EDP COSTS AND CHARGES

Finance, Budgets, and Cost Control in Data Processing

JAMES W. CORTADA

EDP COSTS AND CHARGES

Prentice-Hall Series in Data Processing Management

Leonard Kraus, Editor

Finance, Budgets, and Cost Control in Data Processing

JAMES W. CORTADA

Prentice-Hall, Inc., Englewood Cliffs, New Jersey 07632

Library of Congress Cataloging in Publication Data

Cortada, James W
EDP costs and charges.

(Prentice-Hall series in data processing management)
Bibliography: p. 277
Includes index.
1. Electronic data processing departments—Costs. I. Title.
HF5548.2.C674 658.1'5 79-13820
ISBN 0-13-235655-4

Editorial/production supervision and interior design by Gary Samartino
Cover design by Edsal Enterprises
Manufacturing buyer: Gordon Osbourne

EPD Cost and Charges: Finance, Budgets, and Cost Control in Data Processing, by James W. Cortada

Printed in the United States of America
10 9 8 7 6 5 4 3 2 1

PRENTICE-HALL INTERNATIONAL, INC., *London*
PRENTICE-HALL OF AUSTRALIA PTY. LIMITED, *Sydney*
PRENTICE-HALL OF CANADA, LTD., *Toronto*
PRENTICE-HALL OF INDIA PRIVATE LIMITED, *New Delhi*
PRENTICE-HALL OF JAPAN, INC., *Tokyo*
PRENTICE-HALL OF SOUTHEAST ASIA PTE. LTD., *Singapore*
WHITEHALL BOOKS LIMITED, *Wellington, New Zealand*

Preface

Companies are spending billions of dollars each year on data processing while not always understanding why there is such a great cost or how to measure its benefits. The need exists for guidance in justifying the acquisition of more technically competent individuals, developing increasingly complex applications, and purchasing or renting larger numbers of computers and related equipment. This book provides advice for both data processing executives and their financial and general management on making business decisions that involve computer technology.

It is my belief that companies spend too much money for the data processing that they already have and not enough for data processing that they need. This book explains how to spend DP dollars more productively.

It shows executives and management, in both general and specific examples, how to improve DP decision making that is relevant to a company's financial situation. For the data processing manager, it describes basic standards that a controller must consider in regard to data processing. For other types of management, the book reveals ways to measure costs and benefits in data processing and explains how some more expensive alternatives will yield greater, long-term benefits.

Because the material is intended for a varied audience, some of it might seem simplified to certain individuals. However, I have found from my experience that there is an incredible lack of basic knowledge in upper management about data processing and its financial justification, and there would be no service done to this area if the opposite were assumed. In order to help the more knowledgeable individual locate relevant topics, the chapters are subtitled and an index is provided.

The first two chapters (intended mainly for the non-DP executive) discuss the issues of data processing trends in general and the difficult problems of applying those currents to short- and long-term planning. They also speak, in specific terms, of relating those developments to the needs and business concerns of a company. The second chapter is especially directed to the data processing management that is weak in the area of planning. The next two chapters deal with the more specific issues of justifying applications in business terms, acquiring programs and equipment, and measuring costs, risks, trends, payback, and benefits.

It is important that your contract negotiations support the financial strategies that you have developed for your data processing; the chapter on contracts (Chapter Five) shows you how. It tells you how to ensure that your legal arrangements will not eventually cost more than you intended. Many fundamental options and their financial implications are described. Both data processing and financial executives make the greatest number of financial and operating errors in the area of contracts because they fail to consider company plans, data processing needs, and technological changes within the industry. This chapter is intended to help people in all levels of management avoid such errors when making acquisition decisions.

Chapter Six describes service bureaus and facilities management as alternatives to using a data processing department within your own company. This issue is an important one because the number of such organizations, already large, is continually growing in size and offerings. Most companies eventually deal with them, regardless of the industry or volume of sales, and they can vary widely in their financial, contractual, and service arrangements.

Budgets, chargeout systems, controls, and accounting affect all companies in regard to data processing. Only recently have formal procedures and research into this subject area led to management involvement with

data processing that is equal to its involvement with other departments within the organization. Yet data processing has its unique characteristics. Developing a good DP budget requires that certain considerations be kept in mind that do not always apply to other departments. Also, many data processing managers find that their budgets are not appreciated by non-DP executives. Chapter Seven shows specifically how to create a budget that will be relevant to upper management.

An entire chapter has been devoted to vendors and consultants and a company's relationship to them, defining what can be expected from them and how their activities and knowledge can be channeled to benefit your company's management. Vendors are professionals in their field and often have useful services to offer; but many managers regard vendors as salesmen only and thus allow valuable sources of information and help to go untapped. This chapter clearly defines how management can use vendors to improve investments and increase productivity in data processing.

The sequence of the chapters, in effect, reflects a cycle common to many companies: knowledge of data processing is applied to the needs of the organization; the desired applications are justified; funds are allocated for services, people, software, hardware, and facilities; contracts are signed; and projects are implemented and maintained. To aid the reader, two glossaries have been included, one for financial and accounting terms and the other for DP terms. And as a further aid for continued study of specific points, there is a bibliography, broken down by chapters for easy reference.

In preparing this book, I relied on the advice and comments of data processing, financial, and general management, specialists in the industry, and my colleagues. Although I received much encouragement from my friends within IBM, this book is the product of my work and should in no way be considered an official statement of my employer.

ACKNOWLEDGEMENTS

Many individuals have been helpful in offering advice and information, critiquing chapters, and being patient with my work. I appreciate their enthusiasm for the project and especially their help. International Data Corporation, IBM Corporation, Share, Inc., and Booz, Allen & Hamilton, Inc. granted me permission to use their copyrighted material for illustrations. Edwin G. Brohm, Account Manager at International Data Corporation, gave me much useful information about the secondhand computer market. Gus Kane and Celeste Gonzalez, both of IBM, made numerous suggestions for improving the manuscript based on their many years of experience. William Curley, Financial Analysist for Keuffel & Esser Company, proved very helpful in developing the chapters on budgets and

capital analysis. Paul Becker, of Prentice-Hall, worked closely with me on the development of the book's original outline, while Gary Samartino efficiently moved the manuscript through production into published form. Prentice-Hall was understanding during the book's production as I battled for time to write, work, and live with my family. I especially want to acknowledge the kind patience of my wife, Dora, who once again must have wondered if my typewriter meant more to me than her company. Despite her help and those of many others, there may be weaknesses found in the book; for these I take sole responsibility.

JAMES W. CORTADA

Contents

Preface *xi*

CHAPTER ONE **Data Processing Technology and Trends** *3*

Hardware Developments *5*
Software Developments *17*
Application Developments *27*
Personnel Developments *36*
Implications of DP Technology *39*

CHAPTER TWO **Goals, Planning, and Data Processing** *45*

Long-Range Planning *46*
Project Planning and Control *52*
Short-Term DP Planning *72*
Summary *81*

CHAPTER THREE **Applications and Their Justification** *85*

Reasons for Applications *86*
How to Start an Application Justification *87*
A Case Study on Cost Justification: Defining Benefits *89*
A Case Study on Cost Justification: Defining Costs *96*
Risk Analysis *100*
Financial Measurements *103*
Summary of Stages in Cost Justification Process *107*
Special DP Justification Issues *108*
DP versus Financial Business Decision Making *113*

CHAPTER FOUR **Hardware Costs and Their Justification** *121*

Determining Computer Capacity Requirements *122*
The Purchase versus Lease Issue and Computers *126*
The Financial Decision on Computers *129*
Purchase versus Lease: Strategic Considerations for Computers *131*
Samples of Computer Financial Analysis *145*
I/O Acquisition Considerations *161*
Some Concluding Advice *170*

CHAPTER FIVE **The DP Contract** *179*

Types of Contracts *180*
Factors to Consider in Contract Negotiations *187*
Managing DP Contracts *197*
Financial Buying *198*

CHAPTER SIX **Service Bureaus and Facilities Management** *205*

What a Service Bureau Does *206*
Costs, Benefits, and Risks of Service Bureaus *208*
Selecting a Service Bureau *214*
Facilities Management *217*
Buying Time from Other DP Departments *219*

CHAPTER SEVEN **Developing a Data Processing Budget and Controlling It** *227*

Role of a DP Budget *228*
Types of Budgets *228*
Elements of a DP Budget *231*
Generating Costs for Budget Line Items *234*
Developing and Controlling a DP Budget *239*
Charging for DP Services: The Issue *246*
Charging for DP Services: The Way It is Done *249*
How to Implement Cost Controls in Data Processing *252*

CHAPTER EIGHT **Dealing with Vendors and Consultants** *257*

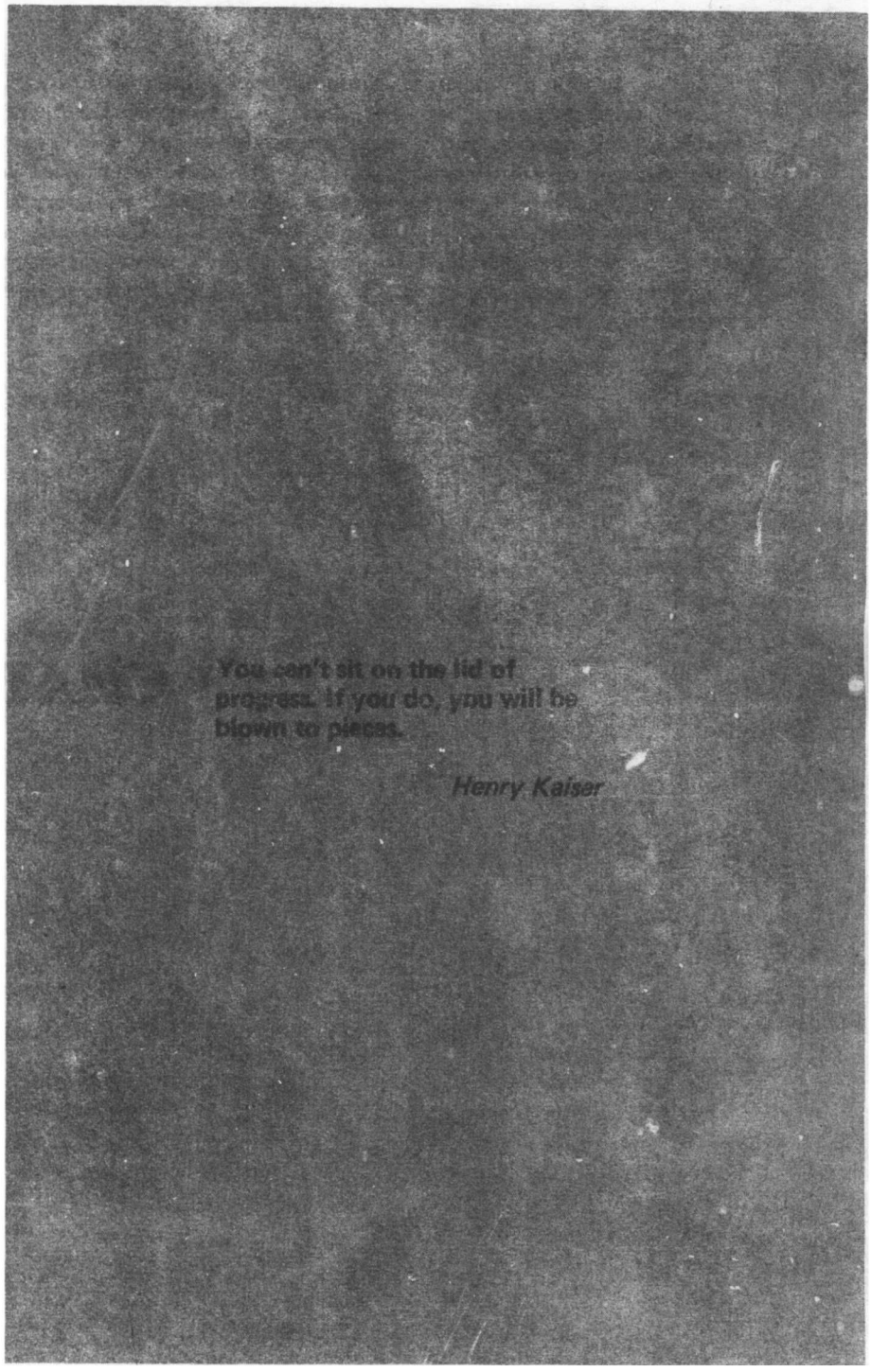
Salesmen and Marketing *258*
Technicians and Support *262*
Consultants and Advice *265*

Glossary of Accounting and Financial Terms *269*

Glossary of Data Processing Terms *273*

Select Bibliography *277*

Index *281*


You can't sit on the lid of
progress. If you do, you will be
blown to pieces.
Henry Kaiser

Chapter 1 shows you how changing technology within DP can significantly impact your costs for data processing in hardware, programs, applications, people, and relates them to your company. This chapter will give you the necessary understanding of the industry so that you can keep costs in line, while taking advantage of all new developments. The potential financial advantages of doing this can run into the hundreds of thousands of dollars in small companies and even more in larger firms. The chapter ends with a section on how to relate DP developments to your specific situation.

CHAPTER ONE

Data Processing Technology and Trends

Rapid changes of major significance in data processing technology have always affected the economics of DP. All predictions of things to come within the next five to ten years suggest that the changes will be at least as spectacular as in the past. Already users notice evolution specifically in the areas of resale values of older equipment, lower cost per instruction for newer ones, software packages which eliminate the need to write one's own, or the introduction of such improvements as data base to reduce data maintenance expenses. And more is on the way. The ideal situation, when defining financial considerations, is to take into account possible future technological changes in order best to take advantage

of them through specific measures in budgets, systems planning, cost justifications, and application development strategies. In considering likely trends, four areas of DP development will be examined briefly—hardware, software, applications, and people—suggesting how these might evolve between now and the next five to ten years. In each case, implications for management will be explored, providing the considerations one must be aware of in making long-range policy decisions and short-term commitments.

As a topic in itself within companies, data processing is growing in importance because of its size. The DP industry in the United States, for example, represents approximately 3% of the Gross National Product, running now into the tens of billions of dollars. Looking at it from the viewpoint of individual businesses, however, in the early 1960s companies might have devoted approximately 0.05% of their sales dollar to data processing services. Today that average is climbing to between 2 and 3% with predictions for the 1980s suggesting the share will grow even more. Another way of measuring growth is to recall that in the mid-1970s approximately 30% of the American work force depended in some form or another on data processing in order to perform their jobs. Industry analysts expect this percentage to climb as high as 70% by the late 1980s as the economy of the industrialized world becomes more service-oriented and we search for more efficient means to conserve declining supplies of raw materials and possibly energy. Moreover, as data processing technology expands its penetration into new areas of applications, and costs decline per unit of work done, the temptation to rely more on computers will be difficult to resist.

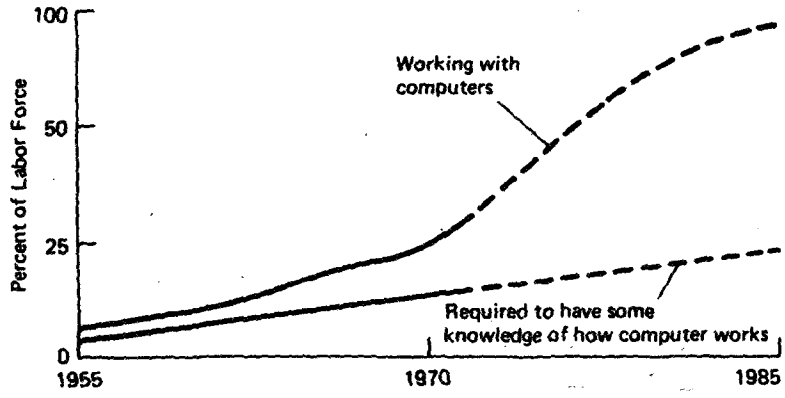


Figure 1-1 Growth of dependence on computers. (*Source: Share, Inc.*)

HARDWARE DEVELOPMENTS

Since the early 1950s, the proportion of a DP budget spent on hardware has steadily declined. The reduction came from approximately 75% of a typical budget down to between 25–45% today and is expected to go down to about 15% by the late 1980s. At the same time, the amount of data processing used rose enormously, accounting for the steady increase in the number of dollars spent on hardware. Looking at it from the point of view of cost per instruction to execute with hardware (leaving expense of software, facilities, and people out), the expenditure dropped dramatically and consistently from the early 1950s to today. As Figure 1-2 indicates, the drop has been impressive. As a dramatic illustration of the change, the retail cost of hand-held calculators dropped approximately 100-fold in the past decade. Yet the number of transitors for storing bits of memory climbed from 500 million in 1960 to approximately one trillion in 1977. And the ones in 1977 are smaller, can handle more, and cost less than earlier examples. The number of components in integrated circuitry usually doubled each year over the past twenty. The cost of direct-access storage during the same period declined 100-fold while the amount available grew by 500 times. What such figures suggest is that the demand for data processing hardware by commercial users has been enormous while simultaneously its cost declined dramatically. All forecasters in the DP industry predict this pattern will continue at a rapid pace well into the 1980s while other observers remind us that traditionally all forecasts of the industry's development and growth have always been far too conservative.

First Ship New Generation Computer	Cost/Million Instructions
1955	$40.00
1961	2.00
1965	.40
1971	.11
1977	.08
1979	.04

Figure 1-2 Cost of processing data using IBM hardware. (*Source: © IBM Corp.*)

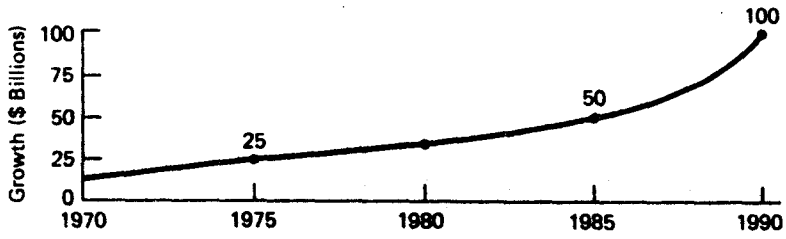


Figure 1-3 U.S. DP hardware growth.

Computers

General-purpose computers, as commonly used in businesses, have enjoyed a continued drop in cost while delivering increased performance over their history. Measured in a number of different ways, these cost figures clearly suggest that the trend will continue. In the past twenty years, the capability of executing a certain number of millions of instructions per second (mip rate) has increased from approximately 20,000 to about five million. Moreover, the speed with which the price of these instructions per second has declined also increased. Between the early 1950s and the end of 1958, prices fell four-fold per 100,000 instructions (executions) per second. In the subsequent six years an additional price reduction of about 20% occurred. From 1964 to 1972, costs fell ten-fold again. Through the end of 1977, prices dropped an additional three-fold average across the entire industry for central processing units.

Several technological trends suggest that the steady decline in the cost of computers will continue throughout the 1980s at a rate similar to the past, if not even more dramatically. Advances in the development

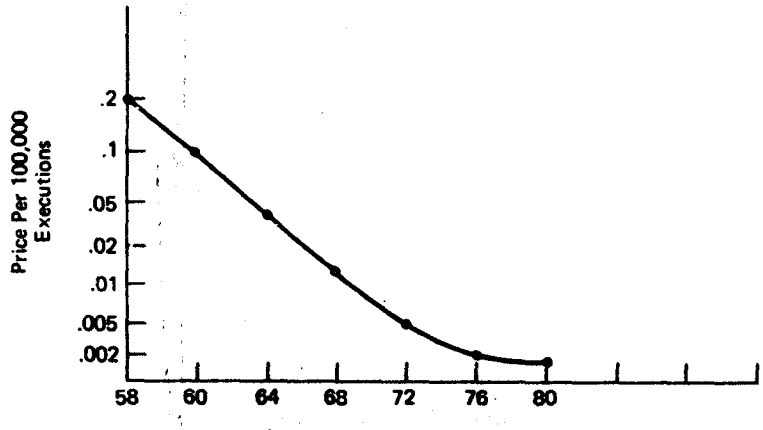


Figure 1-4 Computer price performance. (*Source: Adapted from Lecht,* Computer World, *Oct. 17, 1977, p. 12.*)