

Data Base Administration

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PLENUM PRESS • NEW YORK AND LONDON

Library of Congress Cataloging in Publication Data

Weldon, Jay-Louise.

Data base administration.

(Applications of modern technology in business)

Includes index.

1. Data base management. 2. Business--Data processing. I. Title. II. Series.

QA76.9.D3W45

658'.05

80-20467

ISBN 0-306-40595-4

© 1981 Plenum Press, New York
A Division of Plenum Publishing Corporation
227 West 17th Street, New York, N.Y. 10011

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Printed in the United States of America

Data Base Administration

APPLICATIONS OF MODERN TECHNOLOGY IN BUSINESS

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DATA BASE ADMINISTRATION

Jay-Louise Weldon

To my parents

Preface

In modern organizations, data has been added to the classical economic assets of land, labor, and capital. Data on company products, finances, and operations are gathered into data bases that are used to support management reporting and decision making. Effective use of these data bases requires control over their design and development and coordination among the various users. The exercise of these management functions is called data base administration (DBA).

DBA is an evolutionary area. In many organizations, it was formed as a response to the problems created by the installation of sophisticated systems for data base management. As a result, the practice of DBA has been strongly influenced by its technological and organizational environment. The size, organizational position, staffing, and defined role of DBA vary from firm to firm. However, certain fundamental tasks and responsibilities are, or should be, recognized as the province of DBA.

To date, literature on the DBA function is sparse. Most texts on data base management systems (Date, 1975; Kroenke, 1977; Martin, 1978; Sprowls, 1976; Tsichritzis and Lochovsky, 1977)* discuss DBA as one aspect of that technology.

*Date, C. J. *An introduction to Database Systems*. Second edition, Addison-Wesley, Reading, Mass., 1977; Kroenke, D. *Database Processing*, Science Research Associates, Palo Alto, Ca., 1977; Martin, J. *Computer Database Organization*, Prentice-Hall, Englewood Cliffs, N.J., 1978; Tsichritzis, D. and F. Lochovsky, *Data Base Management Systems*, Academic Press, New York, 1977; Lyon, J. *The Database Administrator*, Wiley-Interscience, New York, 1976; Sprowls, R. C. *Management Data Bases*, Wiley/Hamilton, Santa Barbara, Ca., 1976.

Lyon (1976) has provided a broader description of DBA within a CODASYL data base environment. His coverage is introductory and emphasizes the basic principles of DBA.

This book provides a comprehensive description of DBA: its objectives, its tasks, and the organizational issues raised by its existence. Part I provides an overview of the DBA function and a discussion of the organization and staffing of the DBA group. Parts II-V are devoted to major classes of DBA tasks: planning, design, operation and control, and user support. Part VI contains case histories of DBA in practice.

For individuals in the DBA area, this book can serve as a guide to the scope and content of their responsibilities. For individuals in general management or data processing management, it is a detailed view of this new management area. Finally, this book may be used as a text for graduate business or executive courses on the management of data base systems.

Many people contributed in various ways to the research necessary for this book and to the preparation of the manuscript. In particular, many Data Base Administrators in the New York area took time from their busy schedules to meet with me and share their experiences and views. Without their participation this book would not have been possible. Frank Lowell extended some of the DBA interviews and I am indebted to him for the material on which the case studies (Chapter 16) are based. Thanks are also due to Howard Morgan and to the reviewer for their helpful comments and criticisms. I am grateful to my colleagues in the Computer Applications and Information Systems (CAIS) Area at the New York University Graduate School of Business Administration (NYU-GBA) for their support and encouragement. Finally, I wish to thank the various members of the CAIS secretarial staff, the NYU-GBA Manuscript Center, and the NYU-GBA Computer Center for assisting with the preparation of this manuscript.

Jay-Louise Weldon

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Part I

The Organization of Data Base Administration

Managing the Data Resource

Effective management of organizations, both private and public, depends on information concerning the firm's operations, finances, and the allocation of its resources. With such information management can control costs and maximize profits (private industry) or operational efficiency (public institutions). Such information also provides a basis for planning for future developments, i.e., new products, new services, improved operations.

Since the first nonscientific use of the computer in 1953, organizations have relied increasingly on the use of computers to store and manipulate this information (see Figure 1.1). Today certain industries, e.g., banking and insurance, are virtually dependent on computers. The information explosion of the 1960s and 1970s has made computer data processing a cost-effective operational tool for organizations of almost every type.⁽¹⁾ Recent technological advances, resulting in the availability of low-cost data processing systems, are extending this trend to organizations of almost every size.

To make proper use of these technological tools, the firm must capture data on operations, finances, and resources and convert the data to computer-readable form. The data must be stored, processed, and made available as needed to management. The accuracy and timeliness of the data must be carefully controlled and the processing continually refined to meet new needs. In essence, the data need to be managed.

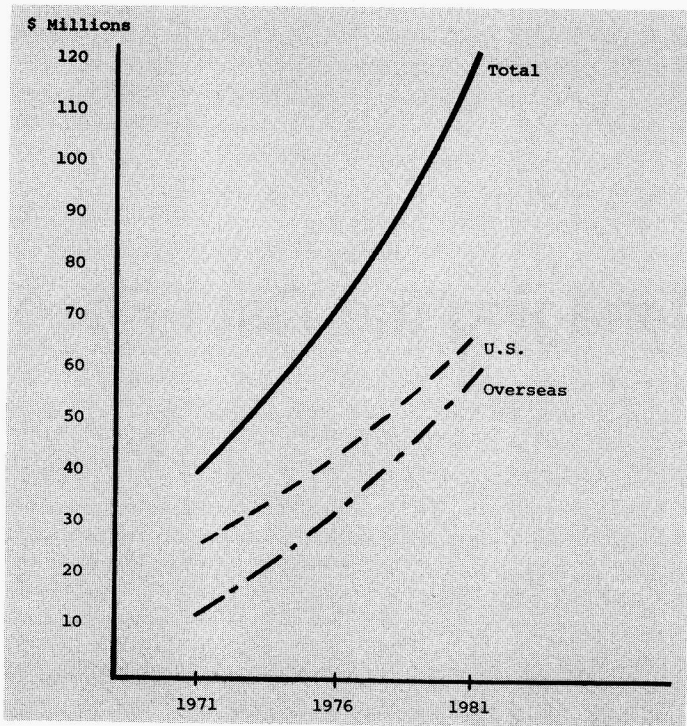


Figure 1.1. General purpose computer systems, \$ millions installed base.

1.1. THE TRADITIONAL APPROACH TO DATA MANAGEMENT

1.1.1. Specialization by Application

Anthony⁽²⁾ has classified management decision making into three categories: operational, tactical, and strategic (see Figure 1.2). Operational decisions govern the day-to-day activities of the firm. The alternatives and decision rules for each are well defined. They also focus on specific functions or events. Tactical decisions are concerned with the allocation of resources and planning. These decisions are more complex and often involve estimates or probabilities in addition to factual information. The highest level of decision making, strategic decisions, is concerned with long-range planning and policymaking. Information for strategic decisions must be gathered from areas both inside and outside the firm.

Data processing (or information) systems can be similarly classified according to the level of decision making that they support. Initially most data process-

ing systems were concentrated at the operational level.^(3,4) Information systems that support operational-level decisions emphasize transaction processing and recordkeeping. Check processing, order entry, and inventory systems are of this type. The data to support this level are the most detailed and voluminous. As a result, the cost savings of operational-level systems could easily be demonstrated by comparison with the labor-intensive systems required for manual processing of the same data.

Over time, systems were developed to support tactical decisions as well. Usually these systems received their input from one of the operational systems. For example, models were applied to improve reordering strategies in inventory control; sales analyses were developed using data from orders received. The benefits of tactical systems are often difficult to quantify, however, so their acceptance and use has been slower than that of operational-level systems.

Even fewer strategic-level systems exist, reflecting the complex, unstructured nature of such decisions and the habits of high-level decision makers. Systems which have been successful at this level are designed to gather, integrate, and display data from a variety of sources in support of the human decision maker.

The operational or tactical nature of most information systems has resulted in system specialization. Information systems have traditionally been developed

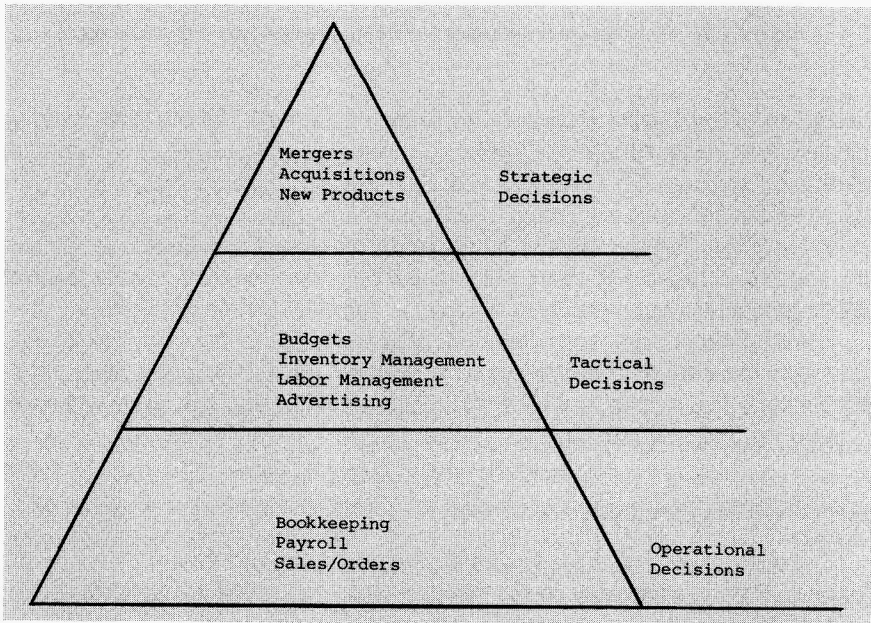


Figure 1.2. Anthony's⁽²⁾ classification of decision making.