	5.75	6.74	7.16	7.14	6.47	6.51	7.19
Standard Deviation	2.89	-	-	2.87	2.79	2.99	2.78	3.05	2.83	2.80

marketing an average of 5.8 years; consumer goods' manufacturers an average of 6.7 years; companies producing both industrial and consumer goods have used a computer in marketing an average of 7.2 years, and the integrated middlemen's average is 7.1 years.

There is no significant difference, at a 95% confidence level, between the mean times the various types of companies have been using computers in marketing.

Both the marketing department employees and the data-processing department employees indicate marketing has used a computer for about 6.5 years. Thus, there is no significant difference between these means. The responses that could not be identified by department employees completing them show a mean time of 7.2 years and standard deviation of 2.8 years. The difference between this mean and the other two is also not significant at a 95% level. Thus, the marketing department employees and the data-processing department employees both feel that marketing has used a computer for about the same length of time.

II . WHAT COMPUTER APPLICATIONS DOES THE MARKETING FUNCTION
OF YOUR COMPANY NOW USE?

. HOW LONG HAS EACH OF THESE APPLICATIONS BEEN IN USE?

The replies to these questions are tabulated in
Tables IV to XXII, inclusive. The number of applications
used by the companies are discussed below.

A. NUMBER OF APPLICATIONS USED

As pointed out in Chapter II, many responses included
as separate applications the different breaks, cross analyses
or sections, that a company may use from a single application.
For example, one company may have included sales analysis by
territory, by branch, by salesman, by census tract, etc., as
separate applications. But these sub-parts of a specific
application have been grouped and considered as a single
application - in the above example, "Sales Analysis". Table II
shows the number of applications each respondent listed. This
number is then compared to the number of applications being
used once the answers were grouped into the 17 applications
delineated in this study.

The average number of applications listed by the 104

Chapter IV - Table II

Distribution of the Number of Computer Applications the Marketing Function now Uses
As Listed by Responding Companies

NUMBER OF YEARS USED	TOTALS			INDUS- TRIAL GOODS, MFRS.	CON- SUMER GOODS, MFRS.	INDUS- TRIAL CONSUMER GOODS, MFRS.	INTE- GRATED MIDDLE- MEN	QUESTIONNAIRES COMPLETED BY		
	NO.	%	% CUM.					MARKETING DEPARTMENT EMPLOYEES	DATA- PROCESSING DEPARTMENT EMPLOYEES	DEPARTMENT NOT INDICATED
Respondents	104	100	-	29	25	32	18	38	40	26
No applications listed	2	2	2	1	1	-	-	1	1	-
1 application	4	4	6	-	1	1	2	2	1	1
2 applications	8	8	14	5	-	3	-	4	3	1
3 applications	16	15	29	3	4	3	6	2	9	5
4 applications	14	13	42	5	3	5	1	8	3	3
5 applications	17	16	58	4	5	6	2	6	5	6
6 applications	24	23	81	5	6	10	3	8	10	6
7 applications	9	9	90	5	1	1	2	4	4	1
8 applications	6	6	96	1	2	3	-	3	1	2
9 applications	1	1	97	-	1	-	-	-	1	-
10 or more	3	3	100	-	1	-	2	-	2	1
Mean	4.84	-	-	4.55	5.12	4.91	4.78	4.68	4.90	4.96
Standard Deviation	2.13	-	-	2.03	2.32	1.80	2.62	2.05	2.31	2.01

respondents is 4.8. This statistic for the replies from each sub-sample is also shown in Table II. At a 95% confidence level, there is no significant difference between any of the means in each group. Thus, the variations in the average number of applications indicated by each sub-sample can be considered chance variations.

Once the computer applications listed as being used by the marketing department were re-grouped into the 17 categories, the average number of applications per reply, as shown in Table III, is 4.0, and this distribution has a standard deviation of 1.66. The means and standard deviations for the sub-samples, according to types of company responding and departments' employee completing the questionnaire are also indicated. The difference between the means for each of the groups are likewise tested for significance. The level of confidence at which these differences became significant are all below the 95% confidence level. Thus the variations between these means can also be considered chance differences due to sampling error.

Chapter IV - Table III
 Distribution of the Number of Categories of Applications Mentioned
 as Being Used in Marketing by Responding Companies

NUMBER OF CATEGORIES LISTED	TOTALS			INDUS- TRIAL GOODS, MFRS.	CON- SUMER GOODS, MFRS.	INDUS- TRIAL CONSUMER GOODS, MFRS.	INTE- GRATED MIDDLE- MEN	QUESTIONNAIRES COMPLETED BY		
	NO.	%	% CUM					MARKETING DEPARTMENT EMPLOYEES	DATA PROCESSING DEPARTMENT EMPLOYEES	DEPARTMENT NOT INDICATED
Respondents	104	100	-	29	25	32	18	38	40	26
No areas listed	2	2	2	1	1	-	-	1	1	-
1 area listed	5	5	7	1	1	1	2	2	1	2
2 areas listed	8	8	15	4	-	3	1	4	4	-
3 areas listed	29	28	43	8	5	9	7	6	13	10
4 areas listed	21	20	63	6	8	6	1	12	5	4
5 areas listed	19	18	81	5	5	5	4	7	8	4
6 areas listed	12	11	92	2	3	6	1	4	4	4
7 areas listed	7	7	99	2	2	2	1	2	4	1
8 areas listed	1	1	100	-	-	-	1	-	-	1
Mean	4.0	-	-	3.72	4.2	4.16	3.89	3.92	4.0	4.12
Standard Deviation	1.66	-	-	1.67	1.63	1.57	1.91	1.62	1.71	1.70

B. THE APPLICATIONS AND THEIR RANKINGS

The computer applications¹ indicated as being used by the marketing function are listed in Table IV. The number of respondents using each application and the average time they have used it are also shown. The second mean calculated for the applications is the total length of time each has been used, divided by the total number of respondents (users as well as non-users). This latter mean is considered a better indication of the average length of time an application has been used by the population of the 258 companies as it includes non-using companies as users for zero time. The applications are also ranked for the various statistics shown in the Table. The first column of rankings is according to the number of companies using each application, from the most frequently mentioned to the least. Inventory Management is the highest ranked, with 60 companies using it, and Sales Analysis is a close second with 58 companies. Distribution Channels and Service Policies analyses are used by the fewest number of companies (5).

¹ In the rest of this chapter, "applications" refer to the 17 re-organized applications, and not to all the individual applications listed by the respondents, unless so indicated.

Chapter IV - Table IV
 Rankings of the Computer Applications Used in Marketing
 by Number of Companies Using Them and by Average Time Used

APPLICATION	NUMBER OF COMPANIES USING	RANK	AVERAGE TIME USED			AVERAGE TIME USED FOR ALL RESPONDENTS		
			MEAN	STD. DEV.	RANK	MEAN	STD. DEV.	RANK
I SALES MANAGEMENT								
1. Sales Analysis	58	2	4.71	3.08	4	2.43	6.59	1
2. Sales Management	30	6	3.83	3.18	10	1.06	4.86	6
3. Sales Territories	52	3	4.10	2.92	8	1.90	5.82	3
4. Service Policies	5	16	5.30	3.35	2	.25	2.34	16
II PHYSICAL DISTRIBUTION MANAGEMENT								
1. Physical Distribution	17	9	4.06	3.54	9	.63	3.81	8
2. Distribution Channels	5	16	6.40	4.22	1	.31	3.26	13
3. Inventory Management	60	1	4.15	3.24	6	2.23	6.39	2
III MARKETING MANAGEMENT								
1. Planning	18	8	4.19	2.92	5	.73	4.03	7
2. Forecasting	42	5	3.44	2.89	13	1.40	5.01	5
3. Marketing Management	15	10	2.30	1.42	17	.33	1.96	12
4. Advertising	11	11	3.23	1.85	14	.34	2.67	11
IV FINANCIAL ASPECTS OF MARKETING								
1. Distribution Costs	9	12	5.00	2.83	3	.38	3.10	10
2. Pricing	6	15	3.83	3.56	10	.22	2.42	17
3. Credit Administration	9	12	3.50	2.78	12	.27	2.40	14
4. Financial Aspects	20	7	3.00	2.28	16	.58	3.13	9
V RESEARCH								
1. Marketing Research	48	4	4.12	3.16	7	1.50	5.99	4
2. Operation Research	9	12	3.06	2.74	15	.26	2.34	15

The average time each application has been used, as well as the respective ranks by the different criteria, are discussed in the following sections for each specific application.

The rank orders, according to the number of companies using an application, and according to the mean length of time an application has been used by all responding companies, have a very high co-efficient of correlation ($R = .95$). The length of time each application has been used (cross-sectional analysis) indicates, in a general way, the sequence (longitudinal analysis) that a company would use in putting the various marketing applications onto a computer. This ranking also approximately coincides with the "degree of sophistication" of the various applications.

C. THE SEQUENCE FOR INSTITUTING THE APPLICATIONS

Perhaps a more useful way of determining the sequence the companies have gone through in instituting computer applications is to analyse the data by length of time they have used a computer for marketing, and by when they started to use

each application. In Table V, the columns refer to the years the companies have used computers in marketing, and the rows refer to the various applications. The numbers in the cells show how many companies use each application in each year of their computer experience. Those companies employing a computer in marketing for one year or less use it for Sales Analysis and Inventory Management only.

As companies continue their employment of computers, they employ less standard applications. During the second year of computer usage in marketing, the number of different applications increases to eight, of which the most commonly used is Marketing Research Analysis (3 companies) and Sales Analysis (2 companies). The new analyses employed in this year are: Sales Management, Sales Territories, Distribution Channels, Market Forecasting, Marketing Management, and Marketing Research. In the third year of computer usage, Distribution Costs and Operations Research Analyses are added. The fourth year of computer use seems to be the "take-off" stage as here 44 applications are used by the responding companies compared to 2, 11 and 10 for the first three years respectively. The new analyses employed are: Advertising,

Chapter IV - Table V
 Distribution of the Length of Computer Experience in Marketing
 when Specific Applications are Used

APPLICATION:	One Year or Less	>1 ≤2	>2 ≤3	>3 ≤4	>4 ≤5	>5 ≤6	>6 ≤7	>7 ≤8	>8 ≤9	>9 ≤10	10 or More	TOTALS	Mean (Yrs)	Standard Deviation
<u>SALES MANAGEMENT</u>														
Sales Analysis	1	2	1	8	5	6	6	5	4	6	14	58	7.1	3.1
Sales Management	-	1	1	4	5	2	3	2	2	3	7	30	6.9	3.1
Sales Territories	-	1	2	5	3	8	5	8	6	6	8	52	7.1	2.8
Service Policies	-	-	-	-	-	-	1	-	-	-	4	5	10.1	2.0
<u>PHYSICAL DISTRIBUTION MANAGEMENT</u>														
Physical Distribution	-	-	-	2	3	1	1	3	2	2	3	17	7.3	2.6
Distribution Channels	-	1	-	-	1	-	-	-	1	-	2	5	7.3	4.2
Inventory Mgt. Analysis	1	1	1	6	6	9	8	6	3	7	12	60	7.1	2.8
<u>MARKETING MANAGEMENT</u>														
Planning	-	-	-	1	2	3	1	3	1	1	6	18	7.9	2.7
Forecasting	-	1	1	5	5	5	4	5	3	2	11	42	7.5	2.9
Marketing Management	-	1	-	3	2	2	1	3	2	-	1	15	6.2	2.5
Advertising	-	-	-	3	2	-	-	2	4	-	-	11	6.4	2.3
<u>FINANCIAL ASPECTS OF MARKETING</u>														
Distribution Costs	-	-	1	2	-	-	1	-	-	1	4	9	7.3	3.7
Pricing Analysis	-	-	-	-	-	2	-	1	-	2	1	6	8.0	1.9
Credit Administration	-	-	-	-	1	1	1	-	1	1	4	9	8.7	2.6
Financial Analysis	-	-	-	1	2	3	2	5	1	2	4	20	7.7	2.4
<u>RESEARCH</u>														
Marketing Research	-	3	2	3	5	7	6	2	5	3	12	48	7.0	3.1
Operations Research	-	-	1	1	-	-	2	-	1	1	3	9	7.8	3.2
TOTALS	2	11	10	44	42	49	42	45	36	37	96	414	7.2	2.9

Planning, Physical Distribution, and Financial Analyses.

The most commonly used applications during this fourth year are: Inventory Management, Forecasting and Sales Analyses.

During the fifth year only one new application, Credit Administration Analysis, is instituted. The most frequently added analyses in this year are: Inventory Management, Sales Management, Forecasting, Marketing Research, and Sales Analyses. During the sixth year, again only one new application, Pricing Analysis, has been added. The most popular applications in this year are: Inventory Management, Sales Territories and Marketing Research Analyses. The last application to be employed, Service Policies Analysis, is not instituted until the seventh year. After seven years of experience in using a computer in marketing, all 17 applications are being employed by at least one company.

III ANALYSIS OF THE INDIVIDUAL APPLICATIONS

A. SALES MANAGEMENT

1. Sales Analysis

The use of computers for assisting in Sales Analysis ranks first in the length of time employed (2.4 years), and second in the number of companies using it (58).

For the purpose of this study Sales Analysis includes: analysis of sales by product, brand, line, market, size and unit; sales to major accounts, all customers, different industries; sales statistics, history and seasonal patterns. The computer programs for such analyses are available from many computer manufacturers. They emphasize this application as one of the first to put on a new machine as it helps show customers the machine's immediate worth. The input data are available from sales invoices or records, and the output either is information marketing management would like to have immediately or which already is being developed by clerical staff. Computers generally can provide this information faster, cheaper and in greater detail than a clerical staff.

A danger in applying EDP to this area of marketing is that management often gets carried away by the amount of data that can be analysed and by the number of different ways it can be broken down. In some cases so much data are being printed by the computer, regarding Sales Analysis, that management becomes inundated. Where this is the case, marketing management might profitably have a clerical staff develop the data, because then they would have to decide what really needs analysis and on what priority.

Only 52% of the companies making Sales Analysis on a computer indicate this to be a very satisfactory application, while 38% feel it is only somewhat satisfactory, and 5% find it unsatisfactory. The remaining 5% did not give any indication. The companies satisfied with this application have, on the average, been employing it for over five years, while many of those less satisfied have been using a computer for Sales Analysis only a short time.

A possible explanation for the positive correlation between length of time used and satisfaction is because many companies that have used this application for a relatively

long time have modified the programs several times to make the analysis more meaningful. On the other hand, the newer users may be experiencing the problems of not receiving the data in an immediately usable form, or the analysis may be broken down into too much detail. Properly handled, this application should prove very satisfactory to all users.

In Table VI the replies from companies using a computer for Sales Analysis are tabulated. Fifty-six per cent of all respondents have their sales analyses done on computers, and have been doing so for an average time of 4.7 years. The distribution of time for this mean, however, is fairly spread out and it has a standard deviation of 3.1 years; the modal time is about 3.5 years. Both figures indicating the central tendency of the distribution are, interestingly, approximately two years less than the equivalent figures for the length of time the responding companies indicated using computers in marketing.

The mean time Sales Analysis has been used by all Companies is 2.5 years, which seems surprisingly low. But this average takes into consideration the fact that only 56%

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Chapter IV - Table VI

Distribution of Length of Time Companies have been Using Computers to Assist in Sales Analysis

NUMBER OF YEARS USED	TOTALS			INDUS-TRIAL GOODS, MFRS.	CON-SUMER GOODS, MFRS.	INDUS-TRIAL & CONSUMER GOODS, MFRS.	INTE-GRATED MIDDLE-MEN	QUESTIONNAIRES COMPLETED BY		
	NO.	%	% CUM.					MARKETING DEPARTMENT EMPLOYEES	DATA-PROCESSING DEPARTMENT EMPLOYEES	DEPARTMENT NOT INDICATED
Respondents: Total	104	100	-	29	25	32	18	38	40	26
Respondents: Sales Analysis	58	56	-	17	11	20	10	22	21	15
1 Year	6	6	6	3	-	2	1	2	1	3
>1 but ≤ 2 Yrs.	4	4	10	2	-	2	1	2	2	-
>2 but ≤ 3 Yrs.	8	7	17	-	4	3	1	4	4	-
>3 but ≤ 4 Yrs.	10	9	26	4	2	4	-	4	4	2
>4 but ≤ 5 Yrs.	7	7	33	1	1	3	2	3	2	2
>5 but ≤ 6 Yrs.	3	3	36	1	1	-	1	2	1	-
>6 but ≤ 7 Yrs.	5	5	41	2	-	1	2	1	3	1
>7 but ≤ 8 Yrs.	1	1	42	-	1	-	-	-	-	1
>8 but ≤ 9 Yrs.	2	2	44	1	-	-	1	-	2	-
>9 but ≤ 10 Yrs.	6	6	50	1	-	4	1	1	1	4
>10 Yrs. or more	3	3	53	-	1	1	1	1	1	1
Years not Indicated	3	3	56	2	1	-	-	2	-	1
Mean (of those indicating its use)	4.71			3.97	4.55	4.73	5.95	3.98	4.71	5.75
Std. Deviation	3.08			2.88	2.79	3.33	3.18	2.69	2.87	3.76

of the respondents are using this application.

In comparing the average time computers have been used to assist in Sales Analysis for the various types of companies and for the different departments' employees, no significant difference, at a 95% confidence level, is indicated.

2. Sales Management Analysis

The application of EDP to Sales Management Analysis ranks sixth in both the number of companies doing so (30) and the average length of time it has been used (1.1 years).

This application includes: sales measurement, sales reporting, customer records, sales statements, sales performance reporting, salesmen's reports, branch sales office reports, sales activity analysis, optimum prospects, sales coverage, sales administration, sales goals and quotas, and incentive payments. The computer programs for some of these applications are available from computer manufacturers but most companies had to develop the programs to fit their specific needs.

The degree of success with this application varies from very satisfactory, 55%; to satisfactory, 10%; and to unsatisfactory, 25%. The remaining 10% gave no indication in this regard. The surprising figure here is the relatively large number of companies not satisfied with Sales Management Analysis. There may be a number of reasons for the dissatisfaction, the foremost being that this application has not been used as long as some of the others. Second, each company has its own specific needs so there is no overall standard program in the case of Sales Analysis. Third, the successful use of the applications included in this group probably require salesmen and their immediate supervisors to change from established activity patterns. Many salesmen and sales managers may resist these necessary changes because they are old-time employees entrenched in their ways, because they feel their job security threatened by the computer, or because the computer is now doing some of the sales management analyses they previously did.

Most companies using this application have started doing so after they have used their computer for other marketing applications. The average length of time for using computers in marketing by the 30 companies employing it for

Sales Management Analysis is 7 years, while this application has been used an average of 3.8 years. Two companies did indicate instituting Sales Management Analysis within the first three years of computer use. But these "early" users are also among the companies not satisfied.

In Table VII a tabulation of the replies indicating use of Sales Management Analysis is presented. The average time used is 3.8 years, and the modal length of time is less than one year. Industrial goods' manufacturers have employed a computer for assisting in Sales Management Analysis, an average of 2.6 years; consumer goods' manufacturers have done so for 2.3 years'; manufacturers of both industrial and consumer goods have an average of 5.7 years; and the integrated middlemen average 3.5 years. A possible reason for the longer time that this application has been employed by companies producing both types of goods is that they have different salesmen, sales managers and branch offices for each type of product (i.e., one sales force to handle the consumer goods and a different one for the industrial goods). Where this is the case the task of sales management is much more complicated and thus these companies may have looked to computers

Chapter IV - Table VII
 Distribution of the Length of Time Companies have been Using Computers
 to Assist in Sales Management Analysis

NUMBER OF YEARS USED	TOTALS			INDUS - TRIAL GOODS* MFRS.	CON-SUMER GOODS* MFRS.	INDUS- TRIAL CONSUMER GOODS* MFRS.	INTE- GRATED MIDDLE- MEN	QUESTIONNAIRES COMPLETED BY		
	NO.	%	% CUM.					MARKETING DEPARTMENT EMPLOYEES	DATA PROCESSING DEPARTMENT EMPLOYEES	DEPARTMENT NOT INDICATED
Respondents Total	104	100	-	29	25	32	18	38	40	26
Respondents Sales Management	30	29	-	9	4	10	7	13	10	7
1 Year	8	7	7	3	1	2	2	4	2	2
> 1 but ≤ 2 Yrs.	1	1	8	-	-	-	1	-	-	1
> 2 but ≤ 3 Yrs.	6	6	14	3	2	1	-	3	3	-
> 3 but ≤ 4 Yrs.	2	2	16	-	1	1	-	-	2	-
> 4 but ≤ 5 Yrs.	3	3	19	1	-	1	1	2	-	1
> 5 but ≤ 6 Yrs.	3	3	22	-	-	1	2	2	1	-
> 6 but ≤ 7 Yrs.	1	1	23	-	-	-	1	-	-	1
> 7 but ≤ 8 Yrs.	1	1	24	1	-	-	-	-	-	1
> 8 but ≤ 9 Yrs.	-	-	-	-	-	-	-	-	-	-
> 9 but ≤ 10 Yrs.	3	3	27	-	-	3	-	1	1	1
10 Years or more	1	1	28	-	-	1	-	1	-	-
Years not indicated	1	1	29	1	-	-	-	-	1	-
Mean (of those indicating its use)	3.83			2.63	2.25	5.65	3.50	3.85	3.39	4.36
Standard Deviation	3.18			2.42	1.26	3.97	2.58	3.41	2.76	3.63

sooner for assistance. However, the differences between any of the means for the length of time the various types of companies have used a computer for Sales Management Analysis are not significant at a 95% confidence level.

For those replies which were completed by a marketing department employee, the average length of time used is 3.9 years and the data-processing employees indicate using Sales Management Analysis on a computer for 3.4 years. Here again, there is no significant difference between these means.

3. Sales Territory Analysis

Use of a computer for Sales Territory Analysis ranks third according to the number of companies doing so (52) and also according to the average length of time it has been used by all respondents (1.9 years).

The specific analyses included under this heading are sales territory analysis, territory potential analysis, salesmen's territory assignments, new territory data information, and territory quotas. All companies using this application indicated the programs for it were developed

within their own company. However, two firms did mention that assistance was received from a computer manufacturer regarding the design of the programs.

A probable reason package programs are not available for this type of analysis is that each company requires certain unique information. If a computer manufacturer developed a program for Sales Territory Analysis it would have to be a very general one needing modification for each user.

Of the respondents, 54% said they were very satisfied with using their computer for Sales Territory Analysis, and 42% were moderately satisfied. Only one respondent was not satisfied. Another said his company had just started to use it, so could not pass judgment.

Companies doing their Sales Territory Analysis on a computer have been using a computer in marketing an average of 7.1 years, and using this application on it for an average of 4.1 years. No respondents indicated trying this application in the first year of their computer experience, and only one tried it in the second year. Interestingly, this company is

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the one not yet satisfied with the results of the application. For this analysis there is a strong positive relationship between the relatively large number of satisfied users, the fact that all the companies developed the programs internally, and the long average period of time (3 years) that the companies have used a computer for marketing before attempting this application.

The tabulation of the replies from companies making Sales Territory Analysis on a computer is shown in Table VIII. Here, the mean length of time is 4.1 years and the mode is about 4.5 years. The industrial goods' companies have used it an average of 3.7 years, with the corresponding figures of 4.2 years, 4.6 years and 3.9 years for consumer goods' manufacturers, industrial and consumer goods' manufacturers, and integrated middlemen, respectively. The differences here are not significant at a 95% confidence level.

Marketing department employees indicated that Sales Territory Analysis has been used an average of 4.8 years, and data-processing employees indicated an average of 3.5 years. Again, the difference between these means is not significant.

Chapter IV - Table VIII
 Distribution of the Length of Time Companies have been Using Computers
 to Assist in Sales Territory Analysis

NUMBER OF YEARS USED	TOTALS			INDUS- TRIAL GOODS' MFRS.	CON- SUMER GOODS' MFRS.	INDUS- TRIAL CONSUMER GOODS' MFRS.	INTE - GRATED MIDDLE- MEN	QUESTIONNAIRES COMPLETED BY		
	NO.	%	% CUM.					MARKETING DEPARTMENT EMPLOYEES	DATA PROCESSING DEPARTMENT EMPLOYEES	DEPARTMENT NOT INDICATED
Respondents Total	104	100	-	29	25	32	18	38	40	26
Respondents Sales Territories	52	50	-	14	13	15	10	18	20	14
1 Year	9	9	9	2	2	2	3	3	5	1
>1 but ≤2 Yrs.	3	3	12	1	1	1	-	-	2	1
>2 but ≤3 Yrs.	11	10	22	5	2	3	1	4	3	4
>3 but ≤4 Yrs.	1	1	23	-	1	-	-	-	-	1
>4 but ≤5 Yrs.	10	9	32	3	1	3	3	3	5	2
>5 but ≤6 Yrs.	3	3	35	-	1	2	-	2	1	-
>6 but ≤7 Yrs.	4	4	39	-	2	-	2	2	1	1
>7 but ≤8 Yrs.	1	1	40	-	1	-	-	1	-	-
>8 but ≤9 Yrs.	2	2	42	-	1	-	1	-	1	1
>9 but ≤10 Yrs.	4	4	46	2	-	2	-	2	1	-
10 Years or more	1	1	47	-	-	1	-	1	-	-
Years not indicated	3	3	50	1	1	1	-	-	1	2
Mean (of those indicating its use)	4.10	-	-	3.65	4.17	4.61	3.90	4.81	3.45	4.08
Standard Deviation	2.92	-	-	2.91	2.74	3.36	2.84	3.20	2.74	2.78

4. Service Policy Analysis

The use of computers for analysing service policies is one of the least used areas. Only five responding companies do so. And this application has been employed by all respondents for an average of 0.25 years. Consequently Service Policy Analysis ranks 16th according to both criteria. However, for the five companies who make Service Policy Analyses on a computer, the mean time is 5.3 years. This average ranks second in longevity, if only the number of companies indicating use of the specific application is considered in calculating the mean. The reason for this large discrepancy in rank order of the two averages is that so few companies are analysing Service Policies on a computer, and those who do so have been using this analysis for a relatively long time.

The specific types of applications categorized under Service Policy Analysis are the following: warranty claims (records and analysis), service required on certain products or parts, and analysis of types of uses and users making claims. These uses of a computer are relatively few

and consequently, each company doing so has had to develop its own specific programs. Four of the five companies employing this application have used a computer for marketing purposes for about 10 years, and all claimed a high degree of satisfaction with Service Policies Analysis. The fifth company has used a computer in marketing for seven years, but has not had satisfactory results from this application yet.

The tabulation of the replies from the users of Service Policy Analysis is shown in Table IX. Only one industrial goods' company has used this application, and has done so for three years. Likewise, only one consumer goods' manufacturer has used it, but for about eight years. The remaining three users were industrial and consumer goods' manufacturers who have used it an average of 5.8 years. The number of companies in each category is so small that tests for significance would not be meaningful.

B. PHYSICAL DISTRIBUTION MANAGEMENT

1. Physical Distribution Analysis

Employment of a computer for analysis in this area

Chapter IV - Table IX
Distribution of the Length of Time Companies have been Using Computers
to Assist in Service Policy Analysis

NUMBER OF YEARS USED	TOTALS			INDUS- TRIAL GOODS, MFRS.	CON- SUMER GOODS, MFRS.	INDUS- TRIAL & CONSUMER GOODS, MFRS.	INTE- GRATED MIDDLE- MEN	QUESTIONNAIRES COMPLETED BY		
	NO.	%	% CUM.					MARKETING DEPARTMENT EMPLOYEES	DATA PROCESSING DEPARTMENT EMPLOYEES	DEPARTMENT NOT INDICATED
Respondents Total	104	100	-	29	25	32	18	38	40	26
Respondents Service Policies	5	5	-	1	1	3	-	2	2	1
1 Year	-	-	-	-	-	-	-	1	-	-
> 1 but ≤ 2 Yrs.	1	1	1	1	-	-	-	-	1	-
> 2 but ≤ 3 Yrs.	1	1	2	-	-	1	-	-	-	-
> 3 but ≤ 4 Yrs.	-	-	2	-	-	-	-	-	-	-
> 4 but ≤ 5 Yrs.	-	-	2	-	-	-	-	-	-	-
> 5 but ≤ 6 Yrs.	1	1	3	-	-	1	-	1	-	-
> 6 but ≤ 7 Yrs.	-	-	3	-	-	-	-	-	-	-
> 7 but ≤ 8 Yrs.	1	1	4	-	1	-	-	-	1	-
> 8 but ≤ 9 Yrs.	-	-	4	-	-	-	-	-	-	-
> 9 but ≤ 10 Yrs.	1	1	5	-	-	1	-	-	-	1
> 10 Years or more	-	-	5	-	-	-	-	-	-	-
Years not indicated	-	-	5	-	-	-	-	-	-	-
Mean (of those indicating its use)	5.3	-	-	1.5	7.5	5.83	-	3.5	5.0	9.5
Standard Deviation	3.35	-	-	-	-	3.51	-	2.83	3.54	-

of marketing ranks ninth by the number of companies using it (17 companies) and eighth according to the average length of time it has been used by all respondents (0.63 years). It also ranks ninth if the mean time is considered for only those companies mentioning its use (this average is 4.1 years). The specific applications included in Physical Distribution Analysis are: warehouse studies (size and location), delivery analysis, optimum routing (time, costs and methods), product movement reporting, and distribution points for location analysis.

It is surprising that this application has not been used by more companies and for a longer time, because the programs required for it have been developed by and are available from most computer manufacturers. There are several reasons why computer companies include these programs in their libraries: cost reductions in distribution can be quickly shown and help justify purchase of the machine; the input data are fairly standard and readily available in many companies; and the mathematical technique generally used in these applications is linear programming, which has been common in business literature for many years.

Of the 17 companies using this application, only six (35%) are very satisfied with the results, 10 users (59%) are somewhat satisfied and one company is not satisfied. All users should be at least moderately satisfied as immediate cost savings can be realized from its use, and a lot of assistance is available from computer manufacturers in this area. The average length of time the companies employing this application have used a computer in marketing is 7.3 years. But none of the companies have used EDP for Physical Distribution Analysis until they have had a computer more than three years. This hesitancy appears to be an anomaly, considering the availability of programs and assistance from either computer consultants or manufacturers.

In Table X the time the responding companies have been using a computer for Physical Distribution Analysis is shown. Industrial goods' manufacturers have done so an average of 2.5 years, consumer goods' manufacturers for 5.4 years, the two industrial and consumer goods' manufacturers for 1.5 years, and the one integrated middleman for 6.5 years. There is no significant difference between any of these means at a 95% confidence level.

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Chapter IV - Table X

Distribution of the Length of Time Companies have been Using Computers
to Assist in Physical Distribution Analysis

NUMBER OF YEARS USED	TOTALS			INDUS- TRIAL GOODS, MFRS.	CON- SUMER GOODS, MFRS.	INDUS- TRIAL & CONSUMER GOODS, MFRS.	INTE- GRATED MIDDLE- MEN	QUESTIONNAIRES COMPLETED BY		
	NO.	%	% CUM.					MARKETING DEPARTMENT EMPLOYEES	DATA- PROCESSING DEPARTMENT EMPLOYEES	DEPARTMENT NOT INDICATED
Respondents: Total	104	100	-	29	25	32	18	38	40	26
Respondents: Physical Dist.	17	17	-	6	8	2	1	6	7	4
1 Year	3	3	3	3	-	-	-	-	2	1
>1 but ≤2 Yrs.	3	3	6	-	1	2	-	1	2	-
>2 but ≤3 Yrs.	2	2	8	1	1	-	-	1	1	-
>3 but ≤4 Yrs.	1	1	9	-	1	-	-	-	1	-
>4 but ≤5 Yrs.	-	-	-	-	-	-	-	-	-	-
>5 but ≤6 Yrs.	1	1	10	-	1	-	-	1	-	-
>6 but ≤7 Yrs.	2	2	12	-	1	-	1	1	-	1
>7 but ≤8 Yrs.	2	2	14	-	2	-	-	1	-	1
>8 but ≤9 Yrs.	2	2	16	1	1	-	-	-	1	1
>9 but ≤10 Yrs.	-	-	-	-	-	-	-	-	-	-
10 Years or More	-	-	-	-	-	-	-	-	-	-
Years not Indicated	1	1	17	1	-	-	-	1	-	-
Mean (of those indicating its use)	4.06	-	-	2.5	5.38	1.5	6.5	4.7	2.64	5.75
Std. Deviation	3.54	-	-	3.46	2.59	-	-	2.59	2.79	3.59

Analysis of the replies completed by the marketing department's employees indicate that the mean time for using a computer in this area of marketing is 4.7 years, while that indicated by the data-processing department's employees is 2.6 years. Here too, the differences between these means are not significant.

2. Distribution Channel Analysis

The analysis of Distribution Channels by computers ranks lowest in popularity along with Service Policies for all the uses made of EDP in marketing, with only five respondents mentioning it. The average length of time used by all respondents is 0.3 years, which ranks 13th out of 17. This average is deceiving, however, because the five companies employing this application have done so for a mean time of 6.4 years, and this is the longest period of time for all the applications.

The specific types of analyses grouped under this heading include: analysis of dealer operations; major account analysis (by facilities, by total volume, by sales staff, and by other attributes); analysis of middlemen; and

analysis of channels of distribution. Here again, the programs have been developed internally, and all the users are satisfied with this application. Three of the five indicate this to be a very satisfactory application, while the remaining two companies claim at least moderate satisfaction.

For the companies doing Distribution Channel Analysis on a computer, the average length of time they have used EDP in marketing is 7.3 years. The earliest any company has made use of this application is only after using a computer for two years. The next earliest is five years and then there is a jump to nine years.

The tabulation of the responses from companies employing this Analysis is shown in Table XI. The three industrial goods' manufacturers have been applying computers to Distribution Channel Analysis an average of 4.5 years, and the two consumer goods' manufacturers 9.3 years. The test for significance of difference between these means indicates no significant differences at a 95% confidence level. But it is worth noting that the consumer goods' manufacturers have been using this application, on the

Chapter IV - Table XI
 Distribution of the Length of Time Companies have been Using Computers
 to Assist in Distribution Channel Analysis

NUMBER OF YEARS USED	TOTALS			INDUS- TRIAL GOODS, MFRS.	CON- SUMER GOODS, MFRS.	INDUS- TRIAL CONSUMER GOODS, MFRS.	INTE- GRATED MIDDLE- MEN	QUESTIONNAIRES COMPLETED BY		
	NO.	%	% CUM.					MARKETING DEPARTMENT EMPLOYEES	DATA PROCESSING DEPARTMENT EMPLOYEES	DEPARTMENT NOT INDICATED
Respondents Total	104	100	-	29	25	32	18	38	40	26
Respondents Dist. Channels	5	5	-	3	2	-	-	1	2	2
1 Year	-	-	-	-	-	-	-	-	-	-
> 1 but ≤ 2 Yrs.	1	1	1	1	-	-	-	1	-	-
> 2 but ≤ 3 Yrs.	1	1	2	1	-	-	-	-	-	1
> 3 but ≤ 4 Yrs.	-	-	2	-	-	-	-	-	-	-
> 4 but ≤ 5 Yrs.	-	-	2	-	-	-	-	-	-	-
> 5 but ≤ 6 Yrs.	-	-	2	-	-	-	-	-	-	-
> 6 but ≤ 7 Yrs.	-	-	2	-	-	-	-	-	-	-
> 7 but ≤ 8 Yrs.	1	1	3	-	1	-	-	-	-	1
> 8 but ≤ 9 Yrs.	-	-	3	-	-	-	-	-	-	-
> 9 but ≤ 10 Yrs.	1	1	4	1	-	-	-	-	1	-
10 Years or more	1	1	5	-	1	-	-	-	1	-
Years not indicated	-	-	-	-	-	-	-	-	-	-
Mean (of those indicating its use)	6.40	-	-	4.50	9.25	-	-	1.5	10.25	5.0
Standard Deviation	4.22	-	-	4.36	2.47	-	-	-	1.06	3.54

average, over twice as long as have the industrial goods' manufacturers. This is probably because their distribution channels are generally longer and more complicated, with more middlemen required to distribute their products.

Another interesting statistic shown in Table XI is the mean time the marketing employees indicate using this application (1.5 years) compared with the average shown by the data-processing employees (10.25 years). But in spite of the relatively large difference between the means, this difference is not significant at a 95% confidence level because of the few companies using a computer in this area.

3. Inventory Management Analysis

The application of a computer for analysis of inventory ranks first according to the number of companies doing so (60) and second according to the mean length of time it has been used by all respondents (2.2 years). The specific analyses included in this category are: inventory control, inventory search, dealers' stocks, order processing, order control, production procurement, order status and

back-log, open to buy, automatic re-ordering and inventory location reports.

The popularity of this use of EDP in marketing is not surprising as the programs for this application, along with Sales Analysis programs, were among the first software items developed by computer manufacturers, because through the use of this application they are able to show computer users rather large savings in inventory costs commensurate with a certain level of customer service.

Most of the companies employing a computer for Inventory Management Analysis were satisfied with the results - 43% were very pleased and 50% were moderately pleased. Only three companies (5%) were not satisfied, and one company had just started using it so could not judge.

This application is instituted relatively early in a company's experience with a computer in marketing -- one company used it in the first year, one in the second, and one in the third. Many companies began to use it after three years of computer experience. On the average, the length of time a computer has been used in marketing by those companies

employing Inventory Management Analysis is 7.1 years, while the average for employing this specific application is 4.2 years.

The tabulation of the replies regarding Inventory Management is shown in Table XII. The different types of companies and the employees of the different departments all indicate using this application about the same length of time. Consequently, the confidence levels where the differences between the means become significant are all below 95%.

C. MARKETING MANAGEMENT

1. Planning Analysis

The use of computers for planning ranks eighth according to the number of companies doing so (18) and seventh by the average length of time used by all respondents (0.7 years).

The types of analyses included in this category are: new product reports and scheduling, planning assistance through technical evaluation, developing marketing plans and strategies,

Chapter IV - Table XII

Distribution of the Length of Time Companies have been Using Computers
to Assist in Inventory Management Analysis

NUMBER OF YEARS USED	TOTALS			INDUS- TRIAL GOODS, MFRS.	CON- SUMER GOODS, MFRS.	INDUS - TRIAL CONSUMER GOODS, MFRS.	INTE- GRATED MIDDLE- MEN	QUESTIONNAIRES COMPLETED BY		
	NO.	%	% CUM.					MARKETING DEPARTMENT EMPLOYEES	DATA PROCESSING DEPARTMENT EMPLOYEES	DEPARTMENT NOT INDICATED
Respondents Total	104	100	-	29	25	32	18	38	40	26
Respondents Inventory Mgt.	60	58	-	12	15	20	13	17	26	17
1 Year	12	11	11	-	3	5	4	4	5	3
> 1 but ≤ 2 Yrs.	5	5	16	2	1	1	1	1	2	2
> 2 but ≤ 3 Yrs.	8	7	23	2	2	3	1	4	3	1
> 3 but ≤ 4 Yrs.	6	6	29	2	2	2	-	-	4	2
> 4 but ≤ 5 Yrs.	7	7	36	2	2	1	2	2	4	1
> 5 but ≤ 6 Yrs.	5	5	41	-	2	1	2	3	2	-
> 6 but ≤ 7 Yrs.	-	-	41	-	-	-	-	-	-	-
> 7 but ≤ 8 Yrs.	-	-	45	1	1	2	-	1	1	2
> 8 but ≤ 9 Yrs.	1	1	46	1	-	-	-	-	1	-
> 9 but ≤ 10 Yrs.	5	5	51	-	1	3	1	1	2	2
10 Years or more	3	3	54	-	-	1	2	-	1	2
Years not indicated	4	4	58	2	1	1	-	-	-	-
Mean (of those indicating its use)	4.15	-	-	4.0	3.71	4.37	4.47	3.5	4.08	4.97
Standard Deviation	3.24	-	-	2.37	2.69	3.64	3.96	2.71	3.09	3.98

merchandise plans, sales planning and production co-ordination, master scheduling, and product-distribution planning. Most of these applications are of a specific nature and consequently, the programs for them have been developed by the using companies.

Of the 18 companies using a computer to assist in Planning Analysis, seven are very satisfied with the results, and the remaining eleven are at least moderately satisfied. None is dissatisfied.

This area of application is generally one of the last instituted. The responding companies did not employ Planning Analysis on EDP until they had accumulated over three years' experience with computers in marketing. The average length of time the using companies of Planning Analysis have used EDP is 7.9 years. Considering these are very specific applications and each company has had to develop their own programs, a delay of three years seems reasonable.

The replies indicating use of Planning Analysis are tabulated in Table XIII. The average time this application

Chapter IV - Table XIII
 Distribution of the Length of Time Companies have been Using Computers
 to Assist in Marketing Planning Analysis

NUMBER OF YEARS USED	TOTALS			INDUS- TRIAL GOODS, MFRS.	CON- SUMER GOODS, MFRS.	INDUS- TRIAL CONSUMER GOODS, MFRS.	INTE- GRATED MIDDLE- MEN	QUESTIONNAIRES COMPLETED BY		
	NO.	%	% CUM.					MARKETING DEPARTMENT EMPLOYEES	DATA PROCESSING DEPARTMENT EMPLOYEES	DEPARTMENT NOT INDICATED
Respondents Total	104	100	-	29	25	32	18	38	40	36
Respondents Planning and Programming	18	18	-	3	3	7	5	7	7	4
1 Year or less	2	2	2	-	-	-	2	1	1	-
> 1 but ≤ 2 Yrs.	1	1	3	1	-	-	-	1	-	-
> 2 but ≤ 3 Yrs.	6	6	9	-	1	4	1	2	4	-
> 3 but ≤ 4 Yrs.	1	1	10	1	-	-	-	-	-	1
> 4 but ≤ 5 Yrs.	1	1	11	-	1	-	-	1	-	-
> 5 but ≤ 6 Yrs.	4	4	15	1	-	2	1	1	1	2
> 6 but ≤ 7 Yrs.	-	-	16	-	-	-	-	-	-	-
> 7 but ≤ 8 Yrs.	1	1	17	-	-	1	-	1	-	-
> 8 but ≤ 9 Yrs.	-	-	18	-	-	-	-	-	-	1
> 9 but ≤ 10 Yrs.	1	1	-	-	1	-	-	-	-	-
10 Years or more	1	1	-	-	-	-	1	-	1	-
Years not indicated	-	-	-	-	-	-	-	-	-	-
Mean (of those indicating its use)	4.19	-	-	3.5	5.5	4.07	4.0	3.5	3.86	6.0
Standard Deviation	2.92	-	-	2.0	3.61	2.07	4.42	2.45	3.47	2.52

has been used by these companies is 4.2 years. The equivalent means for the various types of companies and departments' employees completing the questionnaires are also shown. There is no significant difference between any of these means at a 95% confidence level.

2. Market Forecasting Analysis

Computers are used in making Market Forecasting Analyses by 42 of the responding companies and the average time they have been doing so is 1.4 years. This application ranks fifth according to both these criteria.

The specific analyses grouped under this application include: forecasts by value/price of product sales, market forecasts, long and short range customer analysis and forecasting, socio-economic projections, time series analysis for forecasting and demand forecasts. Some of the programs for these applications are available from computer manufacturers but they are obviously quite general in nature; e.g., time series analysis, or socio-economic projections. Thus, in most cases, these general programs required further refinement by the using companies.

Only 13 companies using a computer for Market Forecasting are very satisfied, 24 are moderately satisfied and four are not pleased with the results. One company just started and said it is too early to tell. The four companies which are dissatisfied with the results are relatively new users of this application, and as these companies modify their programs, they should obtain better results. A problem to improving the performance of this application is that most companies use it infrequently each year, so experience is limited and chances for changes are scarce.

No company employed Forecasting Analysis during its first year of using EDP, and only two companies did so during the next two years. But once the companies gain some confidence and experience (at least three years) in the use of computers and have their own systems analysts and programmers, they move rather quickly into this application. During the next three years, 15 companies instituted Market Forecasting Analysis on their computers. The average length of time for using EDP in marketing by those companies employing it for Forecasting is 7.5 years.

The replies regarding Market Forecasting are tabulated in Table XIV. The average length of time the 42 companies have been using a computer for this application is 3.4 years. If the replies are considered according to the types of companies responding, the average length of time for the application of EDP to Market Forecasting by industrial goods' manufacturers is 1.5 years, by consumer goods' manufacturers 2.8 years, by manufacturers of both industrial and consumer goods 5.0 years, and by integrated middlemen 5.1 years. The difference between the average for industrial goods' manufacturers and consumer goods' manufacturers is not significant at a 95% level, but the difference between the industrial goods' manufacturers and the companies that produce both industrial and consumer goods is significant. One possible reason for this is that the companies which manufacture both industrial and consumer goods are larger firms, and generally more advanced in EDP. Also, their product lines are probably more numerous, so they would want to take advantage of computers sooner. The difference between industrial goods' manufacturers and integrated middlemen is also significant and may be because the large

Chapter IV - Table XIV

Distribution of the Length of Time Companies have been Using Computers
to Assist in Market Forecasting Analysis

NUMBER OF YEARS USED	TOTALS			INDUS- TRIAL GOODS, MFRS.	CON- SUMER GOODS, MFRS.	INDUS- TRIAL GOODS, MFRS.	INTE- GRATED MIDDLE- MEN	QUESTIONNAIRES COMPLETED BY		
	NO.	%	% CUM.					MARKETING DEPARTMENT EMPLOYEES	DATA PROCESSING DEPARTMENT EMPLOYEES	DEPARTMENT NOT INDICATED
Respondents Total	104	100		29	25	32	18	38	40	36
Respondents Market Fore- casting	42	41	-	11	12	13	6	17	14	11
1 Year	9	8	8	6	2	1	-	4	1	4
>1 but ≤2 Yrs.	8	8	16	2	3	3	-	5	2	1
>2 but ≤3 Yrs.	5	5	21	1	2	1	1	4	1	-
>3 but ≤4 Yrs.	4	4	25	1	2	1	-	-	3	1
>4 but ≤5 Yrs.	7	7	32	1	2	1	3	2	4	1
>5 but ≤6 Yrs.	1	1	33	-	-	1	-	1	-	-
>6 but ≤7 Yrs.	1	1	34	-	-	1	-	-	-	1
>7 but ≤8 Yrs.	2	2	36	-	1	1	-	-	1	1
>8 but ≤9 Yrs.	-	-	-	-	-	-	-	-	-	-
>9 but ≤10 Yrs.	3	3	39	-	-	2	1	1	1	1
10 Years or more	1	1	40	-	-	1	-	-	-	1
Years not indicated	1	1	41	-	-	-	1	-	1	-
Mean (of those indicating its use)	3.44	-	-	1.5	2.83	5.0	5.1	2.56	3.96	4.18
Standard Deviation	2.89	-	-	1.41	2.02	3.55	2.61	2.33	2.44	3.91

middlemen, with a number of different lines of merchandise, have a more complex forecasting problem and thus greater dependency upon EDP for forecasting is logical. The difference between the consumer goods' manufacturers and the latter two types of companies is not significant at a 95% confidence level. Also, there is no significant difference between the mean number of years Market Forecasting has been done by computers as indicated by the different departments' employees.

3. Marketing Management Analysis

The employment of computers in this area refers to such applications in marketing management as: risk analysis, progress reporting, information retrieval, project selection guidelines, marketing problem solving, proposal control and analysis, contracts control and analysis, PERT, management by exception, market opportunities analysis and promotion planning analysis. These computer applications are generally the direct concern of top marketing management. EDP is used in these areas by 15 companies, thus ranking 10th in the number of users. The average length of time these applications have been used by all the respondents is only 0.3 years and is ranked 12th by this criterion.

Most of the computer applications included here are quite "sophisticated" and peculiar to the users. Consequently, the employing companies have developed the programs internally. More recently, however, some computer manufacturers have made available library programs for information retrieval, and PERT (Program Evaluation and Review Techniques). As a result, more companies will probably begin using some of these applications.

The degrees of satisfaction associated with the use of Marketing Management applications are: very satisfied - 4 (27%), moderately satisfied - 7 (47%), and not satisfied - 3 (20%). The relatively large percentage of firms less than very satisfied is probably caused by the higher degree of sophistication required to successfully use these applications, together with the relatively short time the companies have used a computer in this area (2.3 years).

The average time the companies using one or more of these applications have been using computers in marketing is 6.2 years. Only one company tried this application within the first three years of its computer experience. In Table XV

Chapter IV - Table XV

Distribution of the Length of Time Companies have been Using Computers
to Assist in Marketing Management Analysis

NUMBER OF YEARS USED	TOTALS			INDUS- TRIAL GOODS, ¹ MFRS.	CON- SUMER GOODS, ¹ MFRS.	INDUS- TRIAL CONSUMER GOODS, ¹ MFRS.	INTE- GRATED MIDDLE- MEN	QUESTIONNAIRES COMPLETED BY		
	NO.	%	% CUM.					MARKETING DEPARTMENT EMPLOYEES	DATA PROCESSING DEPARTMENT EMPLOYEES	DEPARTMENT NOT INDICATED
Respondents Total	104	100	-	29	25	32	18	38	40	26
Respondents Marketing Management	15	15	-	5	5	4	1	6	6	3
1 Year	4	4	4	2	-	1	1	2	2	-
>1 but ≤ 2 Yrs.	1	1	5	1	-	-	-	-	-	1
>2 but ≤ 3 Yrs.	7	7	12	1	4	2	-	2	3	2
>3 but ≤ 4 Yrs.	-	-	12	-	-	-	-	-	-	-
>4 but ≤ 5 Yrs.	3	3	15	1	1	1	-	2	1	-
>5 but ≤ 6 Yrs.	-	-	-	-	-	-	-	-	-	-
>6 but ≤ 7 Yrs.	-	-	-	-	-	-	-	-	-	-
>7 but ≤ 8 Yrs.	-	-	-	-	-	-	-	-	-	-
>8 but ≤ 9 Yrs.	-	-	-	-	-	-	-	-	-	-
>9 but ≤ 10 Yrs.	-	-	-	-	-	-	-	-	-	-
10 Years or more	-	-	-	-	-	-	-	-	-	-
Years not indicated	-	-	-	-	-	-	-	-	-	-
Mean (of those indicating its use)	2.3	-	-	1.9	2.9	2.5	0.5	2.5	2.17	2.17
Standard Deviation	1.42	-	-	1.67	0.89	1.63	-	1.79	1.51	0.58

a tabulation of the replies mentioning use of Marketing Management Analysis is presented. The average time this application has been used by the 15 companies is 2.3 years. The averages for all the sub-samples are also relatively short. Here again there is no significant difference between the various means at a 95% confidence level.

4. Advertising Analysis

The employment of computers for Advertising Analysis ranks 11th by number of companies doing so (11) as well as by the average time it has been used by all respondents (0.34 years).

The specific analyses included in this category are: media analysis, direct mail advertising, data for evaluation of promotional activities, advertising models, guidelines for allocating advertising funds by market, media effects on product sales, sales per capita by media area and analysis of advertising effects by products/markets. Only six of the 11 companies were very satisfied with any of these applications, while two were moderately satisfied and three dissatisfied.

A possible reason for the relatively little use of the computer in this area is that all the companies in the sample were "large" companies, generally employing an advertising agency, and the agency may do these types of analyses on their computers. If so, then the companies in the sample would concern themselves only with the recommendations of their agencies and not with the specific computer application. For the 11 companies who use this application, the average time for using a computer in marketing is 6.4 years. No company employed EDP for Advertising Analysis within the first three years of their computer experience. Five did so in the next two years, and the remaining six companies used Advertising Analysis for the first time in either their eighth or ninth years of computer use.

The tabulation of the replies on this application is shown in Table XVI. The average time used by the eleven companies is 3.2 years. No industrial goods' manufacturers use this application. The five consumer goods' manufacturers employing computers for Advertising Analysis have been doing so an average of 2.5 years. The five producers of both industrial and consumer goods indicate usage for an average

Chapter IV - Table XVI

Distribution of the Length of Time Companies have been Using Computers
to Assist in Making Advertising Analysis

NUMBER OF YEARS USED	TOTALS			INDUS- TRIAL GOODS, MFRS.	CON- SUMER GOODS, MFRS.	INDUS- TRIAL CONSUMER GOODS, MFRS.	INTE- GRATED MIDDLE- MEN	QUESTIONNAIRES COMPLETED BY		
	NO.	%	% CUM.					MARKETING DEPARTMENT EMPLOYEES	DATA PROCESSING DEPARTMENT EMPLOYEES	DEPARTMENT NOT INDICATED
Respondents Total	104	100	-	29	25	32	18	38	40	26
Respondents Advertising	11	11	-	-	5	5	1	4	5	2
1 Year	2	2	2	-	1	1	-	1	2	-
> 1 but < 2 Yrs.	1	1	3	-	1	1	-	1	-	1
> 2 but < 3 Yrs.	2	2	5	-	1	1	-	1	-	-
> 3 but < 4 Yrs.	1	1	6	-	1	2	-	2	-	1
> 4 but < 5 Yrs.	3	3	9	-	1	3	1	1	2	-
> 5 but < 6 Yrs.	2	2	11	-	-	-	-	-	-	-
> 6 but < 7 Yrs.	-	-	-	-	-	-	-	-	-	-
> 7 but < 8 Yrs.	-	-	-	-	-	-	-	-	-	-
> 8 but < 9 Yrs.	-	-	-	-	-	-	-	-	-	-
> 9 but < 10 Yrs.	-	-	-	-	-	-	-	-	-	-
10 Years or more	-	-	-	-	-	-	-	-	-	-
Years not indicated	-	-	-	-	-	-	-	-	-	-
Mean (of those indicating its use)	3.23	-	-	-	2.5	3.5	5.5	3.25	3.1	3.5
Standard Deviation	1.85	-	-	-	1.58	2.0	-	1.5	2.51	1.41

of 3.5 years, and one integrated middleman for 5.5 years. There are no significant differences between any of these means at a 95% confidence level, nor are there any significant differences between the average time the marketing department's employees claim to have used a computer for Advertising Analysis and the average length of time the data-processing department's employees claim.

D. FINANCIAL MANAGEMENT OF MARKETING

1. Distribution Cost Analysis

Employment of EDP to assist in Distribution Cost Analysis includes such specific uses as: distribution cost control, dealer cost analysis, promotional efforts and cost analysis, sales commission payments and bonus calculations. Nine companies indicate using EDP for Distribution Cost Analysis, thus ranking 12th in popularity, and the average time used by all respondents is 0.4 years, which ranks it 10th by this criterion.

The area of Distribution Costs Analysis has only

recently become popular in marketing, and is still in a developing stage. But as the principles of cost accounting become understood more fully by marketing managers, and as more pressure is brought to bear upon marketing for greater cost control, then the use of EDP in this area will become more common. At present, companies are generally using cost-accounting methods adapted from production, but these are not fully compatible to all marketing areas. Once suitable adjustments are made, or more appropriate standard cost methods devised, the popularity of this application will increase.

Limited programs for Distribution Cost Analysis are available from some computer manufacturers, but most of the companies have had to develop their own computer programs.

All of the nine companies employing a computer here are pleased with the results: six companies are very satisfied; and three moderately satisfied. These companies have been using a computer for marketing purposes an average of 7.3 years. Only one company initiated this application before it had three years' experience in EDP. Two companies began using it

in their fourth year of computer use, and one company began using it in the seventh year. The remaining five companies all used a computer for over 9 years before trying Distribution Cost Analysis on it.

The tabulation of the replies for this application are presented in Table XVII. The mean time Distribution Cost Analysis has been employed by the nine using companies is 5.0 years. The averages for the various types of companies as well as department's employees completing the questionnaires are also shown. The differences between the means for the different groups were tested for significance but because of the small number of users in each category, no differences are significant at a 95% confidence level.

2. Pricing Analysis

Six responding companies use computers for Pricing Analysis, making this the 15th (out of 17) most commonly mentioned application. All the responding companies have used it an average of 0.2 years, which is the least amount of time any application has been used. The specific types of analyses included under Pricing are: price variance

Chapter IV - Table XVII

Distribution of the Length of Time Companies have been Using Computers
for Distribution Cost Analysis

NUMBER OF YEARS USED	TOTALS			INDUS- TRIAL GOODS* MFRS.	CON- SUMER GOODS* MFRS.	INDUS- TRIAL & CONSUMER GOODS* MFRS.	INTE- GRATED MIDDLE- MEN	QUESTIONNAIRES COMPLETED BY		
	NO.	%	% CUM.					MARKETING DEPARTMENT EMPLOYEES	DATA- PROCESSING DEPARTMENT EMPLOYEES	DEPARTMENT NOT INDICATED
Respondents: Total	104	100	-	29	25	32	18	38	40	26
Respondents: Distribution Costs	9	9	-	1	3	3	2	1	4	4
1 Year	-	-	-	-	-	-	-	-	-	-
>1 but ≤ 2 Yrs.	1	1	1	-	1	1	-	1	-	-
>2 but ≤ 3 Yrs.	1	1	2	-	-	-	-	-	-	-
>3 but ≤ 4 Yrs.	2	2	4	1	-	1	-	-	1	2
>4 but ≤ 5 Yrs.	1	1	5	-	-	-	1	-	-	-
>5 but ≤ 6 Yrs.	-	-	5	-	-	-	-	-	-	-
>6 but ≤ 7 Yrs.	-	-	5	-	-	-	-	-	-	-
>7 but ≤ 8 Yrs.	2	2	7	-	1	1	-	-	1	1
>8 but ≤ 9 Yrs.	-	-	7	-	-	-	-	-	-	-
>9 but ≤ 10 Yrs.	1	1	8	-	-	-	1	-	-	1
10 Years or more	-	-	8	-	-	-	-	-	-	-
Years not indicated	1	1	9	-	1	-	-	-	1	-
Mean (of those indicating its use)	5.0	-	-	3.5	4.5	4.5	7.0	1.5	4.83	6.0
Std. Deviation	2.83	-	-	-	4.24	2.65	3.54	-	2.52	3.0

reports, price estimating for contracts, least-cost formulations for pricing aids, price analysis, proposal pricing and price list development.

All programs for these applications were developed by the using companies, as most of the requirements for and from this type of analysis are endemic to the individual companies. Of the six companies doing Pricing Analysis by computers, three were very satisfied with the results, and two moderately satisfied. One company had just started using this application, so could not judge. The six companies initiated this application only after using a computer in marketing for an average of 8.0 years. The earliest that any company tried to do Pricing Analysis on a computer is after 5.5 years of experience with EDP.

The number of companies indicating the use of computers for Pricing Analysis, and the length of time they have used this application, were both surprisingly low. This hesitancy by companies does not seem justified by the complication or sophistication of the analyses reported. Rather, they were mostly accounting uses of EDP. If supply and demand

calculations or other such simulation models had been mentioned as part of this application, the hesitancy to employ it would be more understandable.

The tabulation of the responses mentioning Pricing Analysis is in Table XVIII. The mean time this application has been used by the six companies is 3.8 years. The averages for the type of company and department's employees completing the questionnaire are also shown. There are no significant differences between any of these means at a 95% confidence level.

3. Credit Administration Analysis

Nine companies use EDP to help in Credit Administration Analysis, thus ranking this application 12th in "popularity". The average time it has been used by all respondents is 0.3 years, and this is the 14th shortest time for the 17 applications.

The specific analyses included in this category are: credit-card handling, analysis of dealer financial statements, dealer accounts, wholesale credit administration, retail credit

Chapter IV - Table XVIII

Distribution of the Length of Time Companies have been Using Computers
in Pricing Analysis

NUMBER OF YEARS USED	TOTALS			INDUS- TRIAL GOODS, MFRS.	CON- SUMER GOODS, MFRS.	INDUS- TRIAL & CONSUMER GOODS, MFRS.	INTE- GRATED MIDDLE- MEN	QUESTIONNAIRES COMPLETED BY		
	NO.	%	% CUM.					MARKETING DEPARTMENT EMPLOYEES	DATA- PROCESSING DEPARTMENT EMPLOYEES	DEPARTMENT NOT INDICATED
Respondents: Total	104	100	-	29	25	32	18	38	40	26
Respondents: Pricing	6	6	-	-	3	1	2	1	4	1
1 Year	2	2	2	-	1	1	1	1	2	-
> 1 but < 2 Yrs.	1	1	3	-	-	-	-	-	-	-
> 2 but < 3 Yrs.	-	-	3	-	-	-	-	-	-	-
> 3 but < 4 Yrs.	-	-	3	-	-	-	-	-	-	-
> 4 but < 5 Yrs.	1	1	4	-	-	-	1	-	1	-
> 5 but < 6 Yrs.	-	-	4	-	-	-	-	-	-	-
> 6 but < 7 Yrs.	-	-	4	-	-	-	-	-	-	-
> 7 but < 8 Yrs.	1	1	5	-	1	-	-	-	1	-
> 8 but < 9 Yrs.	1	1	6	-	1	-	-	-	-	1
> 9 but < 10 Yrs.	-	-	-	-	-	-	-	-	-	-
10 Years or more	-	-	-	-	-	-	-	-	-	-
Years not indicated	-	-	-	-	-	-	-	-	-	-
Mean (of those indicating its use)	3.83	-	-	-	5.5	1.5	2.5	1.5	3.25	8.5
Std. Deviation	3.56	-	-	-	4.36	-	2.83	-	3.40	-

administration, credit check and analysis, and analysis of types of errors which allowed the granting of credit to poor risks. The computer programs for these applications were all developed by the using companies, except for one major oil company, which used a consultant to program the administration of credit-card accounts. The techniques required for these applications are fairly straightforward and it is surprising that computer companies have not developed some Credit Administration library programs at least for credit-card administration. As the use of credit-cards increases, more emphasis will undoubtedly be placed on EDP to handle the plethora of detail.

The relative little use of this application by the responding companies is perhaps because most of them (except the oil companies) do not issue credit-cards. The manufacturers of most goods and most wholesale organizations do not use credit cards. However, many retailers do, but no responses from the integrated middlemen companies showed the use of computers for Credit Administration Analysis. Most companies selling a service, e.g., hotel chains, credit-card clubs, and

the like, make extensive use of credit-cards, but no such companies were included in the sample.

The nine companies using this application have used a computer in marketing an average of 8.7 years, and this has been the second to last application tried on their computers. The earliest any company has used EDP for Credit Administration Analysis is after about 4.5 years of computer experience. Of the companies using this application, seven indicate very good results, one company is moderately satisfied, and the remaining company has not used the application long enough to tell.

The tabulation of the replies about the use of EDP for Credit Administration is shown in Table XIX. The average time the nine companies have employed computers in this area is 3.5 years. The means for the categories of companies and for the department's employees completing the questionnaires are also shown. Here again, because of the relatively few companies in each category, the "t" tests indicate no significant differences exist at a 95% confidence level.

Chapter IV - Table XIX

Distribution of the Length of Time Companies have been Using Computers
in Credit Administration Analysis

NUMBER OF YEARS USED	TOTALS			INDUS- TRIAL GOODS, MFRS.	CON- SUMER GOODS, MFRS.	INDUS- TRIAL & CONSUMER GOODS, MFRS.	INTE- GRATED MIDDLE- MEN	QUESTIONNAIRES COMPLETED BY		
	NO.	%	% CUM.					MARKETING DEPARTMENT EMPLOYEES	DATA- PROCESSING DEPARTMENT EMPLOYEES	DEPARTMENT NOT INDICATED
Respondents: Total	104	100	-	29	25	32	18	38	40	26
Respondents: Credit Admin- istration	9	9	-	5	1	3	-	2	6	1
1 Year	2	2	2	1	-	1	-	-	2	-
>1 but ≤ 2 Yrs.	-	-	2	-	-	-	-	-	-	-
>2 but ≤ 3 Yrs.	2	2	4	2	-	-	-	1	1	-
>3 but ≤ 4 Yrs.	2	2	6	1	-	1	-	1	1	-
>4 but ≤ 5 Yrs.	-	-	6	-	-	-	-	-	-	-
>5 but ≤ 6 Yrs.	-	-	6	-	-	-	-	-	-	-
>6 but ≤ 7 Yrs.	1	1	7	-	-	1	-	-	-	-
>7 but ≤ 8 Yrs.	1	1	8	-	1	-	-	-	1	-
>8 but ≤ 9 Yrs.	-	-	8	-	-	-	-	-	-	-
>9 but ≤ 10 Yrs.	-	-	8	-	-	-	-	-	-	-
10 Years or more	-	-	-	-	-	-	-	-	-	-
Years not indicated	1	1	9	1	-	-	-	-	1	-
Mean (of those indicating its use)	3.5	-	-	2.25	8.5	3.5	-	3.0	3.1	6.5
Std. Deviation	2.78	-	-	1.26	-	3.0	-	0.71	3.29	-

4. Financial Analysis in Marketing

This category of applications encompasses the specific uses of computers which analyse the monetary consideration in marketing not fitting into the other areas of applications. These analyses include profit and/or contribution analysis by customer, by product, and by territory, small order profitability analysis, appraisal of marketing investments both past and potential, marketing cost control, and sales budgeting.

Twenty responding companies employ one or more of these analyses, making it the seventh most frequently mentioned application. Financial Analysis also ranked seventh according to the average time used by all respondents (0.6 years). The companies using this application have employed computers in marketing an average of 7.7 years. The earliest any company has tried making Financial Analysis of marketing by EDP is only after 3.5 years of computer experience.

The degrees of success attained with this application were: very satisfactory, seven companies (35%);

satisfactory, ten companies (50%); not satisfactory, one company (5%); too soon to tell, two companies (10%). The comments made previously regarding the lack of knowledge about and tools for Distribution Costs Analysis also apply to Financial Analysis in Marketing as these two areas are just in the infancy stage. When more emphasis is placed on cost consciousness in marketing, the use of EDP for the calculations will become more popular.

The replies from companies employing computers for Financial Analysis in Marketing are tabulated in Table XX. The average time this application has been used is 3.0 years. The means for the various sub-samples are also shown, but the differences between them are not significant.

E. RESEARCH

1. Marketing Research Analysis

Marketing Research Analysis is one of the most frequently mentioned areas for application of EDP in marketing. Computers are employed here by 48 responding

Chapter IV - Table XX

Distribution of the Length of Time Companies have been Using Computers
for Assisting in Financial Analysis of Marketing

NUMBER OF YEARS USED	TOTALS			INDUS- TRIAL GOODS, MFRS.	CON- SUMER GOODS, MFRS.	INDUS- TRIAL & CONSUMER GOODS, MFRS.	INTE- GRATED MIDDLE- MEN	QUESTIONNAIRES COMPLETED BY		
	NO.	%	% CUM.					MARKETING DEPARTMENT EMPLOYEES	DATA- PROCESSING DEPARTMENT EMPLOYEES	DEPARTMENT NOT INDICATED
Respondents: Total	104	100	-	29	25	32	18	38	40	26
Respondents: Financial Aspects of Marketing	20	20	-	5	4	7	4	4	10	6
1 Year	4	4	4	1	1	1	1	-	2	2
>1 but ≤ 2 Yrs.	4	4	8	1	2	1	-	2	2	-
>2 but ≤ 3 Yrs.	4	4	12	1	1	1	1	1	2	1
>3 but ≤ 4 Yrs.	1	1	13	1	-	-	2	-	1	-
>4 but ≤ 5 Yrs.	4	4	17	1	-	2	-	-	2	2
>5 but ≤ 6 Yrs.	2	2	19	-	-	-	-	-	1	1
>6 but ≤ 7 Yrs.	-	-	19	-	-	-	-	-	-	-
>7 but ≤ 8 Yrs.	-	-	19	-	-	-	-	-	-	-
>8 but ≤ 9 Yrs.	-	-	19	-	-	-	-	-	-	-
>9 but ≤ 10 Yrs.	1	1	20	-	-	1	-	1	-	-
10 Years or more	-	-	-	-	-	-	-	-	-	-
Years not indicated	-	-	-	-	-	-	-	-	-	-
Mean (of those indicating its use)	3.0	-	-	2.50	1.50	4.21	3.0	3.75	2.70	3.0
Std. Deviation	2.28	-	-	1.58	0.82	3.04	1.91	3.86	1.75	2.17

companies, thus ranking it fourth highest by number of users. The average length of time used by all respondents is 1.5 years, which is also the fourth longest time for any of the applications.

The specific analyses included in this category are: market data analysis, customer analysis, consumer research analysis, penetration reports, competitive activity reports, market survey analysis, traffic studies, customer requirements analysis, taste testing analysis, statistical techniques such as correlation analysis of census data, sales data, economic data and market demand trends analysis. The computer techniques used for most of the above analyses are rather elementary and just involve tabulating or easy statistical calculations. There was no indication of companies using computers for more advanced marketing research projects such as simulation of the market place. Most of the programs being used are available from computer manufacturers, and many have been developed for other than Marketing Research applications; e.g., the mathematical or statistical programs might have been developed for scientific research or engineering work.

Of the companies using a computer for Marketing Research Analysis, 19 claim very satisfactory results (40%), 26 are moderately satisfied (54%), one company is not satisfied, and the remaining two companies have only just started using a computer in this area. The average time these companies have used a computer in marketing is 7.0 years, and many of these Marketing Research Analysis applications were used relatively soon after the companies started using EDP. For example, three companies initiated this application during their second year's experience with computers.

The replies from companies employing this application are tabulated in Table XXI. The 48 using companies have done so for an average of 4.1 years. A mean time is also shown for each category of companies and for each subsample according to which department's employees completed the questionnaire. The difference between the consumer goods' manufacturers and the manufacturers of both industrial and consumer goods is significant at a 95% confidence level. This may be because the companies which manufacture both industrial and consumer goods generally have a more involved market structure calling for more Marketing Research, much of

Chapter IV - Table XXI

Distribution of the Length of Time Companies have been Using Computers
for Marketing Research Analysis

NUMBER OF YEARS USED	TOTALS			INDUS- TRIAL GOODS, MFRS.	CON- SUMER GOODS, MFRS.	INDUS- TRIAL & CONSUMER GOODS, MFRS.	INTE- GRATED MIDDLE- MEN	QUESTIONNAIRES COMPLETED BY		
	NO.	%	% CUM.					MARKETING DEPARTMENT EMPLOYEES	DATA- PROCESSING DEPARTMENT EMPLOYEES	DEPARTMENT NOT INDICATED
Respondents: Total	104	100	-	29	25	32	18	38	40	26
Respondents: Marketing Research	48	47	-	14	13	16	5	23	13	12
1 Year	8	7	7	2	4	1	1	5	3	-
>1 but ≤2 Yrs.	7	7	14	2	2	1	2	2	2	3
>2 but ≤3 Yrs.	7	7	21	4	2	1	-	3	1	3
>3 but ≤4 Yrs.	5	5	26	1	1	3	-	1	3	1
>4 but ≤5 Yrs.	4	4	30	2	-	2	-	3	1	-
>5 but ≤6 Yrs.	4	4	34	1	1	1	1	3	1	-
>6 but ≤7 Yrs.	3	3	37	1	1	1	-	1	1	1
>7 but ≤8 Yrs.	2	2	39	-	2	-	-	1	1	-
>8 but ≤9 Yrs.	-	-	39	-	-	-	-	-	-	-
>9 but ≤10 Yrs.	5	5	44	1	-	3	1	3	-	2
10 Years or more	2	2	46	-	-	2	-	1	-	1
Years not indicated	1	1	47	-	-	1	-	-	-	1
Mean (of those indicating its use)	4.12	-	-	3.43	3.12	5.77	3.70	4.35	3.19	4.73
Std. Deviation	3.16	-	-	2.50	2.72	3.51	3.77	3.33	2.32	3.68

which is amenable to computer analysis.

2. Operations Research Analysis

Nine companies use computers for Operations Research Analysis in marketing, and the average length of time this application has been used by all respondents is 0.3 years. This application ranks 12th according to the number of companies using it and 15th according to the length of time used.

The specific analyses included in this application are: development of business models, operations analysis, win/loss analysis, market model simulation, and other closely related analyses. Many of the companies which did not indicate the use of this application in marketing are in fact already employing operations research (OR) techniques in other functional areas of their business; e.g., models for least cost, or least waste in production. A few companies also mentioned having an operations research, OR department, and indicated that this is an area with good potential for marketing and that they hope to try it soon. The programs used for

Operations Research Analysis in marketing were developed either internally or with the assistance of consultants. The input data are unique for each company and consequently, computer manufacturers have not developed package OR programs other than mathematical calculation ones, which may form a sub-routine in an operations research program.

The average time the using companies of Operation Research Analysis have used computers in marketing is 7.8 years. This use of EDP in marketing is generally one of the last to be employed because of the highly sophisticated nature of the applications, and because of the high level of skills needed by the personnel. Only two companies reported using this application before they had accumulated at least six years of experience with computers. Of the nine companies using Operations Research Analysis, two are very satisfied with the results, five are moderately satisfied, and the remaining two have only started using it so could not judge.

The replies for this application are tabulated in Table XXII. The average length of time the nine companies have used EDP for Operations Research Analysis in marketing

Chapter IV - Table XXII

Distribution of the Length of Time Companies have been Using Computers
for Operations Research Analysis in Marketing

NUMBER OF YEARS USED	TOTALS			INDUS- TRIAL GOODS, MFRS.	CON- SUMER GOODS, MFRS.	INDUS- TRIAL & CONSUMER GOODS, MFRS.	INTE- GRATED MIDDLE- MEN	QUESTIONNAIRES COMPLETED BY		
	No.	%	% CUM.					MARKETING DEPARTMENT EMPLOYEES	DATA- PROCESSING DEPARTMENT EMPLOYEES	DEPARTMENT NOT INDICATED
Respondents: Total	104	100	-	29	25	32	18	38	40	26
Respondents: Operations Research	9	9	-	1	1	4	3	5	2	2
1 Year	2	2	2	1	-	1	-	1	-	1
>1 but < 2 Yrs.	1	1	3	-	-	1	-	-	1	-
>2 but < 3 Yrs.	3	3	6	-	1	1	1	3	-	-
>3 but < 4 Yrs.	1	1	7	-	-	1	1	-	1	-
>4 but < 5 Yrs.	1	1	8	-	-	1	-	1	-	-
>5 but < 6 Yrs.	-	-	8	-	-	-	-	-	-	-
>6 but < 7 Yrs.	-	-	8	-	-	-	-	-	-	-
>7 but < 8 Yrs.	-	-	8	-	-	-	-	-	-	-
>8 but < 9 Yrs.	-	-	8	-	-	-	-	-	-	-
>9 but < 10 Yrs.	1	1	9	-	-	-	1	-	-	1
10 Years or more	-	-	9	-	-	-	-	-	-	-
Years not indicated	-	-	-	-	-	-	-	-	-	-
Mean (of those indicating its use)	3.06	-	-	0.5	2.5	2.25	5.17	2.5	2.5	5.0
Std. Deviation	2.74	-	-	-	-	1.71	3.79	1.41	1.41	6.36

is 3.1 years. The means for the types of companies responding, and for the department's employees completing the questionnaire, are also shown. The tests for significance for the differences between the means was calculated and the results are negative at a 95% confidence level.

CHAPTER V

ANALYSIS OF REPLIES TO THE MARKETING EXECUTIVE QUESTIONNAIRE - PART II

ORGANIZATIONAL AND ADMINISTRATIVE RELATIONSHIPS

The analysis of the replies to the marketing executives' questionnaire is continued in this chapter. Here, the focus is on organizational and administrative relationships between the marketing and data-processing departments, and the problems created by using computers in marketing. In the final section of the chapter future applications for computers in marketing as suggested by the respondents are delineated.

I. MARKETING EXECUTIVES' INVOLVEMENT IN POLICY DECISIONS ABOUT COMPUTERS AND THEIR USES

Are marketing executives involved in any policy decisions regarding computers and their uses? In 89 companies (86% of the replies) a marketing executive is involved either directly (member of the group which sets policy) or indirectly (only consulted by the policy-making body) in decisions about computer acquisition, key data-processing personnel and/or marketing applications. In some companies the involvement is in more than one of the above three decision areas as 137 positive answers were received from the 89 companies. Regarding computer acquisition decisions -- model, size, and buy versus rent -- 13 companies (12.5%) involve a marketing executive directly, while 15 companies (14.4%) involve him indirectly. In decisions about key data-processing personnel, a marketing executive is directly involved in 11 (10.6%) and indirectly involved in 12 (11.5%) companies. However, in decisions regarding specific marketing applications, 37 companies (35.6%) directly involve a marketing executive and in 49 (47.19) the involvement is only indirect.

If consideration is given to the decision areas only, and not the degree of involvement, the replies show that in decisions about:

- i) computer acquisition - 26.9% of the companies involve a marketing executive;
- ii) key data-processing personnel - 22.1% of the companies involve a marketing executive;
- iii) specific marketing applications - 82.7% of the companies involve a marketing executive.

If, on the other hand, consideration is given to the degree of involvement regardless of the decision areas, 40.1% of the replies show a marketing executive to be directly involved, and 50% show him to be indirectly involved. (The remaining 9.9% indicated no involvement).

Answers to this question were also tabulated according to types of companies and the totals are shown in Table I. But there is not much difference in the replies from each group. Analysis of the data according to departments' employee who completed the questionnaire, also show similar answers regarding areas of involvement, but interesting

Chapter V - Table I
Marketing Executives' Involvement in Decisions about EDP

	TOTALS	PERCENTAGE	IND. GOODS* MFG.	CONS. GOODS* MFG.	IND. & CONS. GOODS* MFG.	INTE- GRATED MIDDLEMEN	MARKETING DEPT. EMPLOYEE	DATA- PROCESSING DEPT. EMPLOYEE	DEPT. NOT NAMED		
Respondents	104	100%	29	25	32	18	38	40	26		
Total Responses	152	146%	45	36	48	23	56	59	37		
No Involvement	15	14%	5	4	4	2	5	7	3		
	DIR*	IND**	DIR	IND	DIR	IND	DIR	IND	DIR	IND	
Computer Acquisition	13	15	12.5%	14.4%	7	2	4	4	7	3	4
Key Data-Processing Personnel	11	12	10.6%	11.5%	4	4	3	2	6	3	4
Specific Marketing Applications	37	49	35.6%	47.1%	9	14	9	12	12	11	9
RESPONSES	61	76	40.1%	50.0%	20	20	14	18	34	17	17

* DIR - Means DIRECT Involvement.

** IND - Means INDIRECT Involvement.

differences about the degree of involvement in computer decisions. The results are presented below.

(a) Percentage of companies involving a marketing executive in:

i) computer acquisition decisions,

- marketing department employees indicate 26.7%
- data-processing department employees indicate 27.5%;

ii) key data-processing personnel decisions,

- marketing department employees indicate 21.0%
- data-processing department employees indicate 20.0%;

iii) specific marketing application decisions,

- marketing department employees indicate 87.0%
- data-processing department employees indicate 82.5%.

(b) Percentage of replies indicating a marketing executive is involved in the decisions areas:

i) directly,

- marketing department employees indicate 46.5%
- data-processing department employees

indicate 30.5%

ii) indirectly,

- marketing department employees indicate 44.6%

- data-processing department employees

indicate 57.5%;

iii) no involvement,

- marketing department employees indicate 8.9%

- data-processing department employees

indicate 12.0%.

These figures show that marketing department employees claim a larger percentage of direct involvement by marketing executives in computer policy decisions than do data-processing department employees. The reverse is true regarding an indirect involvement. These disparities may occur for at least two reasons. First, the figures are drawn from two different sub-groups of the sample. In companies where a marketing department employee completed the questionnaire, marketers are probably more aware of the computer and its uses in marketing than would be the case in companies where the senior marketing executive had a data-

processing department employee complete it for him. This greater awareness is probably due to greater participation by marketing executives in computer decisions. Thus, the higher percentage of the replies completed by marketers indicating a direct involvement is reasonable.

A second reason for the different percentages indicated by each sub-sample might be the personal interpretation of each department's role regarding the computer. A marketing executive may feel he has more than enough to do in his own function and would prefer not to be involved in this other area. And the data-processing people may have a psychological bias against "alien" executives deciding policy for their department.

II ASSESSMENT OF THE VALUE OF COMPUTER APPLICATIONS IN MARKETING

The question was asked regarding what criteria the companies use for assessing the value of computer applications in marketing. Table II shows that the most frequently mentioned criterion is whether or not a computer provides better information than was obtained by previous methods. Included

Chapter V - Table II
Popularity of Criteria Used for Assessing Computer Applications in Marketing

STANDARD FOR ASSESSMENT	TOTAL		IND. GOODS	CONS. GOODS	IND. & CONS. GOODS	INTEGRATED MIDDLEMEN	MARKETING DEPT. EMPLOYEE	DATA- PROCESSING DEPT. EMPLOYEE	DEPT. NOT NAMED
	#	%							
Saves Time	51	24%	15	11	18	7	20	18	13
Reduces processing costs	30	14%	8	7	10	5	11	9	10
Provides better information	78	36%	23	20	19	16	32	29	17
Handles larger volume of data	4	1.8%	-	3	1	-	3	1	-
Assists in decision making	46	22%	10	13	15	8	12	22	12
Helps competitive position	5	2.3%	1	1	3	-	2	2	1
TOTAL	214	100%	57	55	66	36	80	81	53

in "providing better information" are the following: the development of information not previously available; the development of information in greater detail and more accurately; and the development of information in a consistent quantitative manner.

The second most frequently mentioned standard is whether or not use of the computer saves time. This criterion should include consideration of the time invested in developing the programs and in preparing the data to be analysed. Unfortunately it does not. Rather, companies only consider actual computer running time -- which may be misleading as a basis for evaluation. However, the criteria described here are from answers supplied by marketing executives who are probably not aware of the time required to develop the programs and to prepare the data.

The third most popular criterion is: does an application assist in decision making? This includes consideration of whether it helps in analysing alternatives, planning and expansion decisions. There are at least two possible reasons for this standard not being used more

frequently. First, many marketing analysis are not sophisticated OR and simulation analyses which provide information about alternative decisions. But as these techniques become more commonly used, EDP will be used to a greater extent in marketing to assist in decision-making. A second possible reason for the lack of use of this criterion is because there is some overlap with the first criterion mentioned - provides better information. Some respondents may have indicated one but meant the other.

The least frequently mentioned criterion is whether or not an application reduces data-processing costs. Here, too, as with the criterion about time saved, the programming and computer running costs should be considered.

The 104 respondents gave 214 answers to this question, indicating that each company uses an average of two criteria each. But this is only an average and some replies show the use of just a single standard. These criteria, however, should be used in combination as a certain application may not save processing costs but may

provide better information. If only the cost savings are considered, the application may be suspended.

III ADMINISTRATIVE PROBLEMS ENCOUNTERED FROM USING COMPUTERS IN MARKETING

Several basic administrative problems were encountered by marketers in using computers in marketing. These are grouped into seven areas, which unfortunately are not mutually exclusive due to the inevitable overlap inherent in segmenting parts of a business. The tabulation of the replies to the question regarding administrative problems is presented in Table III.

The most frequently mentioned problem is poor interdepartmental relations. This is caused by lack of adequate communications between data-processing and marketing employees. From the marketers' point of view, the problem develops because marketers do not have a good knowledge about EDP. They are not able to initiate ideas about where or how computer applications can be used or, to work with the systems analysts and explain the present or required system. Part of this problem may also be caused by the organizational relation-

Chapter V - Table III
Administrative Problems Encountered

PROBLEM AREAS	TOTAL		IND. GOODS	CONS. GOODS	IND & CONS. GOODS	INTEGRATED MIDDLEMEN	MARKETING DEPT. EMPLOYEE	DATA-PROCESSING DEPT. EMPLOYEE	DEPT. NOT NAMED
	#	%							
Interdepartmental problems communications	32	21%	7	9	10	6	10	13	9
Lack of qualified personnel									
- D.P.	32	21%	4	12	10	6	12	10	10
- MKT.	18	13%	5	4	5	4	8	6	4
Scheduling priorities - system too small	29	20%	11	6	6	6	11	13	5
Changing old procedures									
- input data	9	6%	3	2	2	2	3	3	3
- using output	10	7%	2	2	6	-	6	3	1
Costs higher than expected	6	4%	-	4	1	1	3	3	-
Output being received too late	6	4%	2	3	1	-	4	1	1
Selling management on need to use computer	6	4%	1	-	2	3	2	3	1
TOTAL	148	100%	35	42	43	28	59	55	34

ship between the two departments. The data-processing department has a staff relationship to the marketing department and usually reports to a senior financial executive. Thus the marketing department has no formal direct contact with the data-processing department or authority over its employees.

The lack of qualified people, both in the data-processing and marketing departments, is the next most frequently mentioned problem. On the EDP side, this lack of personnel means the staff is too small to handle the amount of work desired (corollary to this, is the fact that generally marketing has a low priority on the available talent). Also, the systems analysts and programmers have insufficient understanding about the operations of the marketing function. Lack of qualified personnel in the marketing department refers to a paucity of computer knowledgeable marketers who understand what can be done with EDP and capitalize on the benefits.

The next problem area, EDP system is too small, is the third most frequently mentioned. The reference here

is to the capacity of the hardware. If the system is too small it cannot handle the volume of the work requested. And departments other than marketing, for historical, organizational, or personal reasons generally have higher priority on the available capacity. These other departments include accounting, engineering, research and production. Also, if a computer is too small, it creates problems for marketers as many marketing analyses require relatively large machines to handle the number of variables, to perform the amount of calculations required by the more "sophisticated" applications, and to have the speed so that experimentation with models would not take an unreasonable amount of time. In most cases, however, the problems caused by small systems are problems of scheduling priorities and not computer capacity problems as not many companies are using advanced Operations Research work in marketing. Where they are, the capacity and personnel problems have been overcome.

The use of a computer in marketing may require changes in established procedures and this also creates problems. Changes are sometimes required for both generation

of input data and use of output. On the input side, some marketing employees may have to adjust their activities to accommodate the manner in which data are needed. On the output side, the employees may be exposed to new and better analyses and information. This will probably require the recipient to be trained to use the new data, and it may create a change in management tasks that will affect the authority relationships.

Another problem area is that of higher than anticipated data-processing costs for some marketing applications. The cause here may be with both the data-processing and marketing departments. EDP management is naturally anxious to use the capacity of the computer and thus may be too optimistic in estimating the expense to develop and run a particular application. This miscalculation of costs, however, is generally made about developmental expenses of an application and not the operating costs. Marketing departments' employees are often at fault too as they show signs of enthusiastic beginners. They use a computer to get additional data which is not worth the incremental costs and they often do not carefully define their

objectives. Also, they sometimes proceed unskillfully on a trial-and-error basis.

Frequently, the output from the computer is received too late to be useful to marketers. This problem may be a manifestation of some problems previously explained: i.e., interdepartmental relationships, lack of qualified personnel and too small an EDP system. Regarding the interdepartmental relations, the marketing executives do not have direct authority over data-processing personnel to ensure the output is developed on time. If data-processors are not knowledgeable about the marketing process, they may not appreciate how urgently the information is needed. Reasons for a delay caused by insufficient data-processing personnel and/or the system is too small, are self-explanatory.

The last problem area is that of convincing management on the need to use a computer in marketing. This problem has vertical as well as horizontal dimensions. The vertical dimension refers to the problem of convincing top management on the need to invest in an EDP system large enough to accommodate the requests of marketing and other

functions. The horizontal dimension refers to persuading marketing management to use a computer. Many marketing managers are more diffident in this regard than executives in other functions because they are not as quantitatively oriented, nor as familiar with computers.

IV THE SOLUTIONS TO THE PROBLEMS

The solutions attempted to the seven problem areas mentioned above are listed in Table IV. These are discussed below in descending order according to number of companies mentioning each. Inauguration of an educational program about EDP is the most frequently mentioned solution. Through this, companies hope marketing employees can gain a better appreciation and understanding of computers.

The second method of solving the problems is to have an exchange of personnel between the marketing and data-processing departments. The resulting mutual acquisition of information about each other's work is invaluable in suggesting and exploring new uses for computers in marketing.

Chapter V - Table IV
Present Solutions to Problems

SOLUTION	TOTAL		IND. GOODS	CONS. GOODS	IND. & CONS. GOODS	INTEGRATED MIDDLEMEN	MARKETING DEPT. EMPLOYEE	DATA- PROCESSING DEPT. EMPLOYEE	DEPT. NOT NAMED
	#	%							
Inaugurated educational program	22	21%	6	4	6	6	6	10	6
Inter-department personnel exchange	20	19%	5	6	4	5	7	7	6
New controls and priority committee established	16	15%	5	4	3	4	9	3	4
Developed new and larger EDP system	13	12%	3	4	4	2	6	5	2
More senior management involvement	6	5.5%	1	1	4	-	2	4	-
Hires better trained personnel	4	3.6%	2	-	-	2	2	1	1
No solution yet	26	24%	6	9	8	3	11	10	5
TOTAL	107	100%	28	28	29	22	43	40	24

The next solution is to develop controls over computer applications through a committee empowered to make and enforce priorities. This solution is primarily concerned with scheduling the data-processing department's work so that output is not received too late to be useful.

Several companies have also tried to solve the problems by enlarging the number of data-processing personnel and/or the size of their computer. In many cases only the former is required at present, as most companies are not using their computer(s) to capacity because of the lack of qualified programmers and systems analysts. Where a computer's capacity is taxed, applications can be farmed out to computer service centers.

Next, a few companies are trying to solve the problems by emphasizing more involvement of senior management in the use of computers. Through this, they hope to overcome the interdepartment problems as top management would take a broader look at the relative importance (payoff) of computer applications.

Not a solution to the problems, but the most frequently mentioned answer to the question about corrective measures being taken was "nothing, at present". Over 25% of the companies gave this reply. In fact a number of respondents indicated they are looking forward to the results of this research for guidance as to what can be done.

There are no meaningful differences between the types of companies for the solutions proposed. However, there is a difference worth noting in the answers supplied by the employees of the different departments. Three times as many marketers intimated that a committee needs to be established to set priorities and controls on the use of EDP. This answer reflects their feelings about the source of many problems - the EDP department. On the other hand, the data-processing employees mentioned almost twice as frequently as did marketers the inauguration of an education program. This answer implies that they think the source of the problems lies in the marketing department's lack of understanding about EDP.

V HOW THE PROBLEMS SHOULD BE SOLVED

The question, "In light of your experience, would you deal with any of the above indicated problems differently, and, if so, how?" was asked of the companies. One-third of the companies indicated that they would change their approach. The normative solutions suggested are presented in Table V. The order in which they are discussed below corresponds to the rank order according to the number of companies mentioning each.

1. Place more emphasis on educating personnel.

This solution includes both marketing and data-processing staff and refers primarily to education about the activities of the other department.

2. Spend more time planning.

The reference here is to the planning required before a system is developed as well as that associated with using existing applications. Interestingly, this fundamental approach is

Chapter V - Table V

Tabulation of the Answers about how Companies Should Try to Solve the Problems

SOLUTION	TOTAL		IND. & CONS. GOODS	IND. & CONS. GOODS	INTEGRATED MIDDLEMENT	MARKETING DEPT. PERSONNEL	DATA-DEPT. PERSONNEL	DEPT. NOT NAMED
	#	%						
More emphasis on education of staff	12	29%	4	2	1	3	3	1
More time in planning	9	21%	2	4	1	3	2	4
Better communications-exchange of personnel	8	19%	-	1	3	1	6	1
Get a larger system	5	12%	2	1	1	4	1	-
Regard EDP as service to all departments (organization)	5	12%	2	1	1	3	1	1
Recognize the importance of the problem	2	4.79%	-	-	1	1	-	1
Purchase service outside company	1	2.39%	-	-	-	1	-	-
TOTAL	42	100%	10	9	15	16	18	8

conspicuously absent from the list of solutions presently used as described in the previous section. A possible reason for companies not mentioning "planning" under current solutions is due to the fact that most companies suggest this solution in reference to the planning required before a commitment is made for a system, and not to the continuous planning required for successful employment of each application. Thus, if a system is already installed, a company would not be using "planning" as a current solution.

3. Create a climate that will encourage better communications and exchange of personnel.

This suggestion refers to a two-way flow of employees between the marketing and data-processing departments.

4. Expand the size of the EDP system.

The reference here is to hardware, software and data-processing personnel. An undercurrent in this suggestion is that insufficient planning preceded the commitment

to the present system. If more emphasis were placed on planning, perhaps the initial system would have been adequate, at least in terms of hardware, for a longer period of time. In some cases, however, this answer may be an excuse rather than a solution -- an excuse offered by data-processing people for not giving adequate service to marketing, and other departments.

5. Emphasize the fact that the data-processing department is a service department to all functions of the company.

This solution is closely allied with two of the methods presently being used: more senior management involvement, and the development of a committee to set controls and priorities on applications.

6. Recognize that use of computers will bring problems.

This suggests more emphasis should be placed on planning and that prophylactic action should be taken for anticipated problems.

7. Purchase computer services outside the company.

In many cases this may be the easiest solution at present for the marketing department, but is rather myopic. If this were done, a company may be trading long term benefits (by having their data-processing employees exposed to marketing and doing present applications) for immediate ease of overcoming some problems.

If these suggested solutions are considered by types of companies, there are no meaningful differences in the replies. But if they are considered according to departments' employees completing the questionnaires, again each suggests answers that reflect inadequacies in the other department. For example, the most commonly suggested solutions by the data-processing personnel are: "more emphasis on education", and "better communications". The former implies a lack of understanding about the rigors imposed by using EDP on the part of marketing employees, while the latter refers primarily to marketers' inability to explain their needs to enable better use of the output.

On the other hand, the most frequently suggested solution by the marketing employees is "get a larger EDP system".

VI THE ORGANIZATIONAL AND ADMINISTRATIVE CHANGES IN THE MARKETING FUNCTION CAUSED BY USING COMPUTERS

Throughout this research it is suggested that use of computers has caused, and will cause, substantial changes to be made in marketing. The marketing executives were asked about the effects using a computer has had on their departments. The replies, grouped into six areas, are presented in Table VI.

The most frequently mentioned effect is that the scope of some departments has been expanded. The use of EDP has allowed more areas to be examined, more relevant data to be analysed, and more activities to be controlled. For example, in one company, the marketing function took over their own financial analyses as the bookkeeping chore is done by the computer. Another illustration of the expanded scope is the company which established a new department in marketing to handle special projects previously done by ad hoc task forces. This is now possible because the computer can

Chapter V - Table VI
Organizational & Administrative Effects
The Use of Computers has had on the Marketing Function

SOLUTION	TOTAL		IND. GOODS	CONS. GOODS	IND. & CONS. GOODS	INTEGRATED MIDDLEMEN	MARKETING DEPT. EMPLOYEE	DATA- PROCESSING DEPT. EMPLOYEE	DEPT. NOT NAMED
	#	%							
Scope of departments expanded	38	30%	17	7	8	6	20	11	7
Alignment of responsibilities	32	25%	3	14	7	8	9	14	9
Forces a more objective look at decision areas	13	10%	3	3	4	3	6	5	2
Reduction of marketing costs	7	5.5%	1	3	2	1	3	3	1
Increase in more technically trained personnel	2	1.5%	-	1	-	1	2	-	-
No effect	35	28%	10	9	8	8	8	17	10
TOTAL	127	100%	34	37	29	27	48	50	29

do the special statistics and accounting tasks previously done by people from other departments.

The next effect, closely allied to the previous one, is that computer usage has enabled realignment of some marketing employees' responsibilities. For example, some companies now allow marketing to employ and supervise data-processing personnel. In other companies product managers were relieved of a lot of statistical work and so could expand their responsibilities to other products and/or activities (e.g., in one company the product managers now had more time to spend in the market so they started supervising some marketing research studies about their products).

A number of respondents also claimed that by using EDP they can take a more objective look at decision areas and alternative courses of action.

The three above-mentioned effects are closely associated. They all pertain to the benefit of being able to increase marketing executives' managerial responsibilities.

Another effect, but mentioned by only two companies, is that the use of computers has forced marketing to employ more and better technically trained people (not necessarily just computer trained, but more quantitatively trained) - primarily in marketing research.

Changes in methods of marketing (resulting in increased profits) is also indicated by some respondents as an effect of using EDP. Some of the areas where a cost reduction has been experienced are: clerical cost reduction; more effective use of elements in the promotional mix such as salesmen and advertising; and reduction in inventory costs. Costs have also been reduced through the more efficient use of managers made possible by employing computers.

Lastly, a large number of companies (35) claim there has been no effect on the organizational and administrative activities of the marketing function attributable directly to EDP. However, this situation will probably change as these companies increase their use of computers.

In Table VI the answers are tabulated about the effects EDP has had on the marketing function. The replies

are analysed by type of company responding and by departments' employee completing the questionnaire. In two areas the answers differ widely between the industrial goods' producers and the consumer goods' producers. In the former, 17 companies claim that the scope of the marketing departments has been expanded, while only 7 consumer goods' manufacturers gave this answer. On the other hand, 14 of the companies making only consumer goods, compared with 3 industrial goods' producers, indicate a "realignment of responsibilities". These two effects are closely allied and even overlap; therefore, the differences in the tabulations are not considered meaningful.

The replies, if considered by departmental employees completing the questionnaire, show largest difference occurs in the "no effect" answer. Eight marketing employees make this claim, and 17 data-processing employees do so. This difference is logical; the data-processing employees are probably not as familiar with the organization and administration effects in the marketing department caused by computers.

VII STEPS TAKEN TO ACQUAINT MARKETERS WITH THE POTENTIAL OF EDP

In view of the vast potential of computers in marketing, and the relatively limited use to date, an important consideration for senior marketing management is how to prepare their employees to capitalize on the advantages of EDP. Table VII shows the main emphasis to be on educational programs operating within the companies. Fifty percent of the replies indicated the use of this activity. External education programs (i.e., programs at universities or by computer manufacturers) are also employed, but less extensively.

Another method used is to encourage employees to educate themselves on their own time. This is done by paying for their fees to EDP courses and by providing reference books and monetary incentives. But only four respondents indicated the use of this technique.

A significant minority of companies (14) prefer to expose their employees to EDP as the need arises in the performance of their jobs. Five companies reported they are doing nothing in this area at present.

Chapter V - Table VII
Steps Taken to Acquaint Marketing Personnel with EDP Potential

	TOTAL		IND. GOODS	CONS. GOODS	IND. & CONS. GOODS	INTEGRATED MIDDLEMEN	MARKETING DEPT. EMPLOYEE	DATA- PROCESSING DEPT. EMPLOYEE	DEPT. NOT NAMED
	#	%							
Internal educational activity	51	60%	15	14	14	8	20	23	9
External educational activity	11	13%	2	3	4	2	2	4	5
Self-education	4	5%	-	-	2	2	2	1	1
Exposed as needed	14	16%	3	3	4	4	8	4	2
Neglected area - nothing being done	5	6%	1	2	1	1	-	5	-
TOTAL	85	100%	21	22	25	17	32	37	17

VIII FUTURE USES FOR COMPUTERS IN MARKETING

Each company was asked about what computer applications they are planning to employ in the future, and about what other areas they think hold potential in marketing. The answers to these two questions are shown in Tables VIII and IX respectively.

Market Forecasting is the application being considered by the most companies (29%); next is Marketing Planning (26%). Consideration of these two applications seems to indicate that these companies have probably gone through, or are nearing the end of the first stage in the evolution of computer usage in marketing -- i.e., using EDP for only accounting and tabulation type applications. Other factors contributing to increased interest in these two applications are:

- (a) new techniques being developed that are easily handled by computers, e.g., exponential smoothing for forecasting;
- (b) marketing management becoming increasingly interested in both these areas, (this is manifest

Chapter V - Table VIII
Future Uses of the Computer in Marketing Being Considered

	TOTAL	IND. GOODS*	CONS. GOODS*	IND. & CONS. GOODS	INTE- GRATED MIDDLEMEN	MARKETING DEPT. EMPLOYEE	DATA- PROCESSING DEPT. EMPLOYEE	DEPT. NOT NAMED
<u>SALES MANAGEMENT</u>	10	4	3	3	-	6	1	3
Sales Analysis	1	-	-	-	1	1	-	-
Sales Management	5	2	-	1	2	1	4	-
Sales Territories	-	-	-	-	-	-	-	-
Service Policies								
<u>PHYSICAL DISTRIBUTION</u>								
<u>MGT.</u>	6	3	-	-	3	1	5	-
Physical Distribution	2	-	-	2	-	1	-	1
Distribution Channels	21	7	4	8	2	12	7	2
Inventory Mgt.								
<u>MARKETING MANAGEMENT</u>	26	5	5	9	7	12	9	5
Planning	29	4	9	9	7	12	13	4
Forecasting	13	4	4	2	3	2	6	5
Marketing Mgt.	11	2	5	3	1	6	4	1
Advertising								
<u>FINANCIAL ASPECTS</u>	2	1	-	1	-	1	1	-
Distribution Costs	3	-	-	1	2	1	2	-
Pricing	7	2	-	1	1	2	4	1
Credit Administration	8	2	1	4	2	1	3	4
Financial Aspects				3				
<u>RESEARCH</u>	25	6	5	10	4	10	10	5
Marketing Research	19	4	4	7	4	8	7	4
Operations Research								

Chapter V - Table IX
Potential "Future" Uses for the Computer in Marketing

	TOTAL	IND. GOODS*	CONS. GOODS*	IND. & CONS. GOODS*	INTER-GRATED MIDDLEMEN	MARKETING DEPT. EMPLOYEE	DATA-PROCESSING DEPT. EMPLOYEE	DEPT. NOT NAMED
<u>SALES MANAGEMENT</u>								
Sales Analysis	8	2	2	2	2	5	2	1
Sales Management	1	1	-	-	-	-	1	-
Sales Territories	4	2	1	1	-	3	1	-
Service Policies	-	-	-	-	-	-	-	-
<u>PHYSICAL DISTRIBUTION MGT.</u>								
Physical Distribution	1	-	-	-	1	-	1	-
Distribution Channels	2	-	1	-	1	-	-	2
Inventory Mgt.	9	2	2	5	-	2	3	4
<u>MARKETING MANAGEMENT</u>								
Planning	9	3	1	4	1	4	4	1
Forecasting	14	7	3	-	4	3	8	3
Marketing Mgt.	5	1	3	1	-	3	2	-
Advertising	4	-	3	1	-	-	4	-
<u>FINANCIAL ASPECTS</u>								
Distribution Costs	1	-	1	-	-	-	-	1
Pricing	1	-	1	-	-	-	-	1
Credit Administration	3	2	1	-	-	-	2	1
Financial Aspects	4	1	3	-	-	1	3	-
<u>RESEARCH</u>								
Marketing Research	21	5	4	8	4	7	9	5
Operations Research	25	4	9	7	5	7	12	6

by the growing number of articles and books about them);

- (c) computer manufacturers developing programs for these applications.

Marketing Research is the third most frequently mentioned potential application. Here, 24% of the responding companies indicated interest. Next is Inventory Management, with 20% of the companies expressing plans to use EDP in this area. Operations Research was mentioned by 19% of the respondents. The number of companies presently using this last application is fairly small. As experience is accumulated in using computers, many companies begin to consider these more "sophisticated" applications. And as more people are trained in the techniques of Operations Research, it will become more widely used in marketing.

Table IX refers to the potential computer applications which the companies think will be beneficial in marketing, but which are not yet being considered for use. The applications under the general heading of research are the most commonly mentioned -- Marketing Research and Operations

Research. Although many companies are using EDP in Marketing Research, the present applications are of the tabulation type, while the analyses referred to as future uses are more sophisticated: e.g., supply-demand forecasts and development of input-output models for particular industries. Operations Research is an area that has been sampled only lightly by marketing, but is one which has great potential.

Other frequently mentioned potential applications are in the general area of Marketing Management. Forecasting and Planning are included here, and over 20% of the companies feel these two areas are important in future considerations about using EDP in marketing.

In hypothesizing about future uses of computers in marketing it should be recognized that the length of time taken by companies before they do more, and more advanced, marketing analyses on a computer is contracting. Companies that have started using a computer only recently are not requiring the same length of time before introducing additional applications as did the "pioneers". The reasons for this are:

- (a) the availability of larger and faster computers,
- (b) the availability of more technically trained computer personnel,
- (c) computer manufacturers doing more development work on programs and applications,
- (d) marketing executives becoming more aware of the benefits of using a computer, and
- (e) development of new computer applications for other functions may be approaching a level of diminishing returns.

CHAPTER VI

ANALYSIS OF REPLIES TO THE DATA-PROCESSING EXECUTIVES'

QUESTIONNAIRE - PART I

PRESENTLY USED APPLICATIONS

These next two chapters contain the analysis of the replies to the data-processing executives' questionnaire in a parallel manner to that of the preceding two chapters. This chapter deals with information regarding computer applications. In the following chapter an analysis of relationships between the marketing and data-processing departments is presented.

A number of questions asked of data-processing executives were not included in the marketing executives' questionnaire because it was felt the latter group would not be familiar enough with much of the information requested.

I. NUMBER OF YEARS COMPANIES HAVE USED COMPUTERS

This question is one that was not asked of the marketing executives. Table I shows the analysis of the replies regarding the length of time computers have been used by the 108 responding companies. The mean time is 6.2 years, with a standard deviation of 2.8 years. The averages for the four groups of companies are also shown. These figures are 6.2, 5.4, 6.9 and 6.6 years for the industrial goods' producers, consumer goods' producers, manufacturers of both industrial and consumer goods, and integrated middlemen respectively.

A "t" test was calculated for each pair of the above means to determine if there were any significant differences (at a 95% confidence level). The only difference which is significant is between consumer goods' producers and industrial-and-consumer goods' producers. The average for the former is the shortest, while the latter have used EDP for the longest time. Thus, it can be claimed that industrial-and-consumer goods' producers have used a computer, on the average, for a longer period of time (1.5 years longer) than have consumer goods' manufacturers.

Chapter VI - Table I
 Distribution of the Number of Years Responding Companies have Used Computers

	TOTAL			INDUSTRIAL GOODS, MFG.	CONSUMER GOODS, MFG.	INDUSTRIAL & CONSUMER GOODS, MFG.	INTEGRATED MIDDLEMEN
	#	%	CUM. %				
RESPONDENTS	108	100%	-	27	34	24	23
1 Year or Less	3	2.8	2.8	1	-	1	1
> 1 but < 2	2	1.9	4.7	-	1	-	1
> 2 but < 3	8	7.4	12.1	4	3	-	1
> 3 but < 4	12	11.1	23.2	1	4	4	3
> 4 but < 5	19	17.6	40.8	5	11	2	1
> 5 but < 6	10	9.3	50.1	3	2	3	2
> 6 but < 7	11	10.2	60.3	2	4	2	3
> 7 but < 8	13	12.0	72.3	4	6	1	2
> 8 but < 9	6	5.7	78.0	-	1	2	3
> 9 but < 10	12	11.1	89.1	4	1	4	3
10 Yrs. or More	11	10.2	99.3	3	1	4	3
DID NOT ANSWER	1	.8	100.00	-	-	1	-
MEAN	6.19	-	-	6.19	5.40	6.93	6.61
STD. DEVIATION	2.81	-	-	2.98	2.15	3.05	3.10

II. NUMBER OF YEARS COMPANIES HAVE USED COMPUTERS IN MARKETING

Of the 108 responding companies, 101 indicated that a computer is used to assist in marketing analyses. The mean number of years for use is 5.3 years. This indicates that, on the average, use of computers in marketing is new since 1960. Table II shows the statistics for the four groups of companies: industrial goods' producers have, on the average, made use of EDP in marketing 5.04 years; consumer goods' producers 4.9 years; industrial-and-consumer goods' manufacturers 6.2 years; and the integrated middlemen for 5.2 years. Only the difference between the averages for consumer goods' producers and manufacturers of both industrial and consumer goods is significant.

From the averages obtained for the time computers have been used in business for any purpose and for marketing, it can be seen that companies generally do not employ EDP in marketing during their first year of computer use (6.2 years versus 5.3 years). The respective time lags for each type of company are:

Chapter VI - Table II

Distribution of the Number of Years Computers have been used in Marketing

	TOTAL		INDUSTRIAL GOODS, MFG.	CONSUMER GOODS, MFG.	INDUSTRIAL & CONSUMER GOODS, MFG.	INTEGRATED MIDDLEMEN
	#	%				
RESPONDENTS	108	100%	27	34	24	23
1 Year or Less	4	3.7	1	-	1	2
> 1 but ≤ 2	9	8.3	2	4	2	1
> 2 but ≤ 3	9	8.3	4	1	2	2
> 3 but ≤ 4	13	12.0	2	5	2	4
> 4 but ≤ 5	19	17.6	4	11	2	2
> 5 but ≤ 6	6	5.6	3	2	1	-
> 6 but ≤ 7	11	10.2	-	4	3	4
> 7 but ≤ 8	9	8.3	3	3	2	1
> 8 but ≤ 9	6	5.6	1	-	2	3
> 9 but ≤ 10	7	6.5	2	1	3	1
10 Yrs. or More	6	5.6	1	1	3	1
MARKETING FUNCTION DOES NOT MAKE USE OF COMPUTERS.	7	6.5	4	1	1	1
DID NOT ANSWER	2	1.9	-	1	-	1
MEAN	5.30	-	5.04	4.86	6.22	5.24
STD. DEVIATION	2.83	-	2.89	2.22	3.31	3.02

- i) industrial goods' producers1.2 years,
- ii) consumer goods' producers0.5 years,
- iii) industrial and consumer goods'
producers0.7 years,
- iv) integrated middlemen1.4 years.

There are four primary reasons for this lag. First, the computer is generally under the administration of a financial manager, such as comptroller or vice-president of finance and this executive tends to favor his own department's use of the computer. Second, package programs are available for many of the accounting and financial analyses, such as accounts receivable, accounts payable and payroll, but are not available for most marketing analyses. Third, marketing personnel generally are not familiar with computers and what they can do. Fourth, many variables in marketing are hard to quantify, and the programs take a longer time to develop.

III . WHAT COMPUTER APPLICATIONS DOES THE MARKETING FUNCTION
OF YOUR COMPANY NOW USE?

. HOW LONG HAS EACH OF THESE APPLICATIONS BEEN USED?

The replies to these questions are tabulated in Tables III to XXIII inclusive. Each application, as well as comparisons between applications, are discussed below.

A. NUMBER OF APPLICATIONS USED

A situation similar to that described in Chapter IV has been encountered in classifying specific applications. Many respondents considered different parts of specific analyses as a separate application. Where this has been the case, the indicated applications were regrouped. In Table III the number of applications listed by the respondents is shown and in Table IV the number used by each respondent once the applications had been reclassified is indicated.

The average number of applications claimed to be used is 4.5. This statistic for the types of companies is also shown in Table III. And there is not a significant difference between any pair of means at a 95% confidence level.

Chapter VI - Table III
 Distribution of the Number of Computer Applications Used in Marketing
 as Listed by the Respondents

APPLICATIONS LISTED							
	TOTAL			Indus- trial Goods'Mfg.	Consumer Goods' Mfg.	Industrial & Consumer Goods'Mfg.	Integrated Middlemen
	#	%	Cum. %				
Respondents	108			27	34	24	23
One Application	4	4	4	1	1	-	2
Two Applications	8	8	12	1	2	3	2
Three Applications	12	11	23	3	3	3	3
Four Applications	11	10	33	1	6	3	1
Five Applications	17	15	48	7	5	1	4
Six Applications	16	14	62	4	3	5	4
Seven Applications	10	9	70	3	2	3	2
Eight Applications	6	6	77	1	1	3	1
Nine Applications	3	3	80	-	2	-	1
Ten Applications	5	5	85	1	2	1	1
Eleven Applications	5	5	90	-	3	1	1
Twelve Applications	1	1	91	-	1	-	-
Did Not Indicate	10	9	100	5	3	1	1
Mean	4.54	-	-	4.18	5.0	4.57	4.23
Standard Deviation	2.64	-	-	2.04	3.06	2.52	2.76

Thus, the variations between the average number of applications indicated by each type of company can be considered as chance variations.

The average number of applications, after reclassification, used by each respondent is 2.9. The averages for each type of company are shown in Table IV. Here too, the differences are not significant at a 95% level.

B. THE APPLICATIONS AND THEIR RANKINGS

The computer applications¹ used in marketing are listed in Table V along with the number of companies using each and the average time used. The average time each application has been used by all respondents, including those who are not yet using a specific application (considered as zero time) is also shown. Column two in the Table shows the ranking order for the applications, from the most frequently mentioned to the least. Sales Analysis is used by the largest number of companies (70) and Inventory Management is second with 64 companies. The order of ranking for these two

¹ For the balance of this chapter, the term "application" refers to the reclassified applications unless otherwise stated.

Chapter VI - Table IV

Distribution of the Number of Applications, after Reclassification,
Used in Marketing

SPECIFIC APPLICATIONS							
	TOTAL			IND. GOODS MFG.	CONSUMER GOODS MFG.	INDUSTRIAL & CONSUMER GOODS MFG.	INTEGRATED MIDDLEMEN
	#	%	Cum. %				
Respondents	108	-	-	27	34	24	23
One Application	6	6	6	2	2	-	2
Two Applications	14	13	19	3	4	4	3
Three Applications	21	19	38	6	5	6	4
Four Applications	24	22	60	2	10	4	8
Five Applications	18	17	77	7	4	4	3
Six Applications	11	10	87	2	4	3	2
Seven Applications	3	3	90	-	1	2	-
Eight Applications	1	1	91	-	1	-	-
Nine Applications	-	-	-	-	-	-	-
Ten Applications	-	-	-	-	-	-	-
Eleven Applications	-	-	-	-	-	-	-
Twelve Applications	-	-	-	-	-	-	-
Did Not Indicate	10	9	100	5	3	1	1
Mean	2.86	-	-	2.68	3.0	3.09	2.59
Standard Deviation	1.55	-	-	1.52	1.67	1.59	1.40

Chapter VI - Table V
 Rankings of the Computer Applications Used in Marketing by Number of Companies
 Using Them and by the Average Length of Time Used

Application	# of Cos. Using	Rank	Average Time Used			Average For All Respondents		
			Mean	Std. Dev.	Rank	Mean	Std. Dev.	Rank
I SALES MANAGEMENT								
1. Sales Analysis	70	1	5.28	2.87	4	3.27	7.55	1
2. Sales Management	22	7	4.80	2.90	6	0.98	5.13	7
3. Sales Territory	31	6	4.43	3.30	7	1.23	5.80	5
4. Service Policies	5	12	5.5	2.0	2	0.25	2.70	11
II PHYSICAL DISTRIBUTION MANAGEMENT								
1. Physical Distribution	36	5	3.46	2.44	14	1.08	4.65	6
2. Distribution Channels	4	13	6.5	2.94	1	0.24	2.93	12
3. Inventory Mgt.	64	2	4.95	2.71	5	2.70	7.01	2
III MARKETING MANAGEMENT								
1. Planning	21	8	4.21	3.04	8	0.74	4.49	8
2. Forecasting	41	4	3.73	3.20	12	1.38	5.83	4
3. Marketing Mgt.	6	11	3.83	2.73	11	0.21	2.34	13
4. Advertising	3	16	0.5	--	17	0.01	0.18	17
IV FINANCIAL ASPECTS OF MARKETING								
1. Distribution Costs	9	10	5.44	3.50	3	0.45	3.95	9
2. Pricing	4	13	2.25	1.71	15	0.08	1.13	15
3. Credit Administration	4	13	2.0	0.71	16	0.04	0.62	16
4. Financial Aspects	10	9	3.5	2.29	13	0.29	2.55	10
V RESEARCH								
1. Marketing Research	49	3	4.02	3.18	10	1.68	6.29	3
2. Operations Research	3	16	4.17	4.73	9	0.12	2.08	14

applications also corresponds to the rank order according to average length of time used by all respondents. The least mentioned applications are Advertising and Operations Research, which are both used by only three companies. The lowest ranked applications according to average time used by all respondents are Credit Administration (16th) and Advertising (17th). The number of users, the average time used, and the rankings according to the different criteria, are discussed in the following sections about each application.

The rankings, according to the number of companies using the applications and according to the mean time used by all respondents, have a co-efficient of rank correlation equal to 0.86.

The length of time each application has been used (cross-sectional analysis) indicates, in a general way, the sequence in which companies put the various marketing applications onto computers. As was indicated in Chapter IV, this ranking also approximates, in reverse order, the sophistication of the various applications.

C THE SEQUENCE OF USING THE APPLICATIONS

Another method for determining the sequence that companies go through regarding their use of EDP in marketing is to categorize the responses by length of time computers have been used, and then see when the companies started using each of the applications (a longitudinal analysis). This is done in Table VI. The figures along the top refer to the number of years the companies have used computers and the applications are listed down the side. The figures in the cells show how many companies started to use each application in a specific year of computer experience.

The companies which have used computers in marketing for one year or less, employ only the following five applications: Sales Analysis, Sales Territory Analysis, Physical Distribution Analysis, Inventory Management, and Financial Analysis in Marketing. An important reason for the introduction of these uses early in a company's experience is that the programs required to do the analyses are available from most computer manufacturers.

Chapter VI - Table VI

Distribution of the Length of Computer Experience Before Specific Marketing Applications

Application	One Year or Less	1 2	3	4	5	6	7	8	9	10 or More	TOTALS	Mean (Yrs)	Standard Deviation
<u>SALES MANAGEMENT</u>													
Sales Analysis	2	5	5	7	12	6	9	8	5	7	70	5.8	2.8
Sales Management	-	1	3	3	1	2	3	2	2	3	22	6.2	2.9
Sales Territory	2	4	4	1	6	3	4	1	1	3	31	5.1	3.1
Service Policies	-	-	-	-	1	1	-	2	2	1	5	7.3	2.1
<u>PHYSICAL DISTRIBUTION MANAGEMENT</u>													
Physical Distribution	1	3	2	5	6	3	4	3	3	3	36	5.7	2.9
Distribution Channels	-	-	-	1	-	-	-	2	2	1	4	7.5	2.7
Inventory Management	1	3	4	8	11	7	8	5	6	5	64	5.9	2.7
<u>MARKETING MANAGEMENT</u>													
Planning	-	1	3	2	4	2	3	2	2	1	21	5.5	2.5
Forecasting	-	3	4	2	6	4	6	5	4	4	41	6.3	2.8
Marketing Management	-	1	2	-	-	1	-	-	-	-	6	4.5	2.7
Advertising	-	1	-	-	-	1	-	1	1	-	3	5.1	3.5
<u>FINANCIAL ASPECTS OF MARKETING</u>													
Distribution Costs	-	-	1	1	1	1	2	1	-	1	9	6.3	2.7
Pricing Analysis	-	-	1	1	1	-	-	1	1	-	4	6.0	2.4
Credit Administration	-	-	1	-	-	-	1	1	1	-	4	6.8	3.1
Financial Analysis	1	1	1	-	2	1	2	-	1	-	10	4.8	2.9
<u>RESEARCH</u>													
Marketing Research	-	3	4	2	9	5	6	5	6	5	49	6.3	2.7
Operations Research	-	1	-	-	-	-	-	-	-	1	3	6.2	4.1
TOTALS	7	27	34	33	60	37	48	34	38	26	382	5.9	2.8

In the second year of computer usage the number of different applications employed increases to 12. The new applications during this year are: Sales Management Analysis, Marketing Research Analysis, Operations Research Analysis and all four analyses grouped under the general heading of Marketing Management. The application used by the greatest number of companies in this year is Sales Analysis (5 companies).

During the third year of computer experience the new applications are Distribution Costs Analysis, and Credit Administration Analysis. Again the most commonly used was Sales Analysis (5 companies), followed by Sales Territories Analysis, Inventory Management, Forecasting, and Marketing Research -- each with four companies using them.

The fourth year is similar to the third in that only two new application are added -- Distribution Channels Analysis and Pricing Analysis. The ones used by the greatest number of companies are Inventory Management Analysis (8 companies) and Sales Analysis (7 companies).

During the fifth year Service Policies Analysis was the only new application, and this is the last one to be added.

Thus, by the end of the fifth year of computer experience, all 17 applications are being used by the responding companies. The most popular applications are still Inventory Management and Sales Analysis.

IV. ANALYSIS OF THE SPECIFIC APPLICATIONS

The specific analyses included in each application listed below are the same as those indicated under the corresponding section of Chapter IV; thus, the descriptions will not be repeated here. This is also true regarding the availability of programs for the applications.

A. SALES MANAGEMENT

1. Sales Analysis

Computer usage for Sales Analysis ranks first of all applications by both the number of users (70) and the length of time used (3.3 years). Fifty of the 70 companies using computers for Sales Analysis indicated this application to be successful. The main reasons for this are: (a) provides better and more accurate information than was previously

available, (b) serves management's needs for information, and (c) assists management in planning and control. It is of interest to note that 20 of the responding companies were not pleased with this application. This, however, is mainly because marketing management is not using the capabilities of EDP properly. They do not know what data they want nor how it should be organized.

The tabulation of the replies about computer usage for Sales Analysis is presented in Table VII. Companies have been employing this application an average of 5.3 years, and this distribution has a standard deviation of 2.9 years. The industrial goods' producers have used computers for Sales Analysis on the average 5.3 years, consumer goods' producers 4.3 years, manufacturers of both industrial and consumers' goods 6.3 years, and integrated middlemen 5.3 years.

Only the difference between the means for the consumer goods' producers and the producers of both industrial and consumer goods is significant.

Chapter VI - Table VII
Distribution of the Length of Time Companies have Used Computers
for Sales Analysis

	TOTAL			INDUSTRIAL GOODS, MFG.	CONSUMER GOODS, MFG.	INDUSTRIAL & CONSUMER GOODS, MFG.	INTEGRATED MIDDLEMEN
	#	%	CUM. %				
RESPONDENTS	108	100%	-	27	34	24	23
RESPONDENTS - SALES ANALYSIS	70	64%	-	11	26	19	14
1 Year or Less	5	4.6	4.6	1	3	1	-
> 1 but < 2	4	3.7	8.3	-	2	1	1
> 2 but < 3	8	6.8	15.1	2	3	1	2
> 3 but < 4	5	4.6	19.7	-	2	2	1
> 4 but < 5	13	12.0	31.2	3	5	3	2
> 5 but < 6	3	2.8	34.5	-	1	2	-
> 6 but < 7	10	9.3	43.8	1	4	1	4
> 7 but < 8	8	6.8	50.6	2	4	1	1
> 8 but < 9	3	2.8	53.4	1	-	1	1
> 9 but < 10	4	3.7	57.1	1	-	3	-
10 Yrs. or More	4	3.7	60.8	-	-	3	1
APPLICATION LISTED BUT NO. OF YEARS NOT LISTED	3	2.8	-	-	2	-	1
MEAN	5.28	-	-	5.32	4.29	6.32	5.34
STD. DEVIATION	2.87	-	-	2.82	2.40	3.34	2.70

2. Sales Management Analysis

Sales Management Analysis ranks seventh according to both the number of companies using it (22) and the average time used (0.98 years).

Of the companies using computers in this area, 19 are satisfied with the results, and only 3 are not. The main reason given for the success is that it provides better and more timely information upon which Sales Management can act.

Most companies using this application started doing so only after they gained some experience on EDP in other marketing applications. No respondents tried Sales Management Analysis in their first year of computer experience and only one did so in the second year. Generally, it is during the third and fourth years that most companies feel confident enough, or have the necessary staff to handle Sales Management Analysis.

The tabulation of the replies for this application is shown in Table VIII. The average length of time Sales Management Analysis has been used is 4.8 years. Industrial

Chapter VI - Table VIII
 Distribution of the Length of Time Companies have Used Computers
 for Sales Management Analysis

	TOTAL			INDUSTRIAL GOODS* MFG.	CONSUMER GOODS* MFG.	INDUSTRIAL & CONSUMER GOODS* MFG.	INTEGRATED MIDDLEMEN
	#	%	CUM. %				
RESPONDENTS	108	100%	-	27	34	24	23
RESPONDENTS - SALES MANAGEMENT	22	20.7	-	4	5	7	6
1 Year or Less	3	2.8	2.8	-	-	2	1
> 1 but < 2	-	-	2.8	-	-	-	-
> 2 but < 3	4	3.7	6.5	1	1	1	1
> 3 but < 4	2	1.9	8.4	-	1	-	1
> 4 but < 5	2	1.9	10.3	1	-	1	-
> 5 but < 6	5	4.8	15.1	1	2	-	2
> 6 but < 7	2	1.9	17.0	1	-	-	1
> 7 but < 8	-	-	17.0	-	-	-	-
> 8 but < 9	2	1.9	18.9	-	1	1	-
> 9 but < 10	1	0.9	19.8	-	-	1	-
10 Yrs. or More	1	0.9	20.7	-	-	1	-
MEAN	4.80	-	-	4.75	5.10	5.29	4.0
STD. DEVIATION	2.90	-	-	1.71	2.30	4.38	2.26

goods' manufactures have employed computers for Sales Management Analysis, on the average, 4.8 years, consumer goods' manufacturers have done so for 5.1 years, manufacturers of both industrial and consumer goods average 5.3 years, and integrated middlemen have average 4.0 years. There is no significant difference between any of these means at a 95% confidence level.

3. Sales Territory Analysis

Employment of EDP for Sales Territory Analysis ranks sixth by the number of companies using it (31) and fifth by the average time in use (1.23 years).

Only 21 of the 31 companies (68%) using computers for Sales Territory Analysis were satisfied with the results. The principal reasons for this satisfaction are similar to those given for Sales Analysis. The 10 data-processing executives who expressed dissatisfaction with this application did so primarily because they felt that too much information was being generated for the small amount being used.

On the average, companies who do Sales Territory

Analysis by computers have been using EDP in marketing for 5.1 years, and this application on it for 4.4 years. Two companies employed this application within their first year of computer experience, four in both the second and third years, and one in the fourth year. After four years of computer experience most of the remaining companies tried employing EDP for Sales Territory Analysis.

The tabulation of the replies regarding Sales Territory Analysis is shown in Table IX. The mean length of time this application has been used is 4.4 years. Industrial goods' producers have used it an average of 4.6 years, with the corresponding figures of 3.5 years, 5.6 years, and 4.3 years for consumer goods' manufacturers, industrial-and-consumer goods' manufacturers, and integrated middlemen respectively. Here too, there is no significant difference between any of these means at a 95% confidence level.

4. Service Policies Analysis

Only five companies use EDP to assist in analysing Service Policies. This ranks twelfth by number of users out of seventeen applications. It also has been used, on the

Chapter VI - Table IX
 Distribution of the Length of Time Companies have Used Computers
 for Sales Territory Analysis

	TOTAL			INDUSTRIAL GOODS, MFG.	CONSUMER GOODS, MFG.	INDUSTRIAL & CONSUMER GOODS, MFG.	INTEGRATED MIDDLEMEN
	#	%	CUM. %				
RESPONDENTS	108	-	-	27	34	24	23
RESPONDENTS - SALES TERRITORIES	31	28.7	-	9	10	8	4
1 Yr. or Less	5	4.6	4.6	1	3	1	-
>1 but < 2	3	2.7	7.3	1	2	-	-
>2 but < 3	5	4.6	11.9	2	-	2	1
>3 but < 4	2	1.9	13.8	1	-	-	-
>4 but < 5	4	3.7	17.5	-	2	1	1
>5 but < 6	3	2.7	20.2	1	1	1	-
>6 but < 7	2	1.9	22.1	-	-	-	1
>7 but < 8	-	-	-	-	-	-	-
>8 but < 9	1	0.9	23.0	-	-	1	-
>9 but < 10	3	2.7	25.7	1	1	1	-
10 Yrs. or More	2	1.9	27.6	1	-	1	-
APPLICATION LISTED BUT NO. OF YEARS NOT LISTED	1	0.9	-	1	-	-	-
MEAN	4.43	-	-	4.56	3.50	5.56	4.25
STD. DEVIATION	3.30	-	-	3.82	3.09	3.76	1.71

average, by all respondents for 0.25 years, which is the eleventh longest time. However, there is a rather large difference between this average and the average length of time the five using companies have employed EDP for Service Policies Analysis (5.5 years). This application ranks second in length of time used if the latter type of mean is used as the criterion. These disparities (between means and between ranks) occur because few companies are using this application but have been doing so for a relatively long time.

For this application each using company developed their own programs. Three of the five companies accumulated over seven years' experience with EDP before trying Service Policies Analysis on it. The remaining two companies began in their fourth and fifth years.

All the companies applying EDP to Service Policies Analysis were satisfied with the results. However, there was no dominant reason why.

The tabulation of the replies for Service Policies Analysis is shown in Table X. Only one industrial goods' company uses this application (for 3.5 years). Likewise, only

Chapter VI - Table X
 Distribution of the Length of Time Companies have Used Computers
 for Service Policies Analysis

	TOTAL			INDUSTRIAL GOODS, MFG.	CONSUMER GOODS, MFG.	INDUSTRIAL & CONSUMER GOODS, MFG.	INTEGRATED MIDDLEMEN
	#	%	CUM. %				
RESPONDENTS	108	100%	-	27	34	24	23
RESPONDENTS - SERVICE POLICIES	5	4.6	-	1	1	1	2
1 Yr. or Less	-	-	-	-	-	-	-
>1 but ≤ 2	-	-	-	-	-	-	-
>2 but ≤ 3	-	-	-	-	-	-	-
>3 but ≤ 4	2	1.9	1.9	1	-	-	1
>4 but ≤ 5	-	-	1.9	-	-	-	-
>5 but ≤ 6	1	0.9	2.8	-	-	1	-
>6 but ≤ 7	-	-	2.8	-	-	-	-
>7 but ≤ 8	2	1.9	4.7	-	1	-	1
>8 but ≤ 9	-	-	-	-	-	-	-
>9 but ≤ 10	-	-	-	-	-	-	-
10 Yrs. or More	-	-	-	-	-	-	-
MEAN	5.50	-	-	3.5	7.5	5.5	5.5
STD. DEVIATION	2.0	-	-	-	-	-	2.83

one consumer goods' manufacturer has been using it, but for about 7.5 years. Of the remaining three companies one was a producer of both industrial and consumer goods and two were integrated middlemen. The average of 5.5 years was common to both categories. None of the differences are significant at a 95% level.

B. PHYSICAL DISTRIBUTION MANAGEMENT

1. Physical Distribution Analysis

The use of computers for Physical Distribution Analysis ranks fifth in number of companies using it (36) and sixth according to the average time used (1.08 years). These rankings are higher and seem more reasonable than those developed from the marketing executives' replies in Chapter IV (ninth and eighth) as the programs required are available from most computer manufacturers.

Twenty-eight of the 36 users feel this application is successful. The remainder were not satisfied with the results. The principal reason given for considering it a success is that it assists management in planning.

The average time the companies using Physical Distribution Analysis have used EDP is 5.7 years. This is one of the first marketing uses to be made of a computer. One company used it in their first year of EDP experience, three in the second year, two in the third year, and five and six tried it in their fourth and fifth years respectively.

Table XI shows a tabulation of the replies regarding this application. The mean time used by the 36 companies is 3.5 years. Industrial goods' producers have employed this application an average of 3.9 years, consumer goods' producers for 3.3 years, manufacturers of both industrial and consumer goods for 5.1 years and integrated middlemen for 2.2 years.

The only difference between these means which is significant is the difference between industrial-and-consumer goods' manufacturers and integrated middlemen. A possible reason for this is that the former are generally large companies and have a complex physical distribution system which is generally under their control. Integrated middlemen, on the other hand, have an established, relatively unchanging physical distribution network that has evolved over a period of years and which is generally not under their control.

Chapter VI - Table XI
 Distribution of the Length of Time Companies have Used Computers
 for Physical Distribution Analysis

	TOTAL			INDUSTRIAL GOODS, MFG.	CONSUMER GOODS, MFG.	INDUSTRIAL & CONSUMER GOODS, MFG.	INTEGRATED MIDDLEMEN
	#	%	CUM. %				
RESPONDENTS	108	100%	-	27	34	24	23
RESPONDENTS - PHYSICAL DISTRIBUTION	36	33.4	-	5	14	7	10
1 Yr. or Less	6	5.6	5.6	1	2	-	3
>1 but <2	3	2.8	8.4	-	2	-	1
>2 but <3	9	8.3	16.7	-	5	2	2
>3 but <4	3	2.8	19.5	-	-	1	2
>4 but <5	6	5.6	25.1	3	-	2	1
>5 but <6	3	2.8	27.9	1	2	-	-
>6 but <7	-	-	27.9	-	-	-	-
>7 but <8	3	2.8	30.7	-	2	1	-
>8 but <9	-	-	30.7	-	-	-	-
>9 but <10	-	-	30.7	-	-	-	-
10 Yrs. or More	1	0.9	31.6	-	-	-	-
APPLICATION LISTED BUT NO. OF YEARS NOT LISTED	2	1.9	-	-	1	-	1
MEAN	3.46	-	-	3.90	3.27	5.14	2.17
STD. DEVIATION	2.44	-	-	1.95	2.42	3.09	1.50

2. Distribution Channels Analysis

Computers are used for Distribution Channels Analysis by four companies and this application is tied for thirteenth place along with Pricing Analysis and Credit Administration Analysis according to number of using companies. And it ranks twelfth by average length of time used (0.24 years). However, this application has been employed, on the average, longer than any other application by the using companies (6.5 years).

All user companies were satisfied with the results for similar reasons to those stated above under Sales Analysis.

The four companies using EDP for Distribution Channels Analysis have been using computers in marketing for an average of 7.5 years. But the earliest any of them employed EDP for this purpose is in the fourth year of computer experience. Two companies started using it in the ninth year and one in the tenth year. This length of delay is surprising as programs for this analysis have been developed by some computer manufacturers and the use has been popularized in the business literature.

The tabulation of the responses for Distribution Channels Analysis is shown in Table XII. The average length of time the four companies have been using this application is 6.5 years. No industrial goods' producers use it. Only one consumer goods' producer has (for 3.5 years), one manufacturer of both industrial and consumer goods (for 8.5 years) and two integrated middlemen have done so for an average of seven years. There is no significant difference between any of these means.

3. Inventory Management Analysis

The use of computers for Inventory Management Analysis ranks second only to Sales Analysis by the number of companies using it (64) and by the average length of time it has been used (2.7 years). The popularity of this application has been helped by most computer manufacturers as they have package programs available and provide assistance in using their equipment for this purpose.

Fifty-four (84%) of the companies using computers for Inventory Management Analysis are satisfied with the results. The remainder, however, are not. This is surprising

Chapter VI - Table XII

Distribution of the Length of Time Companies have Used Computers
for Distribution Channels Analysis

	TOTAL			INDUSTRIAL GOODS, MFG.	CONSUMER GOODS, MFG.	INDUSTRIAL & CONSUMER GOODS, MFG.	INTEGRATED MIDDLEMEN
	#	%	CUM. %				
RESPONDENTS	108	100%	-	27	34	24	23
RESPONDENTS - DISTRIBUTION CHANNELS	4	3.7	-	-	1	1	2
1 Yr. or Less	-	-	-	-	-	-	-
> 1 but < 2	-	-	-	-	-	-	-
> 2 but < 3	-	-	-	-	-	-	-
> 3 but < 4	1	0.9	0.9	-	1	-	1
> 4 but < 5	1	0.9	1.8	-	-	-	-
> 5 but < 6	1	-	1.8	-	-	-	-
> 6 but < 7	-	-	1.8	-	-	-	-
> 7 but < 8	-	-	1.8	-	-	-	-
> 8 but < 9	1	0.9	2.7	-	-	1	-
> 9 but < 10	1	0.9	3.6	-	-	-	1
10 Yrs. or More	-	-	-	-	-	-	-
MEAN	6.5	-	-	-	3.5	8.5	7.0
STD. DEVIATION	2.94	-	-	-	-	-	3.54

considering the straightforwardness of the application as well as the availability of programs and assistance from computer manufacturers. The main reason for the satisfaction is due to saving in costs realized from a reduction in inventory.

This is one of the first applications of EDP used in marketing. The average length of time for computer usage by those companies employing it for Inventory Management Analysis is 5.9 years. And the average time used for this application is 4.95 years. One company started doing so within the first year of EDP experience, three in the second year, four in the third, eight in the fourth and eleven in the fifth.

Table XIII contains the tabulation of the replies for this application. The mean number of years used by producers of industrial goods is 5.0 years, for producers of consumer goods 5.1 years, for manufacturers of both industrial and consumer goods 5.4 years, and for integrated middlemen 3.95 years. Here again, there is no significant difference between any of these means at a 95% confidence level.

Chapter VI - Table XIII

Distribution of the Length of Time Companies have Used Computers for Inventory Management Analysis

	TOTAL			INDUSTRIAL GOODS' MFG.	CONSUMER GOODS' MFG.	INDUSTRIAL & CONSUMER GOODS' MFG.	INTEGRATED MIDDLEMEN
	#	%	CUM. %				
RESPONDENTS	108	100%	-	27	34	24	23
RESPONDENTS - INVENTORY MGT.	64	59.2	-	13	20	18	13
1 Year or Less	2	1.8	1.8	1	1	1	1
>1 but <2	3	2.7	4.5	1	1	1	1
>2 but <3	10	9.4	13.9	1	4	2	3
>3 but <4	12	11.2	25.1	2	2	5	3
>4 but <5	10	9.3	34.4	1	4	3	2
>5 but <6	3	2.7	37.1	2	1	2	1
>6 but <7	5	4.6	41.7	-	2	1	-
>7 but <8	5	4.6	46.3	2	-	1	-
>8 but <9	2	1.8	48.1	1	-	2	1
>9 but <10	4	3.6	51.7	1	-	1	-
10 Yrs. or More	3	2.7	54.4	-	2	1	-
APPLICATION INDICATED BUT NO. OF YEARS NOT LISTED	5	4.6	-	1	2	-	2
MEAN	4.95	-	-	5.0	5.11	5.36	3.95
STD. DEVIATION	2.71	-	-	2.84	2.78	2.81	2.38

C. MARKETING MANAGEMENT

1. Planning Analysis

The use of computers for Planning Analysis ranks eighth by both the number of companies using this application (21) and by average length of time used by all respondents (0.7 years). It also ranks eighth according to average time the 21 using companies have been employing it (4.2 years).

Seventeen of the companies using EDP in marketing planning were satisfied with the results, one company just started to use it so could not judge, and the remaining three companies were dissatisfied. The main reasons for satisfaction are because its use enables more variables to be considered, the routine calculations can be made more quickly, and more timely reports are provided. The main reasons for dissatisfaction are due to the marketing personnel not being able to explain the relationships between the variables adequately and not being able to provide all the required input data.

The companies using EDP in this area of Marketing Management have been using computers, on an average, for 5.5

years. No companies tried Planning Analysis during their first year of computer experience, one tried it during the second year, and three during the third year. From the fourth year and on, many companies started to employ this application.

The tabulation of the pertinent replies is presented in Table XIV. The mean time the 21 companies have used this application is 4.2 years. The average for the five industrial goods' producers is 6.2 years, and for the six consumer goods' producers it is 4.3 years; the five manufacturers of both industrial and consumer goods average 3.5 years and the five integrated middlemen average 2.9 years. The levels of confidence at which the differences between any of these means become significant is below 95%.

2. Market Forecasting Analysis

Forty-one companies are using computers for Market Forecasting Analysis and the average length of time for doing so is 1.4 years. According to both these figures this application ranks fourth.

Chapter VI - Table XIV
 Distribution of the Length of Time Companies have Used Computers
 for Planning Analysis

	TOTAL			INDUSTRIAL GOODS: MFG.	CONSUMER GOODS: MFG.	INDUSTRIAL & CONSUMER GOODS: MFG.	INTEGRATED MIDDLEMEN
	#	%	CUM. %				
RESPONDENTS	108	100%	-	27	34	24	23
RESPONDENTS - PLANNING	21	19.4	-	5	6	5	5
1 Yr. or Less							
> 1 but < 2	2	1.8	1.8	-	1	-	1
> 2 but < 3	2	1.8	3.6	-	1	1	-
> 3 but < 4	5	4.6	8.2	2	-	1	2
> 4 but < 5	2	1.8	10.0	-	-	1	1
> 5 but < 6	1	0.9	10.9	-	-	1	-
> 6 but < 7	4	3.7	14.6	1	1	1	1
> 7 but < 8	-	-	14.6	-	-	-	-
> 8 but < 9	-	-	14.6	-	-	-	-
> 9 but < 10	2	1.8	16.4	1	1	-	-
10 Yrs. or More	1	0.9	17.3	1	-	-	-
APPLICATION LISTED BUT NO. OF YEARS NOT LISTED	2	1.8	-	-	2	-	-
MEAN	4.21	-	-	6.20	4.25	3.50	2.90
STD. DEVIATION	3.04	-	-	3.93	4.11	1.58	1.82

Only 28 (68%) of these companies are satisfied with the results. The remainder are dissatisfied, apart from one company which just started this use so could not judge. Most of the satisfied companies are pleased because computers can consider more variables in making forecasts than can other means available. The main cause for dissatisfaction is due to the fact that the companies did not know how many variables should be considered. The companies using this application have used EDP an average of 6.3 years each. None employed it for this use during the first year but three did so during the second year. For the third and succeeding years, approximately four companies began using their computers for forecasting each year.

The replies regarding Market Forecasting Analysis are tabulated in Table XV. The average time this application has been used is 3.7 years. Industrial goods' manufacturers have used it an average of 3.6 years, consumer goods' manufacturers 2.4 years, producers of both industrial and consumer goods 5.0 years, and integrated middlemen 4.0 years. None of the differences between these means are significant at a 95% confidence level.

Chapter VI - Table XV
 Distribution of the Length of Time Companies have Used Computers
 for Market Forecasting Analysis

	TOTAL			INDUSTRIAL GOODS' MFG.	CONSUMER GOODS' MFG.	INDUSTRIAL & CONSUMER GOODS' MFG.	INTEGRATED MIDDLEMEN
	#	%	CUM. %				
RESPONDENTS	108	100%	-	27	34	24	23
RESPONDENTS - FORECASTING	41	38.2	-	12	12	11	6
1 Year or Less	11	10.2	10.2	1	6	3	1
> 1 but < 2	4	3.7	13.9	2	-	2	-
> 2 but < 3	5	4.6	18.5	4	1	-	-
> 3 but < 4	5	4.6	23.1	2	2	-	1
> 4 but < 5	5	4.6	27.7	1	-	1	3
> 5 but < 6	-	-	27.7	-	-	-	-
> 6 but < 7	2	1.8	29.5	-	1	-	1
> 7 but < 8	3	2.7	32.2	1	1	1	-
> 8 but < 9	1	0.9	33.1	-	-	1	-
> 9 but < 10	2	1.8	34.9	-	-	2	-
10 Yrs. or More	2	1.8	36.7	1	-	1	-
APPLICATION LISTED BUT NO. OF YEARS NOT LISTED	1	0.9	-	-	1	-	-
MEAN	3.73	-	-	3.63	2.41	5.0	4.0
STD. DEVIATION	3.20	-	-	2.92	2.59	4.25	1.97

3. Marketing Management Analysis

This application refers to computer analyses which are primarily the concern of senior marketing management. The specific applications included here were detailed in Chapter IV. Data-processing executives reported that in six companies EDP is used for this purpose. Thus, it is the eleventh most frequently mentioned application. And the average time used is 0.2 years, ranking it thirteenth by this criterion.

Marketing Management Analysis is considered successful by five of the six companies primarily because computers can provide better information than is available by other means. The average length of time these six companies have used EDP is 4.5 years. None of the companies tried this application in the first year they had a computer, and only three tried it during the next four years. Of the remaining three companies, one began making these analyses in the sixth and two in the eighth years of their computer experience.

In Table XVI the tabulation for this application is presented. The average time Marketing Management Analysis has been used by the six companies is 3.8 years. Three of the companies are industrial goods' manufacturers and their average time is 3.2 years; two are producers of consumer goods, and their average is 3.0 years. The remaining company manufactures both industrial and consumer goods, and it has been making analyses in this area of application for 7.5 years. The tests for significance between these means indicate that no significant differences exist at a 95% confidence level.

4. Advertising Analysis

Only three companies use EDP for Advertising Analysis tying it with Operations Research for last place in the usage rankings. This application is also ranked last (17th) by average length of time used (0.1 years). The reason for the relatively low ranks is that most of the responding companies are among the largest companies (according to Fortune magazine) and probably use large advertising agencies which have their own computer. In this case, the individual companies would not duplicate the agencies' analyses.

Chapter VI - Table XVI
 Distribution of the Length of Time Companies have Used Computers
 for Marketing Management Analysis

	TOTAL			INDUSTRIAL GOODS' MFG.	CONSUMER GOODS' MFG.	INDUSTRIAL & CONSUMER GOODS' MFG.	INTEGRATED MIDDLEMEN
	#	%	CUM. %				
RESPONDENTS	108	100%	-	27	34	24	23
RESPONDENTS - MARKETING MANAGEMENT	6	5.6	-	3	2	1	-
1 Year or Less	-	-	-	-	-	-	-
> 1 but < 2	3	2.7	2.7	2	1	-	-
> 2 but < 3	-	-	2.7	-	-	-	-
> 3 but < 4	-	-	2.7	-	-	-	-
> 4 but < 5	1	0.9	3.6	-	1	-	-
> 5 but < 6	-	-	3.6	-	-	-	-
> 6 but < 7	1	0.9	4.5	1	-	1	-
> 7 but < 8	1	0.9	5.4	-	-	-	-
> 8 but < 9	-	-	-	-	-	-	-
> 9 but < 10	-	-	-	-	-	-	-
10 Yrs. or More	-	-	-	-	-	-	-
MEAN	-	3.83	-	3.17	3.0	7.5	-
STD. DEVIATION	-	2.73	-	2.89	2.12	-	-

All three user companies were satisfied, and all said this is so because EDP provides more and better information than they can obtain through other means.

The average amount of EDP experience accumulated by companies doing Advertising Analysis is 5.1 years. One company began this use during the second year they had a computer, one in the sixth, and one in the ninth.

The replies for this application are tabulated in Table XVII. The average length of time used by the three companies is 0.5 years. No industrial goods' manufacturers or integrated middlemen use EDP here. Two consumer goods' producers and one manufacturer of both industrial and consumer goods are doing Advertising Analysis on a computer and have all done so for about the same length of time -- 0.5 years.

Chapter VI - Table XVII
 Distribution of the Length of Time Companies have Used Computers
 for Advertising Analysis

	TOTAL			INDUSTRIAL GOODS, MFG.	CONSUMER GOODS, MFG.	INDUSTRIAL & CONSUMER GOODS, MFG.	INTEGRATED MIDDLEMEN
	#	%	CUM. %				
RESPONDENTS	108	100%	-	27	34	24	23
RESPONDENTS - ADVERTISING	3	2.7	-	-	2	1	-
1 Year or Less	3	2.7	2.7	-	2	1	-
>1 but <2	-	-	-	-	-	-	-
>2 but <3	-	-	-	-	-	-	-
>3 but <4	-	-	-	-	-	-	-
>4 but <5	-	-	-	-	-	-	-
>5 but <6	-	-	-	-	-	-	-
>6 but <7	-	-	-	-	-	-	-
>7 but <8	-	-	-	-	-	-	-
>8 but <9	-	-	-	-	-	-	-
>9 but <10	-	-	-	-	-	-	-
10 Yrs. or More	-	-	-	-	-	-	-
MEAN	0.5	-	-	-	0.5	0.5	-
STD. DEVIATION	-	-	-	-	-	-	-

D. FINANCIAL MANAGEMENT OF MARKETING

1. Distribution Costs

Nine companies reported using a computer for Distribution Costs Analysis, which ranks it twelfth in popularity, and the average time used for all companies is 0.5 years, ranking it ninth by length of time employed.

Only three companies indicated satisfaction with this application. The reason they are pleased is because better analyses of costs are made by EDP than are obtainable by manual calculations.

The nine companies using this application have used computers for marketing analyses an average of 6.3 years. However, the earliest any company has employed EDP for Distribution Costs Analysis is in their third year of computer experience. And here two companies did so. One company added this use in the fourth year, one in the fifth, one in the sixth, two in the seventh, and one each in the tenth and eleventh years.

The replies for this application are tabulated in

Table XVIII. The mean time the nine companies have used computers for Distribution Cost Analysis is 5.4 years.

Only one industrial goods' producer has done so -- for about 7.5 years. The four consumer goods' producers using it have averaged 2.5 years each. Two companies in the industrial and consumer goods' producers classification, and two in the integrated middlemen category use this application, for an average time of 7.0 years and 8.8 years respectively.

Although the difference between the longest and shortest mean times is relatively large, there is still no significant difference between any of these means at a 95% confidence level.

2. Pricing Analysis

Four companies are using computers for Pricing Analysis, tying this application for thirteenth place with Distribution Channels and Credit Administration Analyses in the usage rankings. And it has been used by all companies an average of 0.08 years, ranking it 15th out of 17 in length of time used.

Chapter VI - Table XVIII
 Distribution of the Length of Time Companies have Used Computers
 for Distribution Cost Analysis

	TOTAL			INDUSTRIAL GOODS, MFG.	CONSUMER GOODS, MFG.	INDUSTRIAL & CONSUMER GOODS, MFG.	INTEGRATED MIDDLEMEN
	#	%	CUM. %				
RESPONDENTS	108	100%	-	27	34	24	23
RESPONDENTS - DISTRIBUTION COSTS	9	8.3	-	1	4	2	2
1 Year or Less	1	0.9	0.9	-	1	-	-
> 1 but < 2	1	0.9	1.8	-	1	-	-
> 2 but < 3	-	-	1.8	-	-	-	-
> 3 but < 4	1	0.9	2.7	-	1	-	-
> 4 but < 5	2	1.8	4.5	-	1	1	-
> 5 but < 6	-	-	4.5	-	-	-	-
> 6 but < 7	1	0.9	5.4	-	-	-	1
> 7 but < 8	1	0.9	6.3	1	-	-	-
> 8 but < 9	-	-	6.3	-	-	-	-
> 9 but < 10	1	0.9	7.2	-	-	1	-
10 Yrs. or More	1	0.9	8.1	-	-	-	-
MEAN	5.44	-	-	7.5	2.5	7.0	8.75
STD. DEVIATION	3.50	-	-	-	1.83	3.54	3.18

All four companies are satisfied with this use because the printout provides marketing management with the information requested, as well as information that would not have been available otherwise.

The companies employing EDP for Pricing Analysis have had computers, on the average, for 6.0 years and have been making this application on them for approximately 2.3 years. No company analysed pricing by EDP during the first three years they had a computer. One did so during the fourth year, one during the fifth, one in the eighth year and one in the ninth year.

The replies regarding employment of this application are tabulated in Table XIX. The mean time computers have been used for Pricing Analysis by the four companies is 2.25 years. Two industrial goods' manufacturers have been using it for an average of 1.5 years, one consumer goods' manufacturer for 1.5 years, and one integrated middleman for 4.5 years.

Chapter VI - Table XIX
 Distribution of the Length of Time Companies have Used Computers
 for Pricing Analysis

	TOTAL			INDUSTRIAL GOODS' MFG.	CONSUMER GOODS' MFG.	INDUSTRIAL & CONSUMER GOODS' MFG.	INTEGRATED MIDDLEMEN
	#	%	CUM. %				
RESPONDENTS	108	100%	-	27	34	24	23
RESPONDENTS - PRICING	4	3.7	-	2	1	-	1
1 Year or Less	1	0.9	0.9	1	-	-	-
> 1 but ≤ 2	1	0.9	1.8	-	1	-	-
> 2 but ≤ 3	1	0.9	2.7	1	-	-	-
> 3 but ≤ 4	-	-	2.7	-	-	-	-
> 4 but ≤ 5	1	0.9	3.6	-	-	-	1
> 5 but ≤ 6	-	-	-	-	-	-	-
> 6 but ≤ 7	-	-	-	-	-	-	-
> 7 but ≤ 8	-	-	-	-	-	-	-
> 8 but ≤ 9	-	-	-	-	-	-	-
> 9 but ≤ 10	-	-	-	-	-	-	-
10 Yrs. or More	-	-	-	-	-	-	-
MEAN	2.25	-	-	1.5	1.5	-	4.5
STD. DEVIATION	1.71	-	-	1.41	-	-	-

3. Credit Administration Analysis

Employment of EDP for Credit Administration

Analysis is also used by four companies, which ties this with Pricing and Distribution Channels Analyses for thirteenth place by usage. The average time employed by all companies is 0.04 years, thus ranking it sixteenth out of seventeen in longevity.

Two of the four using companies are satisfied with the results of this application, finding it provides better analysis of information than previously available. The average time these four companies have been using computers for marketing purposes is 6.8 years. Only one company employed EDP for Credit Administration Analysis before its seventh year of computer experience and this was during its third year. Of the remaining three companies, one used a computer here in its seventh year, and one each in the ninth and tenth years.

The tabulation of the replies for Credit Administration are in Table XX. The average length of time for this use of EDP by the four companies is 2.0 years. One

Chapter VI - Table XX

Distribution of the Length of Time Companies have Used Computers
in Credit Administration Analysis

	TOTAL			INDUSTRIAL GOODS: MFG.	CONSUMER GOODS: MFG.	INDUSTRIAL & CONSUMER GOODS: MFG.	INTEGRATED MIDDLEMEN
	#	%	CUM. %				
RESPONDENTS	108	-	-	27	34	24	23
RESPONDENTS - CREDIT ADMINISTRATION	4	3.7	-	-	1	-	3
1 Year or Less	-	-	-	-	-	-	-
> 1 but < 2	-	-	-	-	-	-	-
> 2 but < 3	1	0.9	0.9	-	-	-	1
> 3 but < 4	1	0.9	1.8	-	-	-	1
> 4 but < 5	-	-	-	-	-	-	-
> 5 but < 6	-	-	-	-	-	-	-
> 6 but < 7	-	-	-	-	-	-	-
> 7 but < 8	-	-	-	-	-	-	-
> 8 but < 9	-	-	-	-	-	-	-
> 9 but < 10	-	-	-	-	-	-	-
10 Yrs. or More	-	-	-	-	-	-	-
APPLICATION LISTED BUT NO. OF YEARS NOT LISTED	2	1.8	-	-	1	-	1
MEAN	2.0	-	-	-	-	-	2.0
STD. DEVIATION	0.71	-	-	-	-	-	0.71

consumer goods' producer reported using it but gave no length of time. Three integrated middlemen also use it -- for an average of two years.

4. Financial Analysis in Marketing

This category includes the applications that deal directly with the calculations about the fiscal aspects of marketing, and which do not fit into the other financial categories above. The specific uses included were delineated in Chapter IV under this same section. Replies to the data-processing questionnaire show 10 companies employing EDP in this area. The rankings for this application are ninth in "popularity", and tenth in the average length of time used (0.3 years).

Those companies employing computers for Financial Analysis have used EDP for an average of 4.8 years. One company initiated this application in their first year of computer experience, one in the second, and one in the third. Initial usage by the remaining seven companies is distributed evenly over the remaining seven years.

Eight of the 10 companies are pleased with the results of this computer application primarily because EDP provides analyses that were not done previously. The figures for Financial Analysis are shown in Table XXI. The 10 companies have employed this use an average of 3.5 years each. No industrial goods' producers use this application. Three consumer goods' producers do, however, and their average time used is 4.5 years; three manufacturers of both industrial and consumer goods do likewise, averaging 2.8 years; and four integrated middlemen average 3.2 years. There is no significant difference between these means.

E. RESEARCH

1. Marketing Research Analysis

Marketing Research Analysis is one of the most frequently mentioned applications of EDP in marketing. It is being used by 49 of the responding companies, which ranks it the third most popular application. The average time it has been used by all the respondents is 1.7 years, the third longest time for any application.

Chapter VI - Table XXI
 Distribution of the Length of Time Companies have Used Computers
 for Financial Analysis in Marketing

	TOTAL		INDUSTRIAL GOODS, MFG.	CONSUMER GOODS, MFG.	INDUSTRIAL & CONSUMER GOODS, MFG.	INTEGRATED MIDDLE/EN
	#	%				
RESPONDENTS	108	100%	27	34	24	23
RESPONDENTS - FINANCIAL ASPECTS	10	9.3	-	3	3	4
1 Year or Less	2	1.8	-	1	1	-
> 1 but < 2	1	0.9	-	-	-	1
> 2 but < 3	-	-	-	-	-	-
> 3 but < 4	2	1.8	-	-	1	1
> 4 but < 5	2	1.8	-	-	1	1
> 5 but < 6	-	-	-	-	-	-
> 6 but < 7	2	1.8	-	2	-	-
> 7 but < 8	-	-	-	-	-	-
> 8 but < 9	-	-	-	-	-	-
> 9 but < 10	-	-	-	-	-	-
10 Yrs. or More	-	-	-	-	-	-
APPLICATION LISTED BUT NO. OF YEARS NOT LISTED	1	0.9	-	-	-	1
MEAN	3.5	-	-	4.5	2.83	3.17
STD. DEVIATION	2.29	-	-	3.46	2.08	1.53

Of the 49 companies, 29 were satisfied with the results, primarily because the computer makes faster tabulations.

The companies indicating this use have been employing computers an average of 6.3 years. The earliest that any company tried making this type of application by EDP was after one year of computer experience. During the second year of such experience three companies employed computers in this area, four in the third, two in the fourth, and nine in the fifth. After this, about five additional companies per year instituted Marketing Research Analysis on their computer.

Table XXII shows the figures for this use of EDP. The 49 companies have employed this application an average of 4.02 years. Thirteen industrial goods' producers have been using EDP for Marketing Research Analysis an average of 3.6 years, 14 consumer goods' manufacturers for 2.7 years, 11 producers of both consumer and industrial goods for 6.4 years, and 11 integrated middlemen for 3.6 years. Here, there is a significant difference, at a 95% confidence level,

Chapter VI - Table XXII
 Distribution of the Length of Time Companies have Used Computers
 for Marketing Research Analysis

	TOTAL			INDUSTRIAL GOODS' MFG.	CONSUMER GOODS' MFG.	INDUSTRIAL & CONSUMER GOODS' MFG.	INTEGRATED MIDDLEMEN
	#	%	CUM. %				
RESPONDENTS	108	100%	-	27	34	24	23
RESPONDENTS - MARKET RESEARCH	49	45.4	-	13	14	11	11
1 Year or Less	8	7.4	7.4	2	5	-	1
> 1 but < 2	6	5.6	13.0	2	1	2	1
> 2 but < 3	7	6.5	19.5	2	2	1	2
> 3 but < 4	7	6.5	26.0	2	3	-	2
> 4 but < 5	4	3.7	29.7	1	1	1	1
> 5 but < 6	2	1.8	31.5	1	-	1	-
> 6 but < 7	2	1.8	33.3	-	-	1	1
> 7 but < 8	3	2.7	36.0	1	-	1	1
> 8 but < 9	-	-	36.0	-	-	-	-
> 9 but < 10	3	2.7	38.7	1	-	2	-
10 Yrs. or More	3	2.7	41.4	-	1	2	-
APPLICATION LISTED BUT NO. OF YEARS NOT LISTED	4	3.7	-	1	1	-	2
MEAN	4.02	-	-	3.58	2.69	6.41	3.61
STD. DEVIATION	3.18	-	-	2.78	2.88	3.61	2.26

between the length of time consumer goods' manufacturers have been using computers for Marketing Research Analysis, and the length of time industrial and consumer goods' producers have been doing so. This difference may be due to the fact that a company which manufactures both types of goods will generally have a more involved marketing structure requiring more marketing research. Thus they would look to computers sooner for assistance in this area.

2. Operations Research Analysis

Only three companies are using computers for Operations Research Analysis. This application is used by the fewest number of companies, along with Advertising Analysis. The average length of use for Operations Research Analysis is 0.12 years, which ranks fourteenth by this criterion. However, all three of the using companies were satisfied with the results, and gave as the principal reason for this success the fact that they can now do analyses heretofore impossible or at least highly impractical.

The average time these three companies have been using a computer is 6.2 years, and for Operations Research

Analysis 4.2 years. One company used a computer for OR in marketing during its second year of computer experience, another in its eighth, and the third in its tenth.

The replies for this application are tabulated in Table XXIII. The two industrial goods' producers have used this application for an average of six years, and the one consumer goods' producer for about one-half year. There is no significant difference between the two means.

Chapter VI - Table XXIII
 Distribution of the Length of Time Companies have Used Computers
 for Operations Research Analysis in Marketing

	TOTAL			INDUSTRIAL GOODS, MFG.	CONSUMER GOODS, MFG.	INDUSTRIAL & CONSUMER GOODS, MFG.	INTEGRATED MIDDLEMEN
	#	%	CUM. %				
RESPONDENTS	108	100%	-	27	34	24	23
RESPONDENTS - OPERATIONS RESEARCH	3	2.7	-	2	1	-	-
1 Year or Less	1	0.9	0.9	-	1	-	-
> 1 but < 2	-	-	0.9	-	-	-	-
> 2 but < 3	1	0.9	1.8	1	-	-	-
> 3 but < 4	-	-	1.8	-	-	-	-
> 4 but < 5	-	-	1.8	-	-	-	-
> 5 but < 6	-	-	1.8	-	-	-	-
> 6 but < 7	-	-	1.8	-	-	-	-
> 7 but < 8	-	-	1.8	-	-	-	-
> 8 but < 9	-	-	1.8	-	-	-	-
> 9 but < 10	1	0.9	2.7	1	-	-	-
10 Yrs. or More	-	-	-	-	-	-	-
MEAN	4.17	-	-	6.0	0.5	-	-
STD. DEVIATION	4.73	-	-	4.95	-	-	-

CHAPTER VII

ANALYSIS OF REPLIES TO THE DATA-PROCESSING EXECUTIVE'S QUESTIONNAIRE - PART II

ORGANIZATIONAL AND ADMINISTRATIVE RELATIONSHIPS

The information analysed in this chapter is from the data-processing executive's questionnaire concerning the organizational and administrative relationships between the marketing and data-processing departments.

I. MARKETING EXECUTIVE'S INVOLVEMENT IN POLICY DECISIONS REGARDING COMPUTERS AND THEIR USES

Of the 101 companies using computers in marketing, 34 claim no marketing executive to be involved in policy decisions about computer acquisition, key data-processing personnel, or specific marketing applications. The areas and degree of involvement in the remaining 67 companies are tabulated in Table I.

Chapter VII - Table I
Marketing Executives' Involvement in Policy Decisions about EDP

	Totals			Industrial Goods' Mfg.		Consumer Goods' Mfg.		Industrial & Consumer Goods' Mfg.		Integrated Middlemen	
	Number of Companies	%									
Respondents	108	100%		27		34		24		23	
Marketing Function Not Using EDP	7	6.5		4		1		1		1	
Total Responses Indicated	136	125.9		35		42		29		30	
No Involvement	34	31.5		10		12		6		6	
DECISION AREA	Dir.	Ind.	Dir.	Ind.	Dir.	Ind.	Dir.	Ind.	Dir.	Ind.	
Computer Acquisition	13	8	12%	4	3	1	4	2	3	3	1
Key Data-Processing Personnel	15	2	13.9	5	2	-	4	2	-	4	-
Specific Marketing Applications	25	39	23.1	5	6	10	11	4	12	5	11
TOTAL RESPONSES	53	49	39%	14	11	11	19	8	15	12	12
			36%								

Do marketing executives play a role in decisions about computer acquisition; e.g., decisions about model or size? Only 13 companies (12%) have a marketing executive on the policy-making body directly involved in this decision. Another 8 companies (7.4%) have a marketing executive indirectly involved. In decisions regarding key data-processing personnel, a marketing executive is directly involved in 15 (13.9%) and indirectly involved in 2 (1.9%), companies. And in decisions about specific marketing applications such as Sales Analysis and Inventory Management, 25 companies (23.1%) directly involve a marketing executive, and in 39 (36.1%) the involvement is indirect.

In the decision areas only, without regard to degree of involvement, the percentage of companies involving a marketing executive in:

- i) computer acquisition models is 19.4%,
- ii) key data-processing personnel is 15.8%,
- iii) specific marketing applications is 59.2%.

Considering degree of involvement without regard to decision areas, 39% of the responses indicate a marketing

executive is directly involved in computer policy decisions, and 36% have him indirectly involved. Because a number of companies have a marketer directly involved in some, and indirectly involved in other, computer policy decisions, the above percentages cannot be added to find out how many companies involve marketing executives here. Rather, this figure is calculated by dividing the number of companies indicating a positive response to this question by the total number of companies using EDP in marketing -- 68.5%.

II. ACCESSIBILITY OF MARKETING DEPARTMENTS TO COMPUTERS

Data-processing executives were asked about the accessibility of their companies' marketing departments to a computer. The replies are analysed in Table II. In only three companies has the marketing department its own computer. In 82 companies the marketing department uses the EDP facilities of one other department, generally the data-processing department under the supervision of a financial executive. In seven companies the marketing department uses computers of more than one other department, primarily the data-processing and either planning or engineering departments. Marketing

Chapter VII - Table II

Accessibility of the Marketing Function to a Computer

ANSWERS	Total		IND. GOODS MFG.	CONS. GOODS MFG.	IND. & CONS. GOODS MFG.	INTEGRATED MIDDLEMEN
	#	%				
RESPONDENTS	108	100%	27	34	24	23
Have its own computer	3	2.8	-	-	1	2
Use Computer of one Other Company Department	82	76.2	18	26	20	18
Use Computer of More Than one Company Department	7	6.5	1	2	2	2
Rent Computer Time Outside the Company	4	3.7	2	1	1	-
Use Company Computers and rent Outside Time	9	8.3	3	4	2	-
Marketing Function Does not make use of Computers	7	6.5	4	1	1	1

uses both a company-owned computer and rents time from service centers, educational institutions, or industrial companies selling excess computer capacity in nine companies. Four replies indicated the marketing departments use time on outside computer facilities only.

The replies to this question are also analysed by type of company in Table II. In none of the 27 industrial goods' producers has marketing its own computer and in 18 of these companies, marketing uses only the services of a corporate data-processing department. A similar situation holds for the consumer goods' producers -- in none of the 34 companies does a marketing department have its own computer, and in 26 companies, marketing uses the services of a corporate data-processing department only. The replies from manufacturers of both industrial and consumer goods, indicate that in one company the marketing department has its own computer and in 20 companies marketing uses a computer of another department. From the 23 companies classified as integrated middlemen, 2 replies claimed the marketing department has its own computer, and 18 indicated that marketing uses a computer under the direction of finance or accounting.

III. CALCULATING THE COSTS TO MARKETING FOR USING COMPUTERS

The methods used to charge marketing departments for their use of computers vary from no charge to full costs plus overhead. The methods and number of companies using each are indicated in Table III. In 41 companies (38%) no charge is made; 22 charge for the operating (variable) costs of running the computer; and 18 companies charge on a fixed rate for machine time used, calculated by adding the operating costs to an equipment-rental charge. The formula for the calculations by this last method is as follows:

$$\text{Charge per time used} = \text{Variable costs for machine operation} + \text{Apportionment of rental costs.}$$

$$\text{Where: Rental costs per hour} = \frac{\text{total rental cost/month}}{\text{total operating hours/month}}$$

Only 12 companies included in the charge an amount for overhead in addition to the cost as calculated in the above formula. These overhead costs include space costs and administrative costs for computer facilities. The apportionment of overhead is dependent upon the ratio of computer time used to total computer running time.

Chapter VII - Table III

Bases for Charging the Marketing Function for Computer Time

ANSWERS	Total		IND. GOODS MFG.	CONS. GOODS MFG.	IND. & CONS GOODS MFG.	INTEGRATED MIDDLEMEN
	#	%				
RESPONDENTS	108	100%	27	34	24	23
No Charge Against Individual Department	41	37.9	10	20	8	3
Computer Operating Costs	21	19.4	4	5	6	6
Fixed Rate for Machine Time	18	16.6	4	4	4	6
All Direct Plus Apportionment of Overhead	12	11.0	3	1	3	5
Competitive Service Bureau Costs	3	2.7	1	-	1	1
Marketing Function Does Not Make use of Computers	7	6.6	4	1	1	1

In addition, three companies base the charge on the price that would be paid if marketing purchased this service outside. This method implies that the data-processing department is run on a profit basis as is the outside company (service center).

It is hard to say whether or not the manner of charging has affected marketing's use of computers. It is reasonable to think that where there is no charge marketers would use EDP more. Conversely, one would expect a high charge to discourage use. But some marketers who were not charged make little use of EDP, while others in the same category use it a lot. Moreover, some marketers who were charged have a "high" rate of EDP use, and others in the same category a "low" rate.

IV. SOURCES OF COMPUTER SPECIALISTS' SERVICES FOR THE MARKETING FUNCTION

Associated with the use of computers is the need for people who can translate procedures into computer logic (systems analysts and programmers). Computer operators are also required, but their services are considered, in this

analysis, as part and parcel of a computer. One company said it has erred by placing too much emphasis on the actual computer and not enough on backup personnel, input data and program development. As a result, their computer is idle much of the time. In fact, a much less powerful computer would be adequate for all their needs, given the properly trained staff. This experience emphasizes the need for good analysts and programmers.

The 101 replies from companies using computers in marketing gave 142 answers regarding sources of computer specialists' services indicating that in some companies more than one source is used. In Table IV these replies are tabulated. The corporate data-processing department is the provider in 92 companies. In 17 companies competent personnel from departments other than data-processing are also used; e.g., production, engineering, and research and development.

Marketing hires outside consultants to analyse and program the applications in 12 companies, and in eleven companies the marketing department employs their own computer specialists. Although computer manufacturers have large

Chapter VII - Table IV
Sources of Computer Specialists' Services for Marketing

ANSWERS	Total		IND. GOODS MFG.	CONS. GOODS MFG.	IND. & CONS. GOODS MFG.	INTEGRATED MIDDLEMEN
	#	%				
RESPONDENTS	108	100%	27	34	24	23
Personnel From Central EDP Department	92	85.2	21	29	20	22
Personnel From Other Functions of Company	17	15.4	4	6	6	1
Professional Consultants Outside the Company	12	11.0	4	5	3	-
Employs its own Computer Specialists	11	10.2	4	3	2	2
Computer Manufacturers	10	9.3	3	4	2	1
Marketing Function Does Not make use of Computers	7	6.5	4	1	1	1

staffs of computer personnel, only 10 marketing departments use this source. This may be because: (a) the computer manufacturers employ most of these people for internal activities; (b) they do not have enough well trained specialists to extend their time to many marketing analyses; and (c) the marketing executives do not have a direct relationship with the computer manufacturers; rather, the primary contact has been a financial executive.

V. BASES FOR CHARGING THE MARKETING DEPARTMENTS FOR USE OF COMPUTER SPECIALISTS

The question was asked regarding how the marketing department is charged for services of computer specialists. Table V shows the results of this query. In 65 companies no charge is made. Marketing is charged only the direct costs of EDP's employees' time in four companies. The basis used in 27 companies is to charge for the employees' salary plus a pro-rated amount for overhead. And in one company, all departments using EDP are charged a fixed fee per month regardless of amount used. The reasoning behind the use of this last method is: (a) if a department is charged on this basis it will be more likely to try and make greater use of

Chapter VII - Table V
How the Marketing Function is Charged for Services of Computer Specialists

ANSWERS	Total		IND. GOODS MFG.	CONS. GOODS MFG.	IND. & CONS. GOODS MFG.	INTEGRATED MIDDLEMEN
	#	%				
RESPONDENTS	108	100%	27	34	24	23
No Charge	65	60.2	14	25	14	12
Direct Costs Plus Apportionment of Overhead	27	25.0	8	4	6	9
Direct Cost for Person's Time	4	3.7	-	2	1	1
Fixed Monthly Charge	1	0.9	-	1	-	-

the facilities; (b) in the long run the use by each function will probably equal out; (c) it aids the departments which have the more difficult analyses but with perhaps greater long term benefits; and (d) the departments, although using these computer specialists, probably only once per application, receive the benefit of this work each time they use the application.

VI. THE WAY MOST COMPUTER APPLICATIONS FOR MARKETING ARE INITIATED

This information is tabulated in Table VI. In 68 companies a marketing executive has requested a particular job be studied to see if a computer can do it economically. In 53 cases, marketing applications are initiated after a systems analyst has investigated a particular situation in the normal course of his job. Five companies reported computer uses for marketing have been initiated in one of these three ways: recommended by an outside consultant, taken over tabulating jobs, or comptroller provides a package program.

Chapter VII - Table VI

The Manner in which Most Computer Applications for Marketing
have been Initiated

ANSWERS	Total		IND. GOODS MFG.	CONS. GOODS MFG.	IND. & CONS GOODS MFG.	INTEGRATED MIDDLEMEN
	#	%				
RESPONDENTS	108	100%	27	34	24	23
Marketing Executive Requests Study of Problem	68	63.0	17	21	18	12
EDP Department - System Analysts Investigate Problem in Course of Duties	53	49.0	11	16	13	13
Outside Consultant Recommends Applications	2	1.9	-	1	-	1
Take-Over from Tabulation Department (Additions & Refinements)	2	1.9	1	-	1	-
Comptroller Provides Basic Information	1	0.9	-	-	1	-

In Table VI, the replies are also analysed by type of company.

VII. PERCENTAGE OF COMPUTER TIME USED BY MARKETING

Two questions were asked to find out what portion of the companies' EDP activity is for marketing. The first question was about the percentage of total computer running time used for marketing applications. The second question referred to percentage of total number of programs for marketing analyses.

Table VII shows the percentage of total computer running time used for marketing applications. Here it can be seen that marketing applications account for an average of 13.0% of computer usage. The equivalent figures for the various categories of companies are:

i)	industrial goods' producers	10.0%,
ii)	consumer goods' producers	13.8%,
iii)	industrial and consumer goods' manufacturers.....	12.8%,
iv)	integrated middlemen	14.8%.

Chapter VII - Table VII

DISTRIBUTION OF THE PERCENTAGE OF TOTAL COMPUTER TIME USED EACH
MONTH FOR MARKETING APPLICATIONS

	Totals	Industrial Goods 'Mfgs.	Consumer Goods 'Mfgs.	Industrial & Consumer Goods 'Mfgs.	Integrated Middlemen
Number of Respondents	108	27	34	24	23
0 %	7	4	1	1	1
1	5	2	2	1	-
2	5	1	2	1	1
3	3	1	2	-	-
4	4	1	3	-	-
5	10	2	2	2	4
6	3	1	-	2	-
7	4	1	-	1	2
8	4	2	1	1	-
9	2	1	-	1	-
10	9	2	2	2	3
11	3	1	1	1	-
12	5	1	1	1	2
13	4	1	1	1	1
14	2	-	-	1	1
15	3	1	1	1	-
16 - 20	11	1	7	2	1
21 - 25	6	1	2	1	2
26 - 30	9	1	4	2	2
31 - 35	4	1	1	-	2
36 - 40	5	1	1	2	1
41 - 45	-	-	-	-	-
46 - 50	-	-	-	-	-
Mean	13.0%	10.0%	13.8%	12.8%	14.8%
Standard Deviation	10.6%	10.2%	10.4%	10.7%	11.0%

Table VIII pertains to the percentage of programs used for marketing applications. Here, the average figure is 12.9%, and the figures for the types of companies are:

- i) industrial goods' manufacturers 9.8%,
- ii) consumer goods' manufacturers 15.2%,
- iii) industrial and consumer goods'
producers 12.0%,
- iv) integrated middlemen 14.3%.

VIII. CRITERIA USED FOR CONSIDERING THE USE OF COMPUTER APPLICATIONS IN MARKETING, AND THE STANDARDS USED FOR EVALUATING THE SUCCESS OF SUCH APPLICATIONS

The first part of this section concerns potential applications; i.e., before they are done by EDP; the second part concerns evaluation of applications after they have been done.

A. BASIS FOR PUTTING AN APPLICATION ONTO A COMPUTER

Before a company invests the time and money needed to prepare for making a specific analysis by EDP, it should consider the potential benefits. Data-processing executives were asked about the criteria their companies use to evaluate

Chapter VII - Table VIII
Distribution of the Percentage of Total Programs Used for
Marketing Applications

Number of Respondents	Totals	Industrial Goods, Mfgs.	Consumer Goods, Mfgs.	Industrial & Consumer Goods, Mfgs.	Integrated Middlemen
	108	27	34	24	23
0 %	7	4	1	1	1
1	9	5	2	1	1
2	4	2	1	1	-
3	3	1	1	1	-
4	5	-	2	1	2
5	11	3	2	3	3
6	2	-	1	1	-
7	4	1	1	1	1
8	4	-	1	2	-
9	1	-	1	-	1
10	7	1	1	3	-
11	1	-	-	-	-
12	2	1	1	1	-
13	3	1	-	-	-
14	2	1	-	1	1
15	8	-	4	1	3
16 - 20	10	2	4	3	1
21 - 25	7	1	4	1	1
26 - 30	8	2	2	2	2
31 - 35	5	2	1	-	2
36 - 40	4	-	3	-	1
41 - 45	1	-	-	1	-
46 - 50	0	-	-	-	-
Mean	12.9%	9.8%	15.2%	12.0%	14.3%
Standard Deviation	11.0%	10.9%	11.3%	10.4%	11.2%

potential applications. Table IX shows their answers.

Fifty-two companies use the criterion of whether or not the analysis will help management make better decisions; 47 companies consider the potential costs savings of an application; 44 companies use the criterion of better information for management; 29 use time saving as a standard; and five companies employ an application if it will help improve their competitive position.

A number of respondents said their companies use more than one criterion for assessing each potential application and 177 individual answers were given by 79 companies. In addition, 22 companies claimed use of all five of the indicated standards.

B. THE STANDARDS USED FOR EVALUATING CURRENT COMPUTER APPLICATIONS IN MARKETING

Table X shows the answers about the standards of evaluation used after an analysis has been done on a computer. Interestingly, nineteen companies do not make any evaluation of their computer applications.

Chapter VII - Table IX

The Criteria Used, and the Popularity of Each,
for Assessing Potential Computer Applications

CRITERIA	Totals		Industrial Goods' Producers	Consumer Goods' Producers	Industrial & Consumer Goods' Mfgs.	Integrated Middlemen
	#	%				
Saves Time	29	15	6	11	6	6
Saves Money	47	24	9	15	12	11
Provides Better Information	44	22	13	13	11	7
Assists in Decision-Making	52	26	14	21	9	8
Helps Competitive Position	5	2.5	-	-	2	3
Combination of All Above	22	11	5	5	5	7
TOTALS	199	100%	47	65	45	42

Chapter VII - Table X
Standards Used for Evaluating the Success of Computer Applications
and the Number of Companies Indicating Use of Each

	Totals		Industrial Goods' Producers	Consumer Goods' Producers	Industrial & Consumer Goods' Mfgs.	Integrated Middlemen
	#	%				
Return on Investment	24	24	3	8	4	9
Savings Cover Cost of Application	34	33	9	11	6	8
Allows Better Decision Making by Management	19	19	8	4	3	4
Improves Competitive Position	4	4	1	1	1	1
Must Contribute to EDP Dept. Objectives and Involve a Significant Volume of Business	1	1	-	-	1	-
Not Well-Defined Yet	19	19	5	4	4	6
TOTALS	101	100%	25	27	19	27

Thirty-four companies calculate the money saved by using EDP and whether the savings cover the costs of the application. The costs considered are generally just the operating (variable) costs of running an application, and not the costs associated with the preparation required to make an analysis or overhead costs.

The next most frequently mentioned standard is return on investment of an application. The minimum return acceptable was not indicated by the responding companies but a number of them do state that the priority of an application depends on the relative magnitude of its return on investment. The return on investment is calculated by dividing the cost saving by the costs to develop and run an application. However, this method as well as the previous one does not take into consideration the intangible benefits that may be derived from some applications, such as management receiving the data sooner, the analysis of more data, and better and perhaps different analyses.

The intangible benefits are considered, however, by the 23 companies indicating use of the next two criteria.

These are: "allows better decision-making by management", used by 19 companies; and "improves our competitive position", used by four companies.

Each company indicated the use of only one criterion, which implies that either the monetary benefits or the intangible benefits associated with the applications are ignored.

IX. STEPS BEING TAKEN TO ACQUAINT MARKETERS WITH THE POTENTIAL OF EDP

A primary reason why the potential for computers in marketing has not been explored more fully is because most marketers do not know about computers' capabilities or how to capitalize on them. Consequently, there is an onus upon data-processing personnel to educate the marketers. The data-processing executives were asked about the steps their departments are taking to acquaint marketing people with the potential of computers.

In Table XI the replies are tabulated. Forty companies give educational lectures or seminars about computers.

Chapter VII - Table XI
Steps being Taken by Data-Processing Personnel
to Acquaint Marketers with the Potential of EDP

Steps Being Taken	Totals		Industrial Goods' Mfgs.	Consumer Goods' Mfgs.	Industrial & Consumer Goods' Mfgs.	Integrated Middlemen
	#	%				
Internal Educational Activity	40	31.8	8	19	7	6
External Educational Activity	33	26.3	7	13	9	4
Self Education	2	1.6	-	-	1	1
Exposed as Needed	5	4.0	1	2	1	1
Co-ordination of Activities Between Departments	9	7.1	1	1	6	1
Personal Contact -- Day-to-Day Basis or Computer People Transferred to Marketing Department	9	7.1	-	3	2	4
Already Well Acquainted	5	4.0	2	1	2	-
Nothing	23	18.3	11	5	2	5
TOTALS	126	100%	30	44	30	22

Thirty-three use outside people, mainly from computer manufacturing concerns, to give programs, seminars or talks to marketing personnel. The next two methods mentioned, each by 9 companies, are closely associated in that they both involve personal contact, on a day-to-day working basis, between the employees of the two departments. Nine companies have a special manager for common areas between both the marketing and data-processing departments, and nine have an EDP systems analyst transferred to the marketing department to further computer use there.

In five companies data-processing executives feel their marketing staff is already well acquainted with the potential of computers, while in 23 companies nothing is being done in this regard.

Twenty-five companies gave multiple responses, most of these reporting both internal and external educational activities. Three companies use internal education and coordination between the common activities of the departments.

CHAPTER VIII

COMPARISON OF THE REPLIES TO THE MARKETING AND DATA-PROCESSING EXECUTIVES' QUESTIONNAIRES

Some similar questions were asked on both the marketing executives' and data-processing executives' forms of the questionnaire to see if one group held different opinions than the other about the use of computers in marketing. The answers to these common questions are compared in this chapter.

I AVERAGE LENGTH OF TIME COMPUTERS HAVE BEEN USED IN MARKETING

The 104 replies to the marketing executives' questionnaire showed that, on the average, computers have been used in marketing for 6.7 years. The corresponding figure received from the 108 data-processing executives is 5.3 years. These distributions have standard deviations of 2.9 and 2.8 respectively. Comparing these two distributions by a "Z" test indicates a significant difference exists

between the two means at a 95% confidence level. Thus, on the average, marketing executives claimed to have used computers in marketing longer than did data-processing executives. The average claimed by marketers, however, does not differ significantly from the mean of 6.2 years, which is the time data-processors indicated their companies have used computers for any purpose.

Unfortunately, the data do not indicate why this discrepancy should exist between the answers. Perhaps the marketers are not too familiar with their companies' specific computer activities, and overstated the time computers have been used in marketing by reporting the length of time their companies have had a computer. They may have felt that because their companies owned a computer for a certain length of time that some marketing analyses were done on it for that length of time. Or perhaps the marketers included in the time the period during which they were using accounting or financial reports generated by EDP, but these were not considered as marketing applications by the data-processors. Another possibility is that marketers may have purchased computer work from outside the company, and thus included the length of time

this has been done in their replies, whereas the data-processing executives did not.

II NUMBER OF COMPUTER APPLICATIONS USED IN MARKETING
 AND LENGTH OF TIME EACH HAS BEEN USED

A NUMBER OF APPLICATIONS USED

In Chapter II it was reported that many respondents gave as different computer applications numerous marketing analyses which were really sub-parts of a general analysis. For example, some listed sales analysis by product, market, and customers as different applications. In this research, these are included under the broader category, "Sales Analysis".

Comparison 1, below, of the replies from the two groups of executives refers to the number of applications listed by the respondents. Comparison 2 refers to the average number of applications indicated after the answers were grouped into the 17 marketing applications considered in this study.

1 Number of Applications Listed

The respondents to the marketing executives' questionnaire listed an average of 4.8 applications each, with the distribution having a standard deviation of 2.1 applications. The average number of applications listed in the data-processing executives' questionnaire is 4.5, and the standard deviation here is 2.6 applications. Statistically, there is no significant difference between these means at a 95% confidence level.

2 Number of Applications Indicated after Regrouping

After regrouping, the marketing executives claimed an average of 4.0 applications each, while the equivalent figure indicated by data-processors is 2.9. The standard deviations are 1.7 and 1.6 applications respectively. At a 95% confidence level there is a significant difference between these two means. Thus, marketers claim use of a larger number of computer applications in marketing than do data-processing executives. But here too, the data do not indicate any reason for this disparity. Perhaps many data-processing executives consider some of the applications

included by marketers as senior management analyses, not realizing that these are also used by marketing executives. Perhaps also, marketing executives included in their list of computer analyses reports the data-processors did not know about because they are being done on "outside" computers.

B COMPARISONS OF THE RANKINGS OF APPLICATIONS

1 Rank Order According to Number of Companies Using Each Application

In Chapters IV and VI, the first method employed for ranking the 17 applications is to see how many companies use each. A comparison of the resulting ranks is shown in the first two columns of Table I. Inventory Management Analysis is the most frequently mentioned application, with Sales Analysis number two according to the marketing executives. But this rank order is the reverse of that indicated by data-processing executives. Also, marketers have Service Policies and Distribution Channels Analysis tied for last place (16th), while data-processors rank these 12th and 13th respectively. On the other hand, the data-processing executives' replies

Chapter VIII - Table I

Comparison of Rank Orders for the Applications
according to Various Criteria

Application	Number of Companies Using It		Average Time Used		Average For All Respondents	
	MKT.	D-P	MKT.	D-P	MKT.	D-P
I. <u>SALES MANAGEMENT</u>						
1. Sales Analysis	2	1	4	4	1	1
2. Sales Management	6	7	10	6	6	7
3. Sales Territories	3	6	8	7	3	5
4. Service Policies	16	12	2	2	16	11
II. <u>PHYSICAL DISTRIBUTION MANAGEMENT</u>						
1. Physical Distribution	9	5	9	14	8	6
2. Distribution Channels	16	13	1	1	13	12
3. Inventory Management	1	2	6	5	2	2
III. <u>MARKETING MANAGEMENT</u>						
1. Planning	8	8	5	8	7	8
2. Forecasting	5	4	13	12	5	4
3. Marketing's Management	10	11	17	11	12	13
4. Advertising	11	16	14	17	11	17
IV. <u>FINANCIAL MANAGEMENT IN MARKETING</u>						
1. Distribution Costs	12	10	3	3	10	9
2. Pricing	15	13	10	15	17	15
3. Credit Administration	12	13	12	16	14	16
4. Financial Analysis	7	9	16	13	9	10
V. <u>RESEARCH</u>						
1. Marketing Research	4	3	7	10	4	3
2. Operations Research	12	16	15	9	15	14
COEFFICIENT OF RANK CORELLATION (Rho)	0.87		0.77		0.90	

show Advertising and Operations Research Analyses ranking last (16th), while marketers rank these 11th and 12th respectively.

Despite these discrepancies, there is a fairly high coefficient of correlation between the two sets of rankings, $Rho = 0.87$. This means that both the marketing and data-processing executives indicated approximately the same number of companies use each application.

2 Rank Order According to Average Length of Time Companies have Used Each Application

The next method employed for ranking the various applications is to consider the average length of time the companies have used each. The application used for the longest time as indicated by both marketing and data-processing executives, is Distribution Channel Analysis. Marketers claim to have used Marketing Management Analysis for the shortest time, and data-processors rank this 11th. But, data-processors claim to have used Advertising Analysis for the shortest time, and marketers rank this 14th. This method of ranking has the lowest coefficient of correlation ($Rho = 0.77$), which indicates that although the two types of executives feel they use the

same applications, each thinks they have been using them for different lengths of time.

3 Rank Order by Average Time the Applications have
been Used by All Responding Companies

This method considers the average time each application has been used by all responding companies. This includes not only the companies indicating use of a particular application, but also those companies not yet employing it (considered as zero time). Both marketing and data-processing executives rank Sales Analysis first and Inventory Management Analysis second. At the other end of the scale, however, marketers place Pricing Analysis last and data-processors place Advertising Analysis last. This third method of ranking has the highest coefficient of correlation, $Rho = 0.90$.

C THE SPECIFIC APPLICATIONS

A comparison of the length of time computers have been used in each of the 17 areas in marketing is presented in Table II. The last column of this table shows whether the mean time has been used, as indicated by the replies to the

Chapter VIII - Table II

Comparison of the Mean Time Each Application has been Used
as Indicated by the Two Types of Executives

Application	Marketing Executives' Questionnaire			Data-Processing Executives' Questionnaire			Whether The Difference Between the Means is Significant at a 95% Confidence Level
	% Using	Mean	Std. Dev.	% Using	Mean	Std. Dev.	
I. <u>SALES MANAGEMENT</u>							
1. Sales Analysis	56%	4.71	3.08	64%	5.28	2.87	No
2. Sales Management	29%	3.83	3.18	21%	4.80	2.90	No
3. Sales Territories	50%	4.10	2.92	29%	4.43	3.30	No
4. Service Policies	5%	5.30	3.35	5%	5.50	2.0	No
II. <u>PHYSICAL DISTRIBUTION MANAGEMENT</u>							
1. Physical Distribution	17%	4.06	3.54	33%	3.46	2.44	No
2. Distribution Channels	5%	6.40	4.22	4%	6.50	2.94	No
3. Inventory Management	58%	4.15	3.24	59%	4.95	2.71	Yes
III. <u>MARKETING MANAGEMENT</u>							
1. Planning	18%	4.19	2.92	19%	4.21	3.04	No
2. Forecasting	41%	3.44	2.89	38%	3.73	3.20	No
3. Marketing Management	15%	2.30	1.42	6%	3.83	2.73	No
4. Advertising	11%	3.23	1.85	3%	0.50	--	Yes
IV. <u>FINANCIAL MANAGEMENT IN MARKETING</u>							
1. Distribution Costs	9%	5.00	2.83	8%	5.44	3.50	No
2. Pricing	6%	3.83	3.56	4%	2.25	1.71	No
3. Credit Administration	9%	3.50	2.78	4%	2.00	0.71	No
4. Financial Analysis	20%	3.00	2.28	9%	3.50	2.29	No
V. <u>RESEARCH</u>							
1. Marketing Research	47%	4.12	3.16	45%	4.02	3.18	No
2. Operations Research	9%	3.06	2.74	3%	4.17	4.73	No

marketing executives' questionnaire is significantly different, at a 95% confidence level, from the mean time the data-processing executives have indicated. Generally, the differences are not significant. But for two applications, Inventory Management and Advertising, there is a significant difference between the means.

In the case of Inventory Management Analysis perhaps the significant difference is because marketers were unaware of this application being used in its early stages. Many of the changes caused by use of computers in this area may have affected production but not marketing; e.g., reductions in unnecessary inventory of raw materials and/or work-in-process may go unnoticed by marketing. The same may be said about inventory of finished products, if their management is under production. Further conjecture about the significant difference for this application is that Inventory Management Analysis could have been made by EDP before the marketing executives became aware of it as the programs for this application are readily available from computer manufacturers, and the input data are already available in most companies. Thus, data-processors may have run this analysis

experimentally, without informing marketing to try to prove that savings could be made by implementing the results.

Marketers claimed to have used computers for Advertising Analysis 2.7 years longer than did data-processors. Here the significant difference might be because marketers have been using the analyses done by their company's advertising agency's computer, with the result that they, but not the data-processors, included the length of time this has been happening in their replies. Another possibility for this disparity is that an application included in Advertising Analysis by marketers has been considered in a different type of application by data-processors. For example, an analysis about advertising expenditures may have been included under Financial Analysis by data-processors and under Advertising Analysis by marketers.

III "MARKETING EXECUTIVES" INVOLVEMENT IN POLICY DECISIONS REGARDING COMPUTERS AND THEIR USES

Both sets of replies reported that marketing executives are involved in three major areas of policy decisions about computers:

- (a) decisions regarding the computer itself -- size, model, and buy or rent;
- (b) decisions regarding key data-processing personnel;
- (c) decisions regarding specific marketing applications.

In (a), marketers indicated a marketing executive is involved in 26.9% of the companies, 12.5% claiming direct involvement and 14.4% indirect. Data-processors indicated 19.4%, of which 12.0% is direct and 7.4% indirect. The main difference in these figures is the degree to which marketers are involved. Marketing executives indicated that in 7% more companies, the marketer's involvement is only indirect.

In decisions about key data-processing personnel, marketers reported that 22.1% of the companies involve a marketing executive, 10.6% directly and 11.5% indirectly. The data-processors showed 15.8% of the companies involving a marketing executive, 13.9% direct and 1.9% indirect. Here, the differences in the replies are because marketers claimed a direct involvement in 3.3% fewer companies but an indirect involvement in 9.6% more companies.

In decisions regarding specific marketing application of computers, marketers reported that in 82.7% of the companies a marketing executive is involved, 35.6% direct and 47.1% indirect. Data-processors reported that in 59.2% of the companies there is involvement of marketing executives, 23.1% direct and 36.1% indirect. Thus, 23.5% fewer data-processors think a marketer is involved here, and this difference is about equally divided between the two types of involvement.

Analysis of the replies about these three decision areas shows similar answers from each group regarding the percentage of replies indicating direct involvement by a marketing executive. (Marketers indicated 40.1% and data-processors 39%). But the returns differ about the percentage of replies indicating indirect involvement by a marketing executive -- 50% of the marketers claimed this while only 36% of the data-processors did so. Thus marketers feel they are more involved in policy decisions about computers than do data-processors.

Interestingly, the replies indicate answers that are the reverse of what would be expected if one speculated

about the results regarding the degree of involvement (direct versus indirect). Conjecture leads to a conclusion that data-processors should indicate must less direct involvement by marketing executives in policy decisions than would marketers, while the opposite holds for indirect involvement. One would think that most data-processing executives want to maintain control over EDP policy but would consult with senior people in other functional areas about analyses affecting those areas.

IV HOW COMPANIES ASSESS THE VALUE OF COMPUTERS IN MARKETING

Both types of questionnaires asked about how computer applications in marketing are evaluated. The first standard, shown in Table II in Chapter V and Table IX in Chapter VII, is that an application is considered successful if analysis by EDP "saves time" over other methods. This is used by 23.8% of the companies represented in the marketers' replies and by 26% in the data-processors' replies. This standard is the second most frequently indicated by marketers and the fourth by data-processors.

Marketing executives reported that "reduced processing costs" or "saving money" is a standard used in 14% of the companies (fourth most frequently mentioned). The data-processors indicated 35% of the companies employ this standard, making it the second most popular. The relatively large discrepancy between percentage of companies using may be because marketing executives are less concerned with processing costs of analyses than with interpretation and implementation of results. On the other hand, many EDP executives place much emphasis on doing the work as economically as possible.

"Provides better information" is the next standard shown in the tables. Marketers rank this first in popularity, and data-processors rank it third. Of the marketers, 36.4% indicated their companies use this standard, as against 33% of the data-processors. Although the difference between the figures is not large, the difference between the ranking order is logical as marketers are more concerned with using computer-generated information than are data-processors. Most of the replies from the marketers seems to indicate that their companies are in an intermediate stage of computer use; i.e.,

now using EDP to generate better and faster information as well as information that was not previously available. The data-processors, on the other hand, do not place as much emphasis on this standard as they are not the ones who used the previously available information, nor do they analyse applications from the point of view of interpreting the printout.

The next criterion, closely associated with the one above, is: "Does an application assist management in decision making?" The marketers indicated that 21.5% of the companies use this criterion, ranking it third in popularity. The data-processors claimed 37% use it, thus ranking it first. This standard is unique in that the replies did not indicate in which of many ways decision making is affected by computer use. All other criteria were stated in relative terms: i.e., what using a computer does compared to what was done without one. "Saves money" for example, considers the costs of generating the data by computer to the costs by alternative means. This may account for data-processors giving this criterion greater emphasis, as they presume that most computer applications,

other than routine bookkeeping tasks, are to assist in decision making.

Another possible reason why data-processors place more importance than marketers on this criterion may be that many marketers have not yet reached the stage of sophistication in computer usage where they use the machine for decision making. Rather, they are still at a level where EDP is used only to analyse input data faster and better than was done previously. Furthermore, a marketing executive who is not familiar with simulation or Operations Research may resent the implication that a computer can make decisions for which he has been training many years.

Both groups rank "helps competitive position" fifth as a criterion, as only about 2.5% of the companies in each sample use it. But this is a very broad standard and can be interpreted to mean just about any of the above-stated criteria.

One criterion was mentioned exclusively by marketers as was one by data-processors. The marketers (1.9%) felt an application should be judged by whether it can handle a greater volume of data than other methods. No data-processor mentioned

this, probably because they are used to the large volume capacities of computers and no longer consider this important. On the other hand, marketers, perhaps having been frustrated previously by lack of time to analyse the plethora of available data, may well place importance on, and be impressed by this aspect of an application.

The data-processors' exclusive criterion was that a combination of all above-mentioned standards is used for evaluating each application. This is the way 11% of the companies assess each application. The use of more than one standard is important because for most applications there is more than one type of benefit derived. For example, an application may provide faster and better information than previous methods of analysis. But if it is more expensive to do by EDP, and if "reduces processing costs" is the sole criterion, then the application may be wrongly discontinued.

V STEPS BEING TAKEN TO ACQUAINT MARKETERS WITH THE POTENTIAL OF EDP

Both groups were asked about what is being done in their companies to educate marketing personnel to the potential of EDP. The most frequent reply by each group is that their companies hold seminars for non-data processing people to teach them about EDP. These training sessions are usually

staffed from within the company, 65% of the marketers and 31.8% of the data-processors reported this method. The use of outside people for conducting training sessions was indicated by 12.4% of the marketers and 26.3% of the data-processors.

Another educational activity used is on-the-job training. But this method is limited to specific employees and is undertaken only as their jobs require. In the replies, 16.3% of the marketers and 4% of the data-processors reported use of this technique. Encouraging self-education by individual marketing employees is the least used method, reported by only 4.7% of the marketers and 1.6% of the data-processors.

Both groups said the education area is neglected as nothing is being done at present to inform marketing employees about EDP; 5.8% of the marketers recorded this neglect, and 18.3% of the data-processors mentioned it. One would think the relative frequency of this answer from the two samples would have been reversed; i.e., marketers would claim more neglect in this area as the use of computers in marketing concerns them directly. Also, data-processors would not like to think the education of marketing colleagues about this new and important machine in their company is being ignored.

CHAPTER IX

SUMMARY, CONCLUSIONS & PROGNOSTICATIONS

I SUMMARY

In rapidly expanding technologies it is important to pause occasionally and evaluate progress. Much activity has occurred in the use of computers for marketing, but to date no positional analysis has been done. This research examines the experiences of over 100 corporations in their use of EDP for marketing. Replies from both marketing executives and data-processing executives are analysed by type of company; i.e., industrial goods' producers, consumer goods' producers, manufacturers of both industrial and consumer goods, or integrated middlemen.

First, an analysis of the relevant marketing and data-processing literature is presented. One study, done in 1961, assesses computer experiences of 27 companies in seven

business areas, of which only four pertain to marketing. There are also a number of articles on specific applications. But the bulk of the literature either describes the use of mathematical models in marketing or speculates on future uses for computers.

The principal findings of this research follow.

The mean time computers have been used in marketing is approximately six years. This indicates that although EDP has been used in industry since 1954, not until the early 1960's did companies, on the average, begin using it for marketing analyses. The average number of marketing applications being used per company is 4.6.

In Table I, seventeen categories of applications are listed, along with the average number of users, average time used, and rankings for each. The application employed by the most companies is Sales Analysis, and the one used by the fewest is Distribution Channels Analysis. But this latter application, used by only four companies, has been employed for the longest average time. The application used for the

Chapter IX - Table I

Distribution of Average Number of Companies,
Average Time Used, and Average Rankings
for the Applications

Application	Average No. of Companies Using	Average Time Used	Rankings	
			By No. of Cos. Using	By Length of Time Used
I. <u>SALES MANAGEMENT</u>				
1. Sales Analysis	64	5.02	1	4
2. Sales Management Analysis	26	4.31	7	7
3. Sales Territory Analysis	42	4.26	4	8
4. Service Policy Analysis	5	5.40	15	2
II. <u>PHYSICAL DISTRIBUTION MANAGEMENT</u>				
1. Physical Distribution Analysis	27	3.76	6	10
2. Distribution Channels	4	6.45	17	1
3. Inventory Mgt. Analysis	62	4.55	2	6
III. <u>MARKETING MANAGEMENT</u>				
1. Pricing Analysis	19	4.20	8	9
2. Forecasting Analysis	41	3.58	5	13
3. Marketing Management Analysis	10	3.6	10	12
4. Advertising Analysis	7	1.36	12	17
IV. <u>FINANCIAL MANAGEMENT OF MARKETING</u>				
1. Distribution Costs Analysis	9	5.22	11	3
2. Pricing Analysis	5	3.3	15	15
3. Credit Administration	7	2.75	12	16
4. Financial Analysis	15	3.25	9	14
V. <u>RESEARCH</u>				
1. Marketing Research Analysis	48	4.7	3	5
2. Operations Research Analysis	6	3.61	14	11
			Rho = 0.89	

shortest time is Advertising Analysis. The coefficient of correlation between the two ranking methods equals 0.15, indicating little relationship between the number of companies employing an application and the length of time they have done so.

The short time of use for Advertising Analysis (amount to be spent, and media selection) appears to be an anomaly. But the companies in the sample are among the largest corporations in America, and in most cases their advertising agencies make these analyses.

Generally, the first computer applications made for marketing are Sales Analysis, Sales Territory Analysis, and Inventory Management. A number of companies used these in their first year of computer experience. Service Policy and Pricing Analyses are the last tried. In the case of Service Policy Analysis, companies generally use computers for five years before attempting this application. For pricing purposes, the minimum lag has been four years.

Organizational and administrative relationships

between the marketing and data-processing departments are also analysed. Marketers, in about one-half the companies, are involved in one or more of three computer policy decision areas:

- (a) In computer acquisition decisions: 23.5% of the companies have a marketing executive involved (12.0% directly and 10.5% indirectly).
- (b) In key data-processing personnel decisions: 19.0% of the companies have a marketing executive involved (12.3% directly and 6.7% indirectly).
- (c) In marketing analyses decisions: 70.9% of the companies have a marketing executive involved (29.4% directly and 41.5% indirectly).

Companies use six criteria for assessing the value of computer applications. In order of popularity, they are: provides better information, assists in decision making, saves time, saves money, helps competitive position, and handles larger volume of data. Only 22 companies indicated using a combination of these criteria.

The problems encountered by marketing in their use of computers have been (in order of frequency mentioned): lack of qualified personnel, (both marketing and data-processing); interdepartmental problems caused by lack of communications; scheduling priorities because EDP system is too small; changing employees' old ways; and selling management on the need to use a computer.

The companies have tried to solve these problems in the following ways: (a) establishing educational programs, (b) exchanging personnel between marketing and data-processing departments, (c) establishing priorities and controls for use of computers, and (d) developing larger EDP systems. Interestingly, the most frequently mentioned answer is that nothing is being done about the problems -- yet!

The organizational and administrative changes computer use has made in marketing departments are, in order of frequency mentioned: the scope of some marketing departments and marketers has been expanded; responsibilities of some executives have been realigned; and some old guard, intuitive-type decision makers have been replaced, because a more objective look at some problems is now possible.

The main source of computer services to marketing is corporate EDP departments -- generally administered by financial executives. The use of outside services (consultants and service centers) is another source. A few marketing departments do, however, have their own computers and/or computer specialists. No charge is made for marketing's use of EDP (hardware and personnel) in a majority of companies. In those companies where marketing is charged, the most common basis for calculating the charge is to add variable costs incurred (including time of programmers and analysts) to an allocation of overhead costs. A few companies charge for just variable costs. Also, a small number of companies base the charge on what would be paid if the services were purchased from a service center.

Most computer applications are initiated at the request of marketing executives. Another common way for starting marketing analyses is to have an EDP employee investigate possible applications. The systems analysts' sources of information about potential marketing applications are generally outside the company; e.g., literature, conferences,

computer manufacturers, and discussions with data-processors in other companies. On the average, marketing's use of computers represents 13% of machine running time, and the program used represents about 13% of all programs employed by the companies.

The most frequently indicated method used to educate marketers about computers is to present educational programs, directed and staffed from within. The second most frequently indicated method is to have educational programs presented by outsiders. Third, a number of companies expose marketers to EDP only as their jobs require. Interestingly, almost 20% of the companies are doing nothing in this educational area.

II CONCLUSIONS

Marketing has had a relatively late start among the business functions in applying EDP. Before 1960 few companies made marketing analyses by computers. A limited number of articles appeared in the literature about that time, but they referred primarily to employment of linear programming

techniques for inventory management and to an extrapolation of accounting techniques for sales analysis.

In the last six years, however, much awareness and interest has been generated about this subject and an ever-increasing number of companies have been using computers in marketing. But most present applications are fairly elementary; i.e., only using computers as tabulating or calculating machines. As marketers become more quantitatively oriented, and as more relationships among variables in marketing become better understood, there will be a manifold increase in the use of computers in marketing. And then the computer's contribution to marketing will increase exponentially. In fact, at present marketers have only scratched the surface of the computer's potential.

Among the many reasons why marketers resist using EDP is the fact that they do not understand the mathematical techniques required or the many mysteries that seemingly enshroud computers. But this limited understanding should not be a major obstacle, as marketing executives need not become involved in the details of applications. Rather, their

contribution is greater if they take a broad approach. This perspective will help ensure greater returns from the EDP investment. The results of this study suggest that senior marketing executives should take more interest in their companies' use of computers and just give overall direction to the computer specialists. For this the executives only need know approximately what can and can not be done, where the opportunities lie, what information they require for certain decisions, and how much the information is worth to them.

At present, most EDP people are somewhat isolated and insulated from marketing. In many companies, marketing's use of computers would be further ahead if marketing had its own data-processing personnel and Operations Researchers. Such an arrangement would provide better control by marketing executives of data-processing and would allow the specialists opportunities to understand marketing better. Also, the dependency of marketing on corporate data-processing for initiating marketing analyses would be alleviated. Another way to help increase marketing's use of computers is to

encourage data-processing and Operations Research personnel to keep current in the field. Through their associations and reading many applications would develop.

The principal reason for using EDP in marketing is to increase profits. This can be accomplished by:

- (a) doing the tabulations and calculations faster,
- (b) reducing data-processing costs,
- (c) assisting in decision making by providing better and faster information,
- (d) allowing executives more time for planning,
- (e) enabling the costs and consequences of various alternatives to be calculated.

Profit increase should be the overall criterion for evaluating computer applications, but, because of the many intangibles in marketing, more specific objectives should be developed for each application.

Too little emphasis on planning before developing and using applications is the main reason for the lack of success in marketing's use of EDP. To maximize the benefits from EDP, much planning should be done before an application

is developed. Specific objectives should be delineated (here, senior marketing management's involvement is important), information requirements should be outlined, expected costs considered, and expected savings estimated. Also, the effect that implementation of the results will have on the company as a whole (both long run and short run) is important.

Costs for information should be considered, but the research shows that the price charged for using EDP does not affect the amount used. In order to make good decisions about computer applications, marketing executives should know how much they are willing to pay for certain information. A large amount of data can be generated by computers, but much may be of marginal value. And the really pertinent information may be too costly to develop. The type and amount of analyses made should be economic decisions.

Another important consideration regarding the use of computers in marketing is the education of present employees about the mysterious "machine". This is a neglected area in many companies. Because of this neglect, the use of EDP has probably not been as successful as it could have been.

Skepticism and even resentment towards EDP may develop as some employees feel their job security threatened by computers. With good educational programs, many fears would be alleviated. Also, greater knowledge about computers would enable employees to relate the use of EDP to their own position, and to employ the results of computer applications more efficiently.

III PROGNOSTICATIONS

Numerous potential areas for applications of computers in marketing have been suggested by respondents. The most frequently mentioned are Operations Research, Marketing Research and Market Forecasting. But applications in these areas are already being made by some, albeit a few, companies in the sample. The suggestions, however, apply to the use of more sophisticated techniques, requiring more marketers to better understand the quantitative methods used, and more Operations Researchers to better understand marketing. Not until this mutual edification is furthered will great strides forward be made in, and by, the use of computers for marketing.

A potential area not mentioned, in which computers will be useful to marketers, is in the development of Marketing-Information-Systems (MIS). But to date not much has developed here. Marketers are probably responsible for this lack of advancement, as the capabilities of computers are already sufficient to provide technical back-up required for MIS. In most cases management does not know what information it requires and in what form, or, as mentioned above, what price it is willing to pay for the data. But, in spite of the human limitations at present, this is an area of great promise for computer use.

Another potential area of application is new products planning. Computers could analyse marketing facts very rapidly, allowing companies to pin-point customers' needs and preferences and develop the appropriate product(s) more rapidly. Because of this, the life cycle of many products could probably be shortened.

Using computers to sell is just beginning. Vendors' computers can communicate with those of the vendees and the typical sales "pitch" will probably be composed of a deck

of punched cards or magnetic tapes containing cold facts about product specifications, performance standards, instructions (with costs) for use and price. The Buyers' computer will then analyse this data according to requirements programmed into it, and will compare the suitability of this product to competitors' products. Once specifications have been sent to a vendor's computer, the information will be retained in a memory bank and when that type of product is needed again, the data will be recalled for further evaluation. Product price changes and other such news will be forwarded to the purchaser's computer when appropriate. This new information will then up-date the product "file".

The use of computer techniques for pricing analyses will also be an important future area of application. Some companies claim to be doing this now, but this present activity does not bear much semblance to what will be done in the future. When better pricing models are developed, when game theory is extended to include more variables, and when better information-gathering techniques are used, marketing management will be able to make better pricing decisions with the help of EDP,

as they will be able to consider more variables, more realistically.

Another area of computer application presently used to a limited extent and with limited success, but due to expand tremendously, is promotional expenditure decisions. A few companies are using linear programming in this area and some are even using heuristic programming. But these analyses are primarily about media decisions -- where to spend the advertising dollar. Promotion, as used here, refers to all the ingredients in the promotional mix. Choices will be analysed about trade-offs between different tools, that is, the optimum amount to spend on each to obtain a desired result, and how the change will be interpreted by customers. Although some sophisticated models are used at present for advertising media decisions, they do not consider the effectiveness of individual ads, but only how to maximize exposure with available monies.

Rote marketing is also another area where computers will play an important role. For example, when inventory reaches a predetermined minimum level (as calculated by

computers and corrected occasionally by physical count) an order for a certain quantity will automatically be sent out to the supplier. All order placing, invoicing, billing, order picking, paying and pricing will be handled by EDP.

Marketing Research, as we know it today, will be changed substantially by the use of computers. There will be less emphasis on sampling, because computers can handle the larger volume of data from studies of specific populations almost as quickly and just as easily as handling data from samples. Also, more of the marketing researcher's time will be spent on trying to get data about the quantitative relationships among variables in marketing, so that better models can be made of a company's market place.

The use of computers will also cause more emphasis to be placed on financial management in marketing. New tools for analysis will be developed through use of EDP, and the calculations will be handled quickly once the programs are developed.

Educating marketers about the inter-relationships of the many aspects in marketing decision, and teaching both

students and practitioners how to make better decisions, are other areas where computers will help greatly. Business games which simulate commercial situations are just starting to come into vogue in industry, indicating that the future for using computers in teaching marketing will increase rapidly.

Many writers in the popular literature field express concern over the effects use of computers will have on marketing personnel. There will undoubtedly be many changes caused in present jobs. The mundane jobs, or parts of jobs, are the more susceptible to computerization. By using EDP for the repetitive tasks, individuals will be relieved of burdensome detail and will have more time for performing other duties well. More emphasis will be placed on aspects of marketing requiring creative thinking and initiative. This will cause the level of intelligence to be raised, will enable marketing to be more efficient, and will allow more free time for individuals. All three are desirable by our present value system.

These are but a few areas where computers can be

applied and towards which marketers should move. There are numerous other areas of potential application. In fact, it is hard to conceive of any marketing area not susceptible to the use of EDP in the future. As mentioned in the opening chapter, "the potential is tremendous".

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