

Electronic Data Processing
and Management
Information Systems

The introduction of computers and electronic data processing equipment over the last quarter century is, without a doubt, one of the most dramatic events of our generation. Not only does the computer relieve operating personnel from the often repetitive and menial tasks involved in data gathering, recording, summarizing, analysis, and reporting, but, more to the point, the computer is capable of challenging management's imagination by providing facilities for extended analysis to aid in improved planning and control within the firm. The use of such equipment by public utilities has made substantial inroads into the firm's overall operations. Although many small utilities rely on computer equipment for customer billing, fewer have developed a fully integrated data processing system. Those which have frequently rely on computer service bureaus or time-sharing facilities, mainly because of the costs involved. The larger utilities—particularly those in the Class A and B categories—have found it to their advantage either to rent or to purchase some or all of the components of the data processing system. They can justify computer installation for routine customer billing and accounting as a first step toward a complete management information system.

The purpose of this chapter is to acquaint the public utility

accountant with a number of data processing and management information system (MIS) terms, to outline the role of the accountant in the system, to develop a workable guide for investigating the feasibility of a management information system, and to indicate the functions within the utility which are most adaptable to the electronic data processing technique.

ELECTRONIC DATA PROCESSING

Electronic data processing, as opposed to manual or mechanical recording and analysis of accounting data, accomplishes the same tasks through the electronic data computer and its attendant facilities. The principal advantage of such a system is its ability to handle tremendous amounts of information within a very short period of time; speed of operation is the hallmark of the system. Accountants find that the electronic data processing approach is ideal for many routinized procedures requiring the recording and analysis of large amounts of data; payroll computations and billing procedures associated with customer sales are typical examples.

MANAGEMENT INFORMATION SYSTEMS

Management information systems, or the total systems concept, have received considerable attention over the past decade. The growth and complexity of business organizations require that management teams no longer concentrate on small segments of the enterprise and ignore the total economic function. Brush figh

ting and troubleshooting, although techniques that cannot be ignored, are not adequate for management of an ongoing organized institution. Management now has recognized the importance of the total systems concept and the fact that there are a number of subsystems within the firm which interact in creating the whole. Computers are capable of producing more accurate and much more timely information than was available in the past; they are able to take massive amounts of data and, with unusually high speed, translate these data into usable form for alternative courses of action.

The management information system has been defined as "an approach to information systems design that conceives of a business as an integrated entity composed of interrelated systems and subsystems, and which, with the use of appropriate automatic systems tools, attempts to provide a timely and accurate management information system for optimum managerial decision-making".

The Role of Accounting

An organization often is defined to include the functions of operating personnel as well as those appointed to the highest managerial posts. This managerial hierarchy frequently is illustrated with the diagram in Figure 5. The broad base of the illustration depicts the firm's work or operational force.

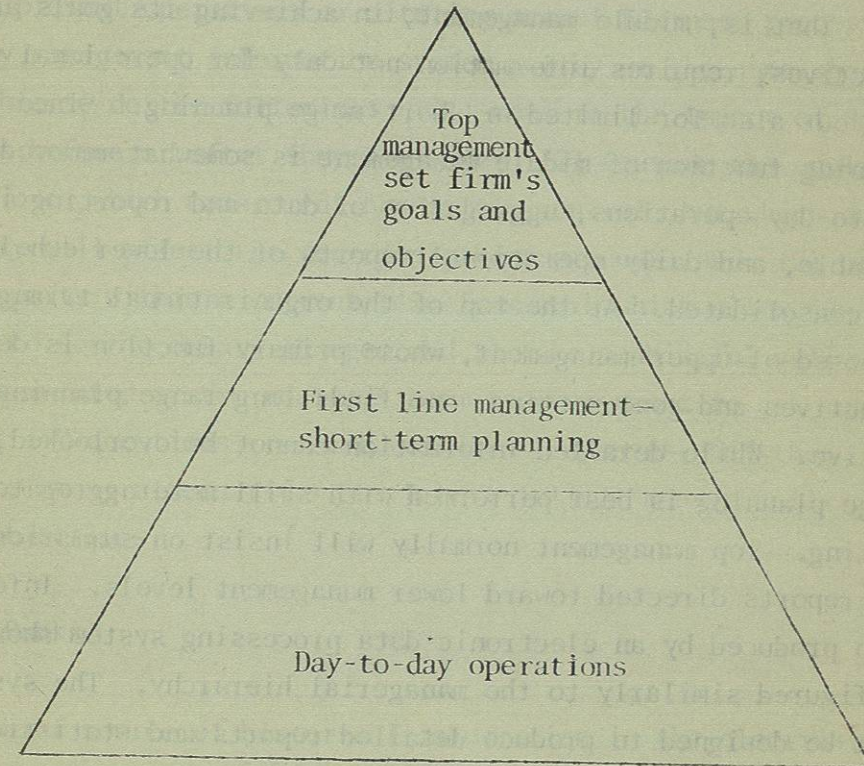


FIGURE 5. Managerial Hierarchy

Lower level supervisors and managers produce huge quantities of data and, in turn, require detailed reports and analyses concerning operational activities. Proceeding upward to middle and top management, one notices needs for further information, but these requirements generally are filled on a more aggregate basis. That is, middle management, in achieving its goals and objectives, requires information not only for operational purposes, but also for limited or short-range planning. Since the planning function of middle management is somewhat removed from day-to-day operations, aggregation of data and reporting is acceptable, and daily operational reports of the lower echelon are consolidated. At the top of the organizational triangle, composed of upper management, whose primary function is defining objectives and goal setting, one finds long-range planning perspective. While detailed information cannot be overlooked, long-range planning is best performed with still more aggregate reporting. Top management normally will insist on summaries of the reports directed toward lower management levels. Information produced by an electronic data processing system should be configured similarly to the managerial hierarchy. The system must be designed to produce detailed reports and statistics for supervisory personnel and aggregate reports for top management's strategic planning and goal setting.

The role of the accountant in providing input for the electronic data processing system is apparent. Historical data with respect to costs, expenses, revenues, and income emanate from the accounting process. This information becomes the basis for ana-

lysis in the management information system. As noted earlier, the advantage of electronic data processing is that it provides timely information so that management can take prompt and effective action. Furthermore, by using a simulation technique management is able to select among alternatives without disrupting present operations or altering actual business processes. Every management information system worthy of the name should be able to do the following: (1) measure the impact of decisions before or after they are made; (2) measure the environment over which management has little control, but which definitely will affect the decision-making process; and (3) provide reports within a current time framework which allow management to see necessary changes and to take meaningful action. Any simulated system analysis permits management to ask many "what if" questions, receive detailed responses, and then choose among alternatives which best fulfill management's goals and objectives.

Data Banks

The chief source of historical information is the electronic data processing system's data bank. In computer language, this is the warehouse or storage place for the collection of accounting and statistical information; it is deposited in the bank and, when needed for analysis, is withdrawn by various users. Debate continues as to whether or not a management information system should contain a single or several data banks. Advantages can be cited for either technique. A single storage

facility usually assembles a tremendous amount of data in a single file and necessitates that all subinformation system functions be able to access that material, but redundancy of data - generally is eliminated. For a number of data banks, smaller - storage facilities are required and interconnection of facilities is less important, but redundant information often is accumulated.

To overcome either the monumental size of a single data bank or the redundancy within a number of banks, a network type of file organization is suggested. This combination attempts to utilize the best features of both approaches. Each element within the system maintains its own file of data, but each file is accessible to all other users of the computer. The results of a single storage facility are reduction in storage facility needs and elimination of information redundancy.

Modular or Total Information Systems

Debate continues over the merits of introducing electronic data processing and management information systems either through - smaller, modular subsystems, or through the total information - system. In the former, data processing techniques may be introduced center by center. The latter approach advocates a switch over from manual or mechanical methods, or an upgrading of the existing tabulation facilities, to installation of a total and complete management information system in one fell swoop.

The following are advantages and disadvantages of the modular approach. (1) Smaller subsystems generally are straightforward and easier to understand. Examples include the subsystems of customer billing, payroll, and inventory control. (2) Proceeding slowly and cautiously allows elimination of system errors from smaller units. (3) Slow introduction allows operators, - supervisory personnel, and management to follow the installation, become acquainted with it, and fully understand its capabilities. Management's cooperation usually is better if they are able to understand what is happening. (4) It recently has been argued that total management information systems, while - they have been attempted, never have been fully developed. In fact, such total systems may be at least five to fifteen years in the future. (5) The modular system often is referred to - as a bottom-to-top approach. By adapting the simpler accounting and record keeping functions to the computer, some companies - find that they never leave this stage of development. (6) Finally, modular facilities often are not compatible with one - another. While the bottom-to-top or modular approach often is less painful, the final result may be one in which the pain is everlasting.

The total system approach may be adopted if management suddenly realizes that continued success requires costcutting and more timely information. Evaluation of a complete switchover at - one time, often referred to as the top-down or crash approach, should include several considerations. (1) With the total system program, all management and supervisory personnel must co-

operate; everyone is involved together. While this may be more painful, the pain probably is shorter lived. (2) Compatible - equipment is available at one time, and incompatibility or redundancies are far more likely to be eliminated. (3) It probably is easier for management to visualize the potential of the information system if all subfunctions are put into operation - simultaneously. (4) Among the disadvantages, the cost of such a total system may be prohibitive. (5) Management might rebel because they do not understand all the system's complexities and capabilities. They may feel they are being sold a bill of goods.

V O C A B U L A R Y I I I

- A -

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|------------------------------------|---------------------------------|
| 1. ACQUAINT | Relacionarse |
| 2. AS OPPOSED | Contrario a |
| 3. ASSEMBLES | Ensambla |
| 4. A NET WORK TYPE OF FILE | Un Archivo de tipo general |
| 5. AS A BOTTOM -TO-TOP
APPROACH | En un enfoque de abajo a arriba |
| 6. AS THE TOP-DOWN- | El enfoque de baja |
| 7. ADVOCATES | Defiende, intercede |

- B -

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|-----------------------|-------------------------------|
| 8. BUREAUS | Oficinas de servicio |
| 9. BILLING PROCEDURES | Procedimientos de facturación |
| 10. A SWITCHOVER | Un cambio |
| 11. AN UPGRADING | Una valuación |
| 12. BRUSH FIGHTING | Trabajo individual |

- C -

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|----------------------------|------------------------------|
| 13. COSTCUTTING | Reducción de costos |
| 14. CAPABLE | Capaz |
| 15. CUSTOMER BILLING | Facturación al cliente |
| 16. CURRENT TIME FRAMEWORK | Marco de tiempo actual |
| 17. CRASH APPROACH | El medio para colarse en, el |