Office Automation

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This book is about the application of computer technology to the processing of information in an office/business environment. It provides understandable and correct introductions to computers, systems analysis, and human factors. There is not overemphasis on one of the subject areas at the expense of another. The book provides a conceptual framework from which the reader will be equipped to deal with whatever technological changes occur, but simultaneously the contemporary situation with respect to business/office information processing is examined in detail.

The book also integrates the developments that are occuring within the wider framework of societal changes; it is not restricted to people only interested in the improvement of office productivity.

Contents

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Please note that certain pages in this book have been deliberately left blank in order to conceal the answers to questions at the end of the chapters.

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For Chris and Kate

The clerk, the computer operator, the secretary, the system analyst, the office manager . . . are the staple people and jobs of the modern city. The typewriter and the telephone are the most urban tools, paper the city's most necessary raw material.

Jonathan Raban, *Soft City.*

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There are many people who have helped in various ways in the creation of this book, and who of course should not be held responsible for any faults that it contains. Of all those who helped there are three people who were particularly important:

John Barrett, an ex-teaching colleague in Ireland, currently director of Computer Services at the National Institute for Higher Education, Limerick. John was responsible for the initial development of my interest in office automation.
Michael D. Zisman, whom I had the pleasure of listening to at a seminar and who through two articles in particular supported my conviction that it was possible to write a book about office information processing that did not consist only of photographs of people sitting smiling at equipment.
Thirdly Archie M. Fleming of the University of Strathclyde, who helped me by pointing out material relevant to this book as he completed his doctoral thesis on office productivity.

Finally, as befits a book dealing with the effect of automation in the office, I keyed in my own manuscript to a word processor. But this step might never have been taken if Mary Murphy and Anne Fay had not originally produced a hundred or so pages of typed manuscript, using old fashioned electric typewriters, thereby transforming hand scrawl into something that looked as if it might be interesting.

Contents

Part One: Introduction

We can do nothing without information.

Ronald Stamper,
Information in Business and Administrative Systems

Summary

Chapter one outlines the scope of the book, its structure and contents. Chapter two looks at the definition of the office and then goes on to outline the developments that have occurred in information processing.

Chapter 1 Purpose and Structure

The purpose of the book: Structure and contents

Chapter 2 A review of Information Work

Introduction: The office: The development of information processing: Mechanization and automation: Review

Chapter 1

Purpose and Structure

Summary

1. The purpose of the book, to fill a gap by writing about the applications of machines and systems in offices and their interactions with people.
2. The topics covered: systems, machines, and people.
3. A detailed description of the contents of each chapter.

THE PURPOSE OF THE BOOK

This book is an attempt to provide a coherent picture of how mechanization, automation, and people can fit together to perform office work. Hopefully it will fit a current gap by providing an introduction to:

—the principles involved in analysing and designing office information systems.
—the basic concepts of how the information machine (the computer) works.
—the people factors involved in introducing mechanization and automation into offices.

Depth

The book is intended to start from first principles in each of the three subject areas and to take the reader through from these first principles to an understanding of the complexity that is involved in office information systems.

As well as providing training, the book is meant to be educational. The difference between the two is that whilst training tells how to do something, education gives some idea of why the training is being given. It is however not a concern here to produce a text which goes into extreme depths on, say, systems analysis.

The text is capable of being used in either a one- or a two-semester mode depending upon the level of further detail that is used to expand upon some of the points covered here. An obvious example of material expansion would be the acquisition of some practical skill in the analysis, programming, and use of a simple computer program.

In order to prevent unnecessarily wasted effort, the reader is advised to read the immediately following section from which he or she (although literary convention will mean that he appears in the text more often than she) will be able to decide which chapters he wants to read and perhaps more importantly which chapters he does not want to read.

STRUCTURE AND CONTENTS

Overall structure and contents

There are three topics in this book: systems, machines, and people. The sequence of these three topics could be tackled in a number of different ways. For example historically our understanding has, more or less, developed from

PART	*Chapter*	Contents
1. INTRODUCTION	*1. The structure and scope.*	How the material is arranged. What is covered. Who the book is intended for.
	2. A review of information work.	The central importance of information to life. The office. Developments in society: Employment. The causes and effects of growth. Women as office workers. The existence of alienation. The growth of information companies. Mechanization and automation: Work amplification and replacement. Information media and automation. The need for training in information systems.
2. CONCEPTS	*3. Science and technology.*	The difference between scientific understanding and technological manipulation. The need for understanding.
	4. Concepts for office analysis.	The activity system. Communication as an activity. Productivity.
3. OFFICE SYSTEMS	*5. Systems analysis.*	Analysis. Design. Evaluation. Failure.
	6. Information systems.	Organization structure. Decision making.
	7. The information machine.	Tools. Machines. The representation of information by codes. The operation of the computer. The technology of storage. Communication with the machine.
	8. Man.	Alienation. The man-machine interaction. The interaction between people.
4. APPLICATIONS	*9. Current office work.*	Analysis of office worker study data for the individual job and for the organization.
	10. Future office work.	Activity and mission. Techniques of improvement and their effects. The viability of improvements.
	11. The Management of change.	Resistance to change, its causes and cures. Effects of change. Selection for change.
5. IMPLICATIONS	*12. The individual job.*	A summary of the effects and likelihood of change for the clerk, the secretary, the professional and the manager.
	13. Organization and society.	Autonomy. Centralization. Small organizations. The take-up of automation. Employment.

Exhibit 1. *The structure and contents of the book*

the individual person, to the machine, and finally to the system. However, this is not a book primarily concerned with historical development. A better analytical understanding can be achieved by reversing the sequence of historical development by first considering systems and then looking at the system components of machines and people. Exhibit 1 indicates briefly the structure and contents which are described in more detail below.

Detailed structure and contents

Each of the five Parts starts with a Summary outlining the subsequent material. Each chapter is prefaced by a Summary which lists in note form the central arguments of the chapter. In addition each chapter has a Review section which contains a more literate summing up of the chapter as well as details of any references, a bibliography and questions, exercises and answers (where appropriate).

Chapter 2. In Chapter 2 a brief historical review of office information processing is given in an attempt to provide an overview of the whole subject. The significance of information processing in general, the causes and the effects of the increase in the numbers of information workers, and the basic concepts of productivity, mechanization, and automation are dealt with.

Part 2. Part 2 is concerned with describing the differences between science and technology, and how from this difference the need for concepts or models arises. Then the basic model is provided which is used in this book to describe and understand office information processing. Chapter 3 deals, briefly, with the rise in the use of and the power of a scientific technology. Chapter 4 introduces the basic concepts which are the foundations upon which the book is based.

Part 3. Part 3 develops the use of the activity system as a model for the office. In Chapter 5 the techniques of system analysis are reviewed, and whilst it is not the purpose of this chapter to turn you the reader into a systems analyst it is intended that you should have some idea of the outline of the methodology and techniques of analysis, design, and evaluation. Of course the best understanding comes through practice and there is included a self-assessment system analysis and design tutorial case study. Having dealt with the principles of systems, the particular example of information systems is dealt with in Chapter 6 by considering organizational structure, procedures, and decision making. In Chapter 7 the information-machine (the computer) component of information systems is described. In Chapter 8 the other system component, Man, and his needs are reviewed.

Part 4. Part 4 deals with the application of information technology to the way that office work is conducted. First, in Chapter 9, the way that office work is

currently performed is analysed. Then in Chapter 10 the question of how information technology could be used to affect the way that office work is performed is considered. Finally in Chapter 11 the difficulties of introducing and implementing new methods of working are discussed.

Part 5. This final part is a summary, a review, and to some extent a polemic dealing with the implications of information technology for the individual, the business organization, and for society in general. The central concern, besides attempting to explain what information is capable of, is to make clear that there is a dynamic tension between machine and person. This is the fundamental 'educational' theme which recurs throughout the text.

Chapter 2

A Review of Information Work

Summary

1. The importance of the communication of information.
2. The office
   —the impossibility of a useful definition.
   —a description.
3. The interconnexion between the development of information processing technology and changes in society, particularly:
   —different types of work.
   —the growth of government.
   —the economic activity of women.
   —the growth of information technology companies.
4. Mechanization and automation. Their differences and their effects upon society. The need for education in and understanding of information systems and automation.

INTRODUCTION

The purpose of this chapter is to present a usable description of what 'the office' is, how information processing (which is what offices are concerned with) has developed, and what the requirements are if this continuing development is to be successful.

For many people 'the office' and office work is dismissed as simply being something to do with typing and filing and making copies of documents. Taking typing as an example, then typing has the same relationship to the office as the door-to-door brush salesman has to marketing or as house conveyancing does to law. That is typing, door-to-door salesmen, and house conveyancing are all essential activities in the society that we live in, but they do not represent the furthest limits of their respective subject areas.

All life depends upon the successful processing and communication of information. In its broadest sense life is entirely concerned with communication, for each of us, as with all life forms, is made up from chemicals the composition of which are primarily determined by our parents—as our parents in their turn were determined by their parents. This process of communicating chemical messages is the foundation of life.

But apart from the fundamental level of human evolution, communication and the processing of information in general is vital to the kind of society that we live in. Each time that any individual person makes a discovery of any kind, the knowledge of that discovery must die with him or her unless that knowledge is communicated. Human beings are unique in that they have developed an array of powerful tools to communicate and process information. These abilities allow us to transfer thoughts both from place to place and from generation to generation. This information-processing ability has led to all of the variety of institutions and activities (businesses, government, philosophy, politics, etc.) which are parts of our contemporary society. Significantly many of these activities are characterized by the presence of the office and the office worker.

THE OFFICE

The definition of 'office'

It would be nice before we go very far to have a clear idea of what an office is. Unfortunately we all, each and individually, know what an office is. But in general, and this is why our knowledge is unfortunate, our knowledge is rather like the knowledge that mankind had of gravity before the mid-1600s, a poor, unthought-through kind of knowledge from which comes no real comprehension of the surrounding environment. As in many other circumstances, when we attempt to define what we mean by 'the office' it is extraordinarily difficult to provide a concise and clear definition.

Complexity. Like most words 'the office' conjures up different ideas for different people. For example the office could mean:

—where Mummy goes every morning.
—an overhead.
—where transactions are abstracted.

and each of these images is right for each of: the child, the accountant, and the system analyst. The reason that there are different viewpoints is because 'the office' is a shorthand label expressing something which is complex. The office means amongst other things all those resources used and activities performed by people and machines to manipulate information. The viewpoints of child, accountant, and analyst simply reflect different aspects of the complex.

Current manifestations. Any definition of the office we do use probably ends up with too much emphasis on current physical reality—the typewriters, telephones, and photocopiers etc. rather than anything else. If a time traveller were to concentrate on these physical realities he would find it extremely difficult to recognize the existence of any office before the 1960s, when plain