INFORMATION RESOURCE MANAGEMENT

OPPORTUNITIES AND STRATEGIES
FOR THE 1980S

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FOREWORD

Information is an ingredient vital to good management. The sharply reduced cost of computer technology and the rapid improvements in the availability of useful new technologies in the telecommunications and office automation arenas have created a very real opportunity to improve the effectiveness of corporate and nonprofit management through improved use of information by management. However, this opportunity has not been easy to exploit in the past two decades. If anything, it is becoming more difficult.

The problems today in the information systems field are legion, but I cite only a few: the need to prioritize the huge resources that are being pumped into information systems development; the need to integrate the various pieces; the difficulties that nonspecialists are finding in working with new technologies; the conflicts between the information specialists and the users of information; and the lack of education of top management as to the key opportunities. One could go on and on.

In every organization there is a need to assist key users to ascertain information requirements, to plan for systems development, and to monitor the status of both the development and the ongoing status of information systems. In short, there is a need for someone to act as the architect of the organization's information capabilities. This is what William R. Synnott and William H. Gruber call "Information Management." Historically, for the first 25 years of the computer revolution, the focus has been on the individual parts of the whole field that Synnott and Gruber have defined as Information Management. Information technology and practice have changed very rapidly, and this has encouraged specialization in hardware, software, operating systems, management information systems, telecommunications, office automation, systems analysis, programming, and so on. This book puts it all together from the viewpoint of the top information officer of the firm.

The strength of the book comes from the experience of the authors. Bill Synnott has provided a wealth of day-to-day "gut feel" for the operating environment of the information manager together with the wisdom derived from years of experience. The strategies suggested are those that have been tried and found effective in actual operation. Bill Gruber has added the

conceptual insights gained from many years as a researcher, professor, and consultant in the information systems area.

This book thus provides an answer to a need that has only recently become recognized. There are hundreds, even thousands, of books about various facets of the field, but no other book provides such a pragmatic, organized focus for the total field of Information Management from the viewpoint of the top information managers. This book may be used as a handbook of strategies that are useful in improving the effectiveness of specific facets of Information Management. Thus the reader can turn directly to strategies on hardware capacity planning, user service contracts, programmer productivity, or executive information systems. One way of looking at the book is as a "how-to handbook."

The book is more than a collection of strategies for improving the effectiveness of various specialized facets in the field of Information Management. It provides a cohesive approach that integrates the field of Information Management.

Synnott and Gruber hold strong opinions about how to manage information resources. They have little patience for the amateurishness which too often comes with decentralization of information activities. A strong centralized Information Management function sharing power in the management of information resources is an important theme of their book. They make a strong case for the creation of the role of Chief Information Officer in the firm. They argue that effective Information Management can be best performed through adoption of the centrally oriented Management by Strategies (MBS) technique described in this book. Some will argue that their views are too centralized. So be it. The case is made with vigor and has much to recommend it.

I believe the book succeeds in documenting the extraordinary opportunities managers have in the 1980s for improving the effectiveness of Information Management. The importance of Information Management as a critical success factor in the achievement of high business performance is also documented. The uniqueness of this book is not only that it addresses the neglected management side of Information Management, but that it is written from a practitioner's point of view. The strategies discussed represent techniques and ideas that have been used successfully. Thus, this is a timely and useful book for information managers, users of information services, and professors who want to expose their students to the current issues and opportunities in the field and some of the management strategies being used by leading companies to effect strong Information Management leadership.

JOHN F. ROCKART

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June 1981

PREFACE

Despite the extraordinary progress made in information management practices during the 1970s a dichotomy still exists between producers of information services and users of information. Most of the literature in the field is concerned with technical details and fails to make the connection between the information resource and the overall goals of the organization. *Information Resource Management* was written to bridge this gap. Our major goal is to deal with information resource management from the general management perspective: to show the information specialist how to work effectively with users, senior management, and staff professionals in the overall management of information resources.

Our methodology in writing *Information Resource Management* has been to organize the book around a series of strategies that have helped to produce the progress of the 1970s. These strategies have not been drawn from out of the blue. They work. They are the result of our work in and experience with several industries—banking, insurance, pharmaceuticals, petroleum, transportation, and publishing.

The more we thought about and studied these successful strategies the more we could see the necessity for users to better understand the field of information management in order to take full advantage of the opportunities it presents for improving organizational productivity. These new capabilities demand the involvement of all who are concerned with the information needs of their organizations. Our experience demonstrates that both users and producers of information services must be jointly involved in any program to improve the effectiveness of information processing and utilization.

We benefited from the careful editing of Alice Falk and Naomi Rosenberg. The many drafts were produced with patience and dedication by our secretaries, Mary Gail Barberio and Joyce FitzGerald. Warren MacFarlan, Richard Nolan, Paul Strassmann, Jack Rockart, and others provided many useful suggestions. Our Wiley editor, John Mahaney, and his staff ably guided our efforts to transform our draft manuscript into the document which was published.

Executives and managers at the First National Bank of Boston and client

companies of the Research and Planning Institute contributed their perspective on strategies for information management and have been involved in implementing many of the strategies cited for improving its effectiveness. Of course, we would like to thank our wives Suzanne and Lucretia, without whose patient support and understanding we could not have devoted the time, labor, and lost evenings, weekends, and holidays to this effort.

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Boston
Cambridge
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Information in the Practice of Management

The organizations that will excel in the 1980s will be those that manage information as a major resource.

John Diebold[1]

A quiet revolution is occurring in the data processing industry. The computer era of the 1960s and 1970s is giving way to the information era of the 1980s. The emphasis on hardware and software of the computer era is shifting toward a focus on information management as we enter the first decade of the information age.

This difference in focus is significant because it emphasizes the quality and the value of the output of computers rather than the quantity, "by-the-pound" approach of the past. The data processing industry has demonstrated its capacity to produce huge outputs of paper—literally billions of pages every working day. What is needed, however, is not more paper or raw data, but distilled, summarized information that can be accessed, assimilated, and used more effectively, particularly by managers. In a recent speech, Robert M. Price, president of Control Data, questioned the need for even larger volumes of computer outputs:

> On the one hand, American business is inundated with information about itself, its products and the economic environment. On the other hand, business is experiencing stagnation of productivity that threatens its very ability to compete.[2]

And John F. Rockart, director of the MIT Center for Information Systems Research, cited the typical experience of a company president:

> I think the problem with management information systems in the past in many companies, has been that they are overwhelming as far as the executive is concerned. He has to go through reams of reports and try to determine for

himself what are the most critical pieces of information contained in the report, so that he can take the necessary action and correct any problems that have arisen.[3]

The data processing industry has experienced a remarkable growth since 1960. But for the most part, the quantity of output has outstripped the quality of output. This is not to say, however, that great strides have not been made in improving the quality of these products, in increasing the productivity of the firm, and in developing more effective information systems and services in support of business activities. In fact, both the quality and the quantity of data processing—or, more aptly stated, *information resources*—now provide an opportunity to move from the computer orientation of the recent past to the information orientation of the 1980's.

Executives in the best-managed companies achieved impressive progress in information management and utilization during the 1970s. From this progress in leading companies, it is now possible to set standards for effective information-management practices in the 1980s. John Diebold has stated this challenge for corporate management very clearly:

> Information, which in essence is the analysis and synthesis of data, will unquestionably be one of the most vital of corporate resources in the 1980's. It will be structured into models for planning and decision making. It will be incorporated into measurements of performance and profitability. It will be integrated into product design and marketing methods. In other words, information will be recognized and treated as an asset.[4]

The information age revolution represents new opportunities for data processing managers, directors of management information systems, and system and programming managers to extend their career paths into the new world of information resource management. This new role of information resource manager, or simply, information manager, as we refer to it throughout the book, as director of the *information management (IM) function* in the organization, offers an opportunity to migrate away from the technocratic image of the past and to establish a new image as a business manager, a general manager, and an information manager.

The low cost of computers is giving increased impetus to the distributed processing movement, with its attendant physical control of computer resources moving into the hands of users. This new development creates the need for an entirely new way of thinking about and managing distributed information resources in the organization, another new challenge to today's information manager.

In *The Third Wave*, Alvin Toffler painted a powerful picture of the world of the next few decades and suggested that the new civilization and the computer revolution (the third wave) will follow the industrial revolution (the second wave) as one of the most potent forces in our society.[5]

We can see how dramatically our society has changed from an agricultural society to an information society by noting the change in the deployment of human resources in the last century. In 1890, 46% of the working population was deployed in agriculture, and only 4% in the information business; by 1979, these statistics were reversed, with only 4% in agriculture and 46% in information services.[6]

The traditional responsibility of information managers will change with this revolution to that of control over information resources, rather than control over physical computing resources. The new challenge of the 1980s for information managers is to understand that this revolution is occurring, to understand how it is changing the role of information managers, and then to rise up and *lead* that change. Those who do this successfully will become the new breed of EDP managers; and those who do not will remain as part of the old breed—who will probably be working for the new breed.

TRANSACTION VERSUS INFORMATION PROCESSING

For over 20 years, we have been developing systems for clerks. It is time we began putting computers to work for managers. During the 1960s and even during most of the 1970s, the primary responsibility of the corporate EDP function was to reduce the clerical costs of producing ever-larger volumes of paper output. The typical corporate EDP function was the manufacture of paperwork. It processed the transactions of operating a business. The processing of transactions is, of course, important in the operational or lower-level control of business activities, and computers have made possible important improvements in the productivity of these clerical workers. However, the processing of transactions from operations, no matter how effective, rarely reaches into the offices of corporate management. Thus the role of the IM function beyond simple transaction processing is not even considered by too many corporate managements.

Transaction processing was, and still is, the prevalent use of computers in business, but this is changing. In a survey of 81 user managers in six major corporations, Dr. John Rockart and his associates at the MIT Center for Information Systems Research reported that over 90% of the installed computer applications in those companies were transaction-processing systems.[7] On the other hand, Rockart also reported the trend toward management *information systems*, noting that the development backlog showed that only 60.6% of new systems requests were for transaction processing, the remaining 39.4% being for on-line inquiry/analysis-type systems. Moreover, the backlog of inquiry/analysis systems was more than four times greater than the present installed base of such applications.

These findings highlight both problems and opportunities. Large backlogs of computer systems continue to exist in many firms, and users are impatient with the IM's function's lack of responsiveness to their systems

and information needs. On the other hand, as basic transaction systems become automated, the demand begins to shift to management and inquiry systems, providing a greater opportunity for information managers to direct more of their resources to management assistance rather than operations and clerical support. Management systems tend to require more advanced technologies, such as interactive systems, data-base management systems, high-level user languages, computer models, minicomputers, and telecommunications networking. Management systems also require greater user-management involvement than traditional record-keeping and transaction-based systems. Thus the frontier for information managers in the decade ahead will very likely be greater information-systems involvement in programs that improve the effectiveness of management functions in the corporation, as well as greater user involvement in the management and use of information resources. Direct user interfaces with information data bases will also help to address the system's backlog, particularly the maintenance of existing systems, much of which is devoted to information extraction and reporting. As users begin to bypass the need for programmer intervention, more resources will be freed for new development work.

The challenge for information executives will be to define their responsibilities more broadly to include the full scope of all facets of information management. Paul Strassmann, vice-president of Xerox, with worldwide responsibility for administrative and information systems, defined this challenge and the new scope of opportunity as follows:

> Once we accept the notion that the top information executive's job encompasses much more than managing data processing expenses, we still have to articulate, in terms of precise objectives, just what the job calls for in today's business environment. In my view, the new job definition would include the following objectives:
>
> Ensuring the integration of data processing, administrative processing, and office labor productivity programs.
>
> Instituting accounting, cost-control, and budgeting innovations that will subject all information systems overhead activities to the disciplines traditionally applied to direct labor.
>
> Subjecting office labor automation programs to analyses comparable to those applied to all other forms of capital investment.
>
> Conceiving organizational designs that will permit information to be handled as a readily accessible and easily priced commodity rather than as a bureaucratic possession.
>
> Creating within the organization an internal market for alternative information systems products, so that trade-off decisions, even technologically complex ones, can be decentralized into the hands of local user management.
>
> Fostering a technique of pricing that will allow decisions on introducing new technology, or abandoning obsolete technology, to be made on a decentralized basis.

> Installing and monitoring measurement methods that will protect improvements in productivity achieved by automation programs.[8]

INFORMATION AGE INTEGRATION

In the 1960s, the data processing manager presided over the company's computer programmer resources like a high priest over his subjects. No one in "user land" or management understood much about the "technical back shop." They only knew that it was a powerful, though esoteric, tool that was incredibly fast and could do the work of a great many people. They told the DP manager what they needed and he or she went about doing it, one day appearing on the doorstep to announce that the new system was ready to be converted. Because of inexperience and the state of the art, considerable ups and downs occurred as systems were installed and shaken down. Also, because of inadequate specifications and lack of user involvement, these systems often performed well short of expectations even after being shaken down.
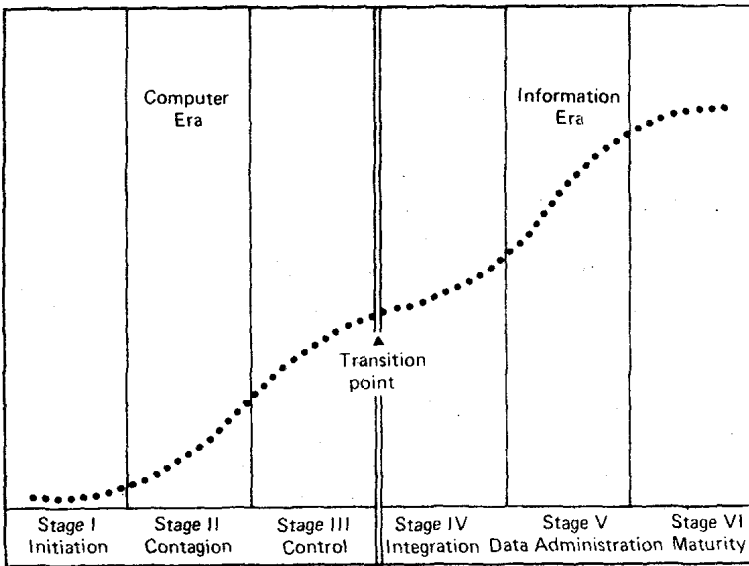
Nonetheless, the practice of systems management gradually improved, user involvement as a requisite for success became more recognized, and hardware and software became more reliable. By the late 1970s, many a DP department had matured to become an efficient, controlled, and vital support function of the organization. Costs were coming under control, systems were performing as expected, and reliable and valuable services were provided by data processing departments.

Just as it appeared that data processing was reaching a stage of maturity, major technological developments entered on the scene to shake up the data processing world once again. The spread of minicomputers and telecommunications began to break up data processing and the centralization-decentralization issue heated up anew. Richard L. Nolan described this process in his well-known *Harvard Business Review* article, "Managing the Crises in Data Processing."[9] He described six stages of EDP growth, as illustrated in Exhibit 1-1.

Stage 1, *Initiation,* marks the installation of the firm's first computers and the introduction to automation; Stage 2, *Contagion,* marks the rapid proliferation and growth of computer systems in the organization as automation spreads; Stage 3, *Control,* marks management's attempt to contain the rapidly rising costs of computing services and to bring data processing growth under control; Stage 4, *Integration,* marks the transition point for renewed but controlled growth as diverse systems and technologies are integrated into cohesive systems; Stage 5, *Data Administration,* marks the conclusion of the development and implementation of a completely integrated data-base system; and Stage 6, *Maturity,* is the final stage of data processing maturity in the firm.

Most well-run DP organizations have now been through the *computer era*

Exhibit 1-1   Six stages of data processing growth.

characterized by the first three stages of growth and are now at the transition
point of moving into the *information management* era, characterized by No-
lan's last three stages of growth. The early 1980s will see many of these
organizations struggling with the *integration* of diverse systems and distrib-
uted resources as they strive toward the totally integrated-data-base admin-
istration stage in the latter part of the 1980s.

Information resource management, in our view, involves the integration
of diverse disciplines, technologies, data bases, and other information-
handling resources. We see this integration stage as a particularly challenging
aspect of IM in the 1980s. Integration will take many forms. To be success-
ful, it must necessarily involve the people side of management as well as
technology management. We see at least three dimensions in 1980s integra-
tion: *planning, people,* and *technology.* On the *planning* side, there will be a
need to carefully integrate business and systems planning so that they jointly
address the objectives of the firm. Long-range strategic planning of this kind
is still done only rarely by most companies. On the *people* side, it will be
absolutely mandatory that the various management groups in the organiza-
tion (i.e., corporate senior management, user management, and information
management) be integrated through the shared management and control of
tomorrow's distributed information resources. On the *technology* side, not
only will the technical delivery systems (i.e., computers, terminals, com-
munications, and data bases) have to be integrated, but also the diverse

information systems that have been built over many years must be integrated into more meaningful, useful information resources and management information systems.

In *Managing in Turbulent Times,* [10] Peter F. Drucker provided guidance for information managers who see the opportunities in the information age. Drucker noted the importance of concentrating resources on results and a "sloughing off of the resource-devouring and unproductive past" (p. 45). Turbulent times provide an opportunity to move ahead of competitors. Drucker noted that leading companies tend to operate at about twice the productivity of other companies in their industries (p. 19). William H. Gruber and John S. Niles [11] also evaluated this disparity between leaders and followers in the utilization of new management technologies. They analyzed trends in the utilization of more effective management practices and forecast the best management practices in the mid-1980s as a "future-firm" status of management competence. We believe the image of a future-firm level of competence in the management of information is a useful standard for planning the transition from the computer era to the information era.

SYNOPSIS OF THIS BOOK

This book has been written as a guide to opportunities and strategies for information managers in the 1980s. Effective leadership of the IM function in this decade will require different strategies than those used in the past. The strategies which have been brought together in this book have been used successfully by leading well-managed companies. They work! Therefore, they can serve as useful guides to information managers in the changing times ahead.

Not all strategies will fit all organizations. All companies are different and require different solutions to problems. But many of the problems, opportunities, and strategies presented can be applied in many company situations. The reader can pick and choose from this collection of ideas and tools to solve specific problems in his or her own environment.

Part 1: The New Management

Following this introductory chapter, we begin by examining the importance of strategic planning as the first step toward integrating corporate objectives, individual business unit needs, and information management goals. Leading companies practice various planning techniques to achieve the integration of business and information systems activities. The unique methodology which we have developed is the management by strategies (MBS) concept introduced in Chapter 2. MBS serves as the framework of the book, which sets forth a series of strategies that can be applied to specific information management situations. MBS should be an adjunct to a management by objec-

tives (MBO) program. Whereas MBO defines *objectives*, MBS defines *strategies* for reaching those objectives—strategies that can be customized to fit a specific company and its problems and needs. The cumulative effect of an MBS program is, in itself, a powerful integration mechanism for effective information management. Effective information management, in turn, is a desirable goal because it leads to better support of the business activities and information needs of the corporation.

The transition from data processing to information management will present new role opportunities for alert information managers in the years ahead. To avoid falling into the "marketing myopia" experienced by the railroad business, which failed to realize that it was not in the railroad business but in the broader business of transportation, we need to understand that the data processing business is evolving into the broader information management business. Change occurs rapidly in a revolution. The information age is opening new opportunities for information managers. In this first part of the book, we evaluate these new opportunities for information managers and recommend a major new perception of the scope of information management in the 1980s. A number of role strategies are discussed to help information managers recognize and capitalize on the opportunities now available to them.

Part 2: Management Integration

The human relations and political dimensions of information management are the subject of Part 2 of the book. The critical interrelationships among the three management groups described earlier (corporate management, user management, and information management) will probably be the single most critical success factor in the effectiveness of IM functions in the future firm. This is true because top managers are becoming research-based managers, looking more to analytical–statistical–quantitative tools to manage the business, as opposed to the experience-based managers of the past, who relied heavily on verbal inputs. Users are also becoming more sophisticated in computer literacy and, because of declining costs in computers, are becoming more involved in the management and control of the computer resources used to support their business activities.

Part 2 examines ways and means of increasing the influence of IM in the organization. Influence is important because it has to do with strong leadership, and leadership is needed both to obtain and to direct the resources needed to support corporate goals and business activities, which, in turn, lead to increased productivity, new computer-based revenue services, and higher profit contributions. The IM function's location in the hierarchical structure, the nature of its management and control of corporate information resources, and its success in automation penetration in various parts of the firm, all contribute to the degree of influence, the leadership ability, and the effectiveness of the IM function. Two chapters are devoted exclusively to