BUSINESS DATA SYSTEMS

A practical guide to

SYSTEMS ANALYSIS AND DATA PROCESSING

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Preface

The contents and structure of this book are based upon the results of a survey carried out by the author This survey revealed a general dissatisfaction with the existing books on systems analysis and data processing, and a need for a practical book addressed to students and practitioners in business management, accountancy, and computer science.

This book is directed towards that readership, and is essentially of a practical nature. It explains the use of computer hardware against a background of business applications and situations. The text is of particular interest to persons studying for the examinations of the professional accounting bodies, but also looks beyond the academic world to the needs of the practising systems analyst and others involved in the design of computer-based business information systems.

The examples within the chapters relate the text to the actual problems arising in business. The exercises at the end of each chapter are intended as additional learning material; the reader is advised to prepare his own solution before studying the one suggested by the author. Students, tutors and practitioners wishing to research a topic more deeply are directed to the comprehensive lists of references following each chapter.

The detailed case study in the final chapter draws together the separate points of the preceding chapters, and offers an opportunity for the study of a practical business data processing situation.

A full index and glossary provide access to explanations of all terms likely to be encountered in the fields of data processing and systems analysis.

The author welcomes comments, suggestions and criticisms, which should be addressed to him via the publisher.

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Included among the exercises are questions set originally by the institutions shown below. Their permissions to reproduce these questions are gratefully acknowledged.

The British Computer Society
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The Institute of Cost and Management Accountants

H.D.C.

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Business and Management Information

1.1 BUSINESS ORGANIZATIONS

All concerns that are in some ways constrained by money and resources can be regarded as business organizations. These include manufacturing and commercial companies, central and local government departments, administrative organizations, financial institutions, and service agencies. All of these organizations are referred to hereafter by the generic terms 'organization' or 'company'.

The organizations involved with data processing (d.p.) and systems analysis vary considerably in size, from huge international corporations and government departments down to small 'back street' companies and private individuals. The factors common to all of these should be a clear understanding of the purpose and aims of the organization, and a systems approach to the solution of problems.

We tend nowadays to talk of 'solving' business problems as if they are mathematical equations that have unique and absolute solutions. What is really meant by a solution is a method of alleviating the burden of a task or of avoiding a calamity that might ensue from difficulties encountered. There are no immediate solutions to most business problems; it is more likely that the answers are provided by a highly organized system that has been carefully planned and is assiduously operated. This is because business problems are often connected with the need for the information necessary to control the organization's activities.

What are the aims of business organizations? Why do businesses exist and for what purposes? There are, no doubt, many metaphysical answers to these questions but in the pragmatic sense they are related to the control over money, people and resources. A company financed by privately-owned share capital aims to maintain or increase its profitability and thereby maximize the long-term value of its shares. The vagaries of the stock market are beyond the scope of this text but profitability is still a prime aim if a company is to continue in existence. Other long-term aims of companies are expansion, diversification, and monopolization of product and market areas.

Organizations that are publicly owned, i.e. government controlled, are usually regulated by the need to keep within their operating budgets. Their

objectives may be decided as a result of political, social or economic considerations but, in the end, they are operated within monetary constraints. This calls for the provision of adequate information about their activities and environment.

Readers unfamiliar with business organizations are advised to read reference 1.1.

Business Work Areas

The need for information and the consequent requirement for a means of processing raw data rapidly and accurately applies to a wide range of work areas in business. From Fig. 1.1 can be seen in broad outline the way in which work areas connect together and contribute to the financial and management accounting statements. The arrowed lines in this diagram indicate the general flow of action and the related data in an 'average' manufacturing company. Slight variations from this may occur with other types of organization.

Perhaps the most obvious need for information applies to a company's financial position as derived from processing its transactions. Closely associated with financial accounting is management accounting, i.e. the control over a company's manufacturing costs in relation to its productive output.

Accounting information stems from book-keeping procedures, each and every financial transaction contributing to some extent to the financial position of a company. There are numerous items of expenditure and income that have to be accounted for in arriving at a company's annual balance sheet and profit/loss statement. We are, therefore, in d.p. systems aiming for a means of gathering all the financial transactions, and processing them accurately and economically in order to provide not only the statutory information required of an organization but also further information to improve its efficiency and profitability. Ref. 1.2 provides useful knowledge for readers unacquainted with accounting principles.

Prime work areas common to manufacturing companies are:

production control,
stock control,
costing,
purchases control and accounting,
sales orders and accounting,
wages accounting.

Production control

This is a wide area since there are many different manufactured products and methods of production. Nevertheless this area falls essentially into two parts: (a) planning what to do, and (b) ensuring that it is done. The former often demands the handling of large amounts of production data such as bills of quantities and machining operations. The latter entails the continuous checking of performance against targets.

Stock control

Closely associated with production is the recording and control of stocks. In general terms, stock includes raw materials, components—made-in and

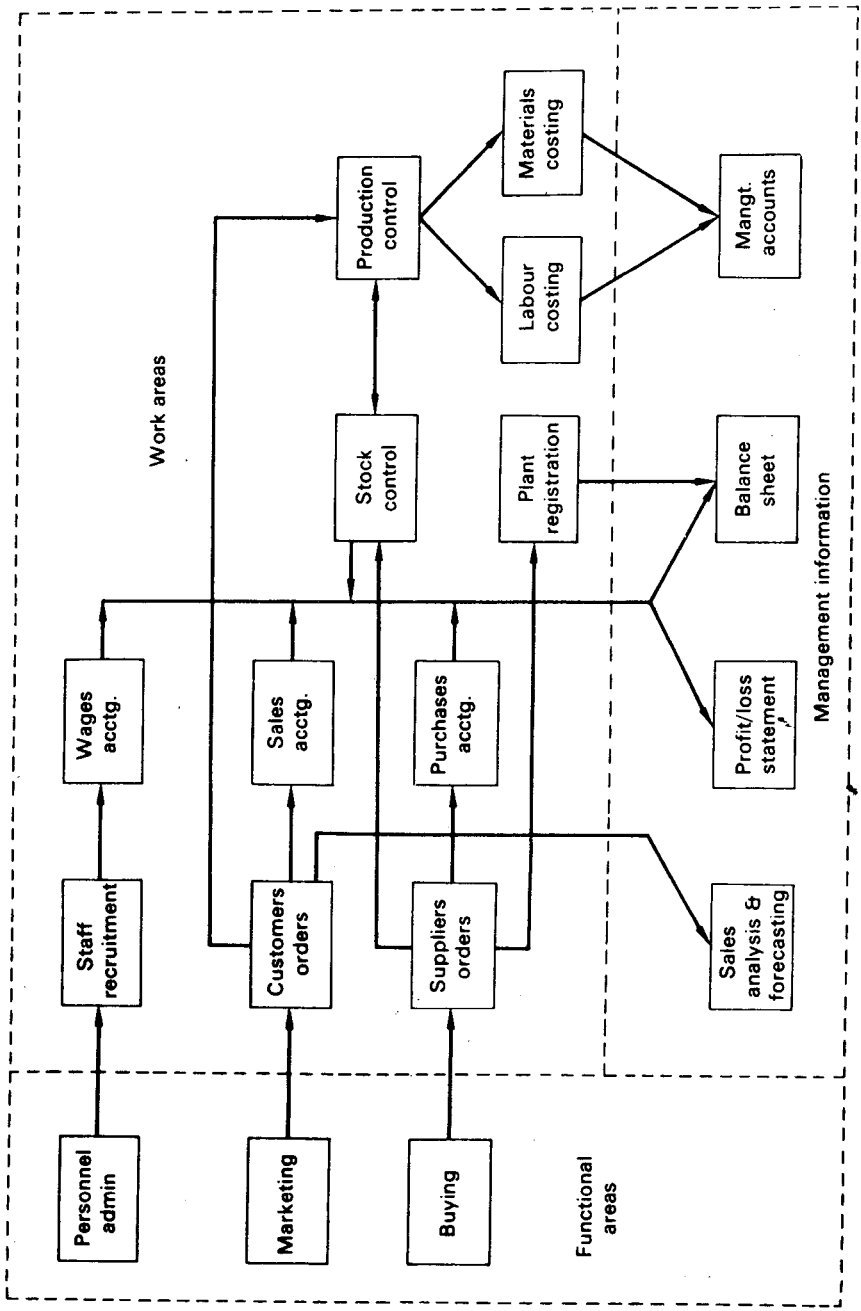

Fig. 1.1 Interrelationships of work areas and management information

bought-out, sub-assemblies, finished products, tools, jigs and other consumable items. Manufacturing cannot proceed without the materials and tools for production being available at the right time and in the right place.

Costing

Another aspect of production is its costs—is the output at an acceptable level in relation to the direct and indirect cost of production? Direct costs are roughly proportioned to output, while indirect costs are of a fixed or semi-fixed nature and are incurred even if there is no productive output, e.g. the rent and rates of a factory. It is important to be able to detect changes in direct material and labour costs that might cause manufactured products to become unprofitable.

Purchases control and accounting

If production is to proceed smoothly, tools, raw materials and components must be purchased and supplied into stock. This necessitates the placing of orders with other companies, ensuring that the goods are delivered correctly and on time, and subsequently paying for them.

Sales orders and accounting

If production is to be worthwhile, the end products must be sold at a profit. Thus not only is it necessary to sell the products but to do so quickly and to ensure that the consequent debt is recorded and collected.

Wages accounting

Pervading all the above work areas is the need for workpeople of various trades and of different levels of skill and authority. Included is a wide range of personnel from factory floor workers to the managing director, and one thing they have in common is the need for remuneration. This necessitates a personnel administration system and a payroll system. The former provides details of the staff's capabilities and personal attributes, the latter accounts for their pay and associated monies.

Integrated Systems

It is evident that the above work areas are closely connected and that certain items of data affect several of them. Similarly the information arising from the work areas contributes to the final information required by management. These points give rise to the concept of an integrated system. By this is implied that each department's work is carried out in such a way that it interrelates with that of the others. Similarly each piece of data is recorded once only and thereafter passes through the company in the same form. This in turn implies a common collection of data organized in such a way that all applications can make use of it.

These notions are only truly implementable by the employment of a computer-based system, giving rise to 'integrated data processing' and a 'database management system'. These concepts are discussed in later chapters. Sufficient to say here that integrated d.p. has not flourished to the extent that