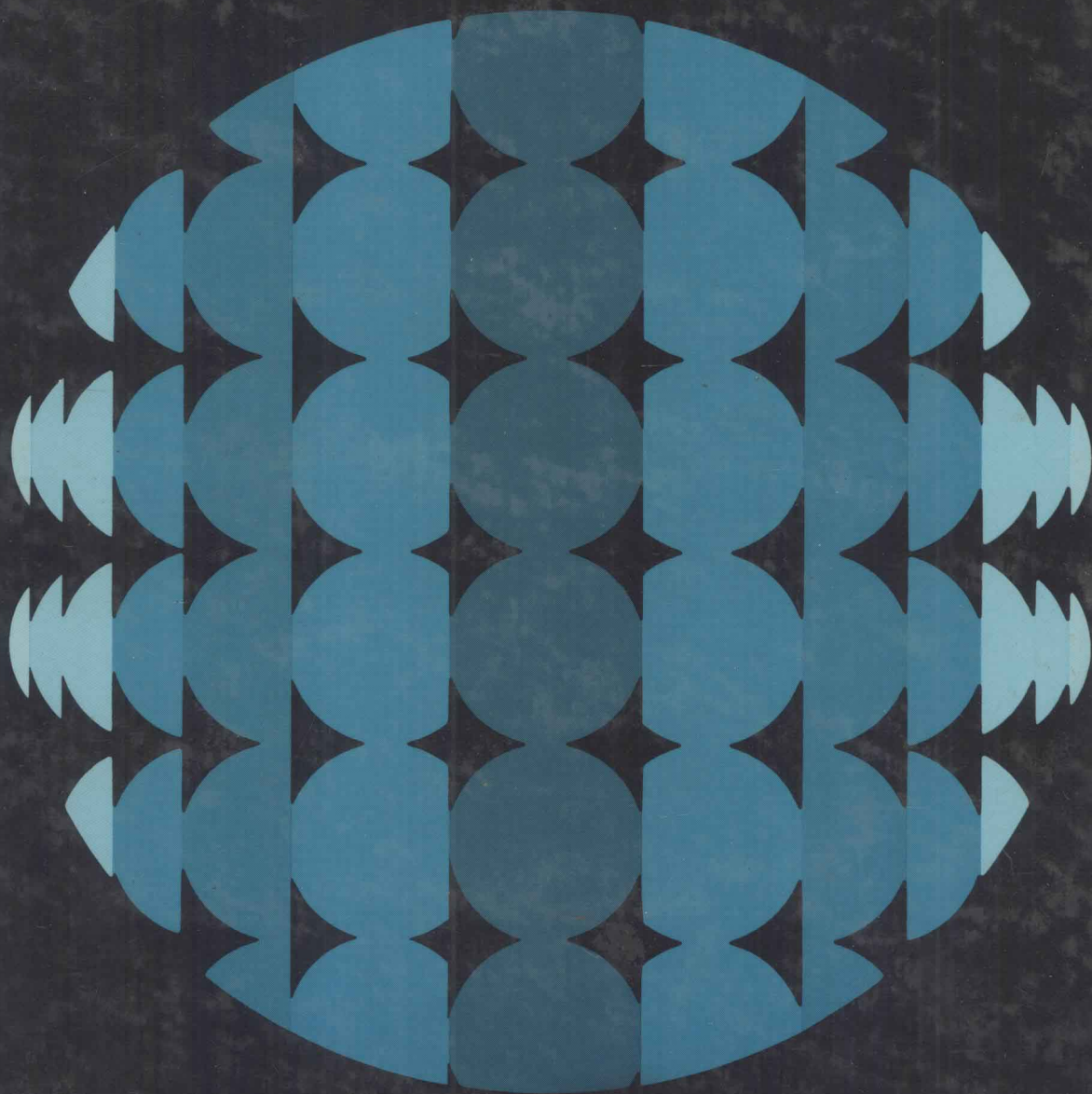


MANAGEMENT OF COMPUTER OPERATIONS

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MANAGEMENT OF COMPUTER OPERATIONS

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***MANAGEMENT
OF
COMPUTER OPERATIONS***

To Adi, Einat, Danna, and Yael

Preface

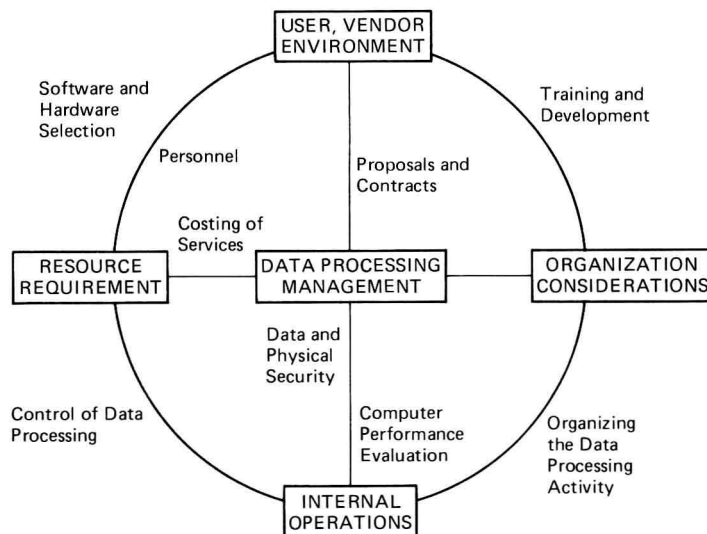
With the expanding use of data processing, particularly in business, increasing numbers of people in all disciplines are finding themselves involved in acquiring, developing, using, managing, controlling, and auditing data processing systems. Therefore, management of data processing, which includes all those activities, has become an important function in many organizations.

This book is designed for persons interested in the management of data processing. It is also intended for use as a textbook for students who are majoring in computer science and/or information systems as well as students in business administration who are learning about information systems. This book may also be used as a reference for practitioners, such as policymakers in middle and upper management who establish, implement, and monitor policies that affect the data processing activity in the organization.

In view of the diverse backgrounds and interests of the intended readers, the structure of the book follows a logical sequence to ensure a comprehensive treatment of the topics covered. In addition to extensive discussions and explanations of critical topics, we also discuss diverse topics in an integrated manner that stress interrelationships and common themes. The book requires only elementary knowledge of the fundamentals of data processing. It is believed that the nonprofessional will find no difficulty in following much of the presentation.

With its balance between theory and applications, and with broad coverage of topics, *Management of Computer Operations* is divided into ten chapters that cover most of the topics a data processing manager faces. The accompanying chart presents an overview of these topics and the relationship between them.

For better understanding, the book should be read in sequence, since some later chapters assume knowledge of preceding ones.



Most of this book was written while I was on sabbatical at the University of Southern California, Graduate School of Business Administration, Department of Management and Policy Sciences. I am much indebted, therefore, to the university's faculty and staff for giving me the opportunity to work on this project. I also wish to thank my colleagues on the Faculty of Management at the Tel Aviv University for providing me with all the help I needed during my work.

This book incorporates a number of articles written by colleagues. I wish to express my great appreciation to these scholars for allowing me to use their material.

Since most of the material in *Management of Computer Operations* has been used in the form of notes in classes at the University of Southern California, I am indebted to many colleagues and students for their helpful suggestions.

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Preparation of Proposals and Contracts

INTRODUCTION

This chapter describes the procedures involved in the computer system acquisition process, starting with the preparation of a request for proposal (RFP) and culminating in the signing of a contract with a chosen supplier. The intention is to present a comprehensive checklist of procurement procedures rather than a model or proposal for any particular decision method. Therefore, alternative methods of performing a given step will be described, but no specific preferences for any one method are given.

The process of computer acquisition is a complex one, necessitating numerous preliminary steps before the actual formulation of the requirements can be accomplished. These preliminary steps include the actual drafting of the RFP, analysis of proposals submitted by suppliers, decisions on supplier selection, negotiations with the supplier selected, and finally the preparation of a contract. Care must then be taken to prepare for conversion to the newly selected system, which requires a follow-up on the supplier's compliance with the conditions agreed upon and system acceptance checks.

In presenting a complete picture of the computer system acquisition process, we begin with a concise description of the initial preparatory steps. The subsequent sections cover the details of each particular step in the process. Figure 1.1 is an overview of computer system acquisition process.

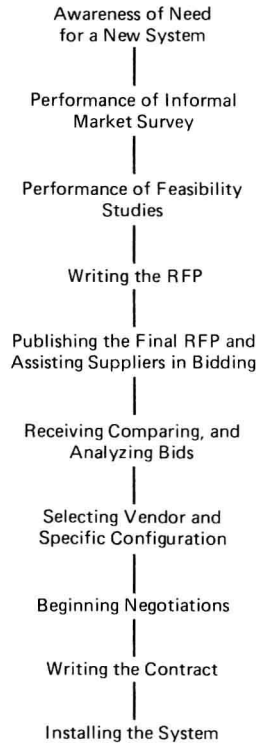


Figure 1.1 Overview of Computer System Acquisition Process

PRELIMINARY STEPS

The steps leading to the actual writing of an RFP, which will generally consume many resources, such as time and money, can be outlined as follows.

Awareness of the Need for Equipment Replacement

As a rule, the procurement process begins with a “feeling” that the current system employed is no longer sufficient. This recognition may either be a vague perception or a well-based result of systematic study and measurement, often performed at the time of installation of the existing computer. Of course, all such “intuitive feelings” must be analyzed for cost-effectiveness, especially if the organization has no prior experience with computer systems.

Factors that Support the Decision to Acquire a New System

The initial awareness of the need for a new computer system, or a first computer, as the case may be, can arise from one or more of the following circumstances:

Unmanageable projected work Load

While a number of applications are being regularly processed by the existing system, it becomes apparent, through studies and projections, that an unmanageable overload on the current system exists or may soon occur. This can be attributed to increases in the number of operations, volume of files, or quantity of output.

Extended requirements projected

New, broader, and more sophisticated client requirements will soon overwhelm or render the existing system obsolete.

Manual information system explosion

The manual systems can no longer cope with the existing work load.

Advent of new technology

Clients may demand services that cannot be performed with the current system (e.g., switching and communication or data-base management), and thus there may be intense pressure to replace the current system, regardless of whether or not it is fully loaded.

Many cases of equipment replacement are due to more than one of these factors, namely, demand for quicker throughput as well as the need for extended and more sophisticated services that can support the decision to acquire a new system.

Determining Specific Needs

Use quantitative yardsticks to measure existing system

After the decision is made to procure a new computer by RFP, the work load of the existing system should be measured for a number of months as a departure point for preparing the RFP.

The chief parameters to be obtained for each application (as monthly averages) are the following:

- Number of jobs submitted
- CPU seconds utilized
- Read/write operations on direct access units
- Read/write operations on magnetic tapes
- Number of records input
- Number of lines printed
- Size of memory required

- Number of direct access devices required concurrently
- Number of magnetic tape devices required concurrently
- Execution frequency

For each file, the following information should be gathered:

- Number of records
- Record size
- Total file volume
- Storage devices
- File organization technique
- Frequency of access
- Average daily hours of use
- Backup arrangement

The utilization of these data will be discussed in the following sections. However, it should be noted that data collection leading to valid and representative averages will take quite a few months.

Determine qualitative requirements

Concurrently with quantitative data gathering, qualitative information is required, especially with respect to future systems. To this end, the analyst should interview both present and potential users or customers to ascertain their demands and needs. From such a survey, analysts will then prepare a forecast of qualitative and quantitative requirements regarding software, hardware, and types of applications. Such a forecast should include the following:

1. Rates of increase of input and output should be measured for existing systems. From these measurements an educated guess can be made about the influence of input and output rates on other load characteristics.
2. For new applications based on existing techniques, the customer should be requested to obtain actual data from similar systems in operation from which an approximation might be made regarding the resulting load on the new installation. Such data are somewhat forced, but nonetheless are still useful.

Perform feasibility studies

The purpose of an RFP is to provide a uniform, unbiased basis for soliciting bids for a system. Sometimes, it may be that there is no point in preparing an RFP, since there are no feasible alternatives to be compared. In such cases, a formal decision should be made not to go through the expensive process of preparing an RFP. However, if an RFP is to be prepared, a feasibility study

should be undertaken first to determine current and future information processing requirements before the actual RFP can be formulated and drafted. By taking the time to examine its present and future needs, the firm is well prepared and is more likely to end up with a satisfactory agreement that ensures that the best possible combination of hardware and services will be obtained at the lowest cost.

The following points outline the preliminary steps leading to the preparation of the RFP.

1. *Justify the system economically.* Economic reasons for system replacement should both be justified and feasible. Cost-benefit analysis may be performed.
2. *Develop the system realistically.* The RFP should be realistic in the sense that the actual potential of both equipment and technology being available will be taken into account.
3. *Estimate the costs of data processing.* An estimate of capital and running costs of data processing should be obtained. These estimates can be used later as a baseline for comparison.
4. *Eliminate unsuitable systems.* Unsuitable systems should be eliminated, allowing effort to be concentrated on those considered acceptable.
5. *Forewarn potential suppliers.* Advance warning should be given to potential suppliers allowing them more time to prepare a serious bid.

Perform informal market survey

After the need for a new system is recognized, an informal market survey is required to become acquainted with the existing possibilities. Such a survey will also help to fine-tune both the quantitative and the qualitative considerations inherent in the procurement of a new system. Only after the completion of this survey can the purchaser's specific needs be efficiently and intelligently matched with available systems. An informal market survey will save time in the long run and should involve the following activities:

1. *Obtain copies of other RFPs.* Getting copies of RFPs prepared by similar organizations is a starting point in developing a checklist of things that are important or that meet your needs.
2. *Visit other data processing managers.* Visiting with those who have been through the procurement process is one of the best ways to get first-hand information regarding system procurement.
3. *Use professional organizations.* Joining a professional organization permits sharing of technical and professional knowledge as well as making contacts through the industry.
4. *Research technical journals.* Publications can provide detailed and comparative information about current data processing systems and the general management problems associated with them.

5. *Use computer vendors as a source of information.* Local computer vendors offer a wealth of information at no cost and can arrange a series of presentations for you on nearly any subject you desire.

Prepare timetable

Preparing a timetable is absolutely essential in developing the RFP. The timetable should be rather rigid, so that the entire process is not too lengthy. The best planning takes place when the need for replacement is perceived to be approximately two years before the time of actual replacement. If such is the case, the second year can be devoted to preparations for physical installation and other preliminary and conversion steps. A suggested schedule for the first year is presented in Table 1.1.

Most of the foregoing discussion relates to organizations that presently have a computer and thus can make comparisons. Totally inexperienced firms are in a different position, however, and therefore some remarks are in order.

The actual decision with respect to feasibility studies and market surveys involves a longer process. The process generally starts with an explosion of the manual information system and loss of managerial control. The feasibility study, then, is conducted by either the organization's own EDP personnel or by external consultants. If the recommendation is to proceed with an RFP, the first step is to appoint a data processing manager, who will start building a skeleton staff. This process should take about half a year, after which time the market survey can begin.

As there are no data to be measured with respect to existing computerized systems in these cases, the manual system must be measured (e.g., number of cards and types of transactions and their frequency) and a projection drawn for its

Table 1.1 SUGGESTED SCHEDULE FOR FIRST-YEAR PLANNING

Month	Activity
1	Decision is made to start studies toward RFP. Preparation includes discussions of requirements, forecasts, and budgets.
2	Market survey is performed.
3,4	Quantitative measurements are derived. Qualitative requirements and forecasts are formulated.
5	RFP is drafted, including appendices. Committees are appointed. Final tender draft is approved.
6	RFP is published and is distributed to viable candidate suppliers.
7,8	Competing suppliers are guided on their bids by means of adequate information.
9	Bids are received and preliminary investigation is begun. Unsuitable bids are refused and others are completed according to need.
10,11	Perform analysis of bids (trials and investigations are required).
12	Analysis is completed and final position is taken. Recommendations are made by committees.
13	Negotiations are begun with supplier selected. Contract is signed. Preparations are started to receive and install the equipment.

expansion in the next few years. Quite possibly, part of this information could have been gathered for the feasibility study. These estimates then replace information on work load and file volume.

It will be more difficult for completely inexperienced customers to define qualitative requirements. Therefore, the job of the professional staff necessitates the expenditure of more time and effort and will probably exceed the two-month period allotted in our proposed time frame.

WRITING THE REQUEST FOR PROPOSALS

Introduction

The request for proposals is a document used to solicit competitive bids for special acquisitions (e.g., construction projects, defense systems, computer systems). This section deals exclusively with RFPs for acquisition of computer services, software, and systems (systems are defined as a package of hardware, software, and related services).

The variability of performance characteristics and capabilities for each element (hardware, software, service) of a computer system is immense, and the possible permutations of the total combination are infinite. For this reason especially, a properly composed RFP is critical to the acquisition of a satisfactory computer system.

Although this discussion deals exclusively with an RFP for a computer system, the general guidelines outlined should be applied when acquiring any single element of a system.

When drafting an RFP, the purchaser should proceed with expressed intention that the RFP will be an integral part (in fact, the basic “core”) of any purchase contract that results from the RFP. This explicit intention dictates that the RFP contain all necessary disclosure required for the vendor(s) to make informed, binding, viable replies.

In the world of computer systems and their acquisition, Murphy’s law (if anything can go wrong, it will) can always be expected to hold. Further, the later one attempts to correct any problems that develop, the more expensive (and difficult) the corrections become. These additional facts provide further substantiation for the investment of time, personnel, and money required to draft a quality RFP. If “shortsighted” management insists on skimping on this investment, it must bear the blame for additional risks (substantial) and extra costs (almost inevitable) resulting from that decision. Such shortsightedness opens the door to possible legal battles, system failures or shortcomings, and so on, and almost always guarantees dissatisfaction with the resultant computer system. A properly drafted RFP is the “ounce of prevention” in the old cliché, “an ounce of prevention is worth a pound of cure.”

In summary, a quality RFP is essential to the acquisition of a satisfactory computer system and the proper exercise of management’s fiduciary responsibility.