A Management Information System (MIS) performs transactional processing and supplies information to organizational management for planning and decision making. It is suggested that the MIS administrator should be concerned with the system's cost effectiveness, completeness, and degree of use. The amount of training of MIS users and the necessity for a dynamic system are discussed. When implementing a new MIS, the administrator should concentrate on using good organizational politics, should avoid computer jargon, and should encourage organizational personnel involvement in planning. The MIS should be built on existing data processing structures, and the MIS administrator should be very careful about data accessibility and security.

Considering the Organization

An Organization may be considered as a four-level entity with organizational personnel at its base, directed by supervisory personnel, which in turn are controlled by mid-management, and finally executive management. Decisions at the supervisory level are termed operational decisions, at the mid-management level - tactical decisions, and at the executive level - strategic decisions. Data gathered at the organizational personnel level is termed transactional data, because it usually reflects the organization's day-to-day transactions.

A Management Information System (MIS) is a computer-based system for performing transactional processing and for supplying information to the various management levels to aid in planning and decision making. The MIS consists of one or more databases (collections of data accessible for various applications and managed by a software system) and a set of functions (i.e., software packages) that control all transactional, planning, and decision making support.

The MIS is expected to perform most data processing applications (e.g., billing, scheduling, inventory control) and to provide assistance for planning and decision making. Management information systems provide timely, concise, accurate, structured information to all levels of management in performing their jobs. It is not suggested that an MIS actually plans or makes decisions for anything more than the most mundane situations.

Consider the MIS

In this situation regardless of the level of the existing MIS, the information systems administrator is at a major plateau: management has accepted the concept of an MIS. But, this acceptance is not eternal. Good management will review the role of the information system just as it does the Vice President for Marketing or the office copy machine. Thus, the MIS administrator should continually examine the information system in light of the following questions:

1. Is the MIS cost effective? It is not enough that a management information system provide information. Information has no value unless it suggests a plan or changes a decision. For the latter the value of information is determined by information value = actual result - original result - cost of information where "actual result" is the outcome of the decision based on the additional information and "original result" is the outcome that would have resulted had the original decision been made. Suppose that an organi-
zation is considering decision X which will produce a $250,000 profit, but expends $50,000 on information I that suggests that decision Y is better. If indeed decision Y leads to a $400,000 profit, then the value of information I is $400,000 - $250,000 - $50,000 = $100,000. Obviously, if decision Y leads to a profit of less than $300,000 or if information I costs more than $50,000, then the MIS providing information I is not cost effective.

Unfortunately, cost effectiveness cannot be so easily determined in the real world. Of the three parameters, it might actually be possible to compute a realistic "actual result," but "original result" is generally unknown simply because the original decision was not made. Furthermore, "cost of information" involves not just the costs of collecting data and applying MIS functions, but also some proportion of software, hardware, and personnel expenses that are often difficult to isolate. However, such assessments should be attempted because the existence of a management information system can often be justified by considering the value of the information it provides.

(2) Is the MIS complete? Rare is the management information system that contains all the capability desired. Most MIS's are implemented in phases beginning with a transaction system core and then spreading both outward and upward including additional transaction functions and ultimately tactical and strategic planning and decision functions. It is all too common that the organization loses sight of the original scope of the system and funnels most effort into maintenance and enhancements to the existing functions. In the ideal situation, effort would continue to add (at a predetermined pace) additional capability via new functions and new databases.

The best guard against this problem is the use of long range planning for the management information system itself, with 1-year, 3-year, 5-year, etc. plans. Organizational management should monitor this activity just as carefully as it does the development of a new product line.

(3) Is the MIS used at all levels? In conjunction with the degree of completeness of a management information system, it is important that management personnel at all levels be aware of the utility of the MIS. Of primary importance is that supervisory personnel be provided with functions that will aid in their operational control of the organization. Such things as daily schedules, queries concerning work in progress, and up-to-date sales figures show the supervisory staff that the MIS is a two-way street. Unfortunately at this level (and certainly below it with the organizational personnel providing transactional information) the MIS is often viewed as a monster consuming details of every activity of one's job and giving little in return.

Conversely, mid-management and executives often consider the MIS as an operational-level tool from which they occasionally glean some desirable information. But, rarely is the information system considered a partner in planning and decision making (which it can be), and almost never at this level is there an attempt to enter into the databases information that is specifically oriented to tactical and strategic planning. Such information as population assessments, survey results, competitor figures, market analyses, and economic predictions are often just the raw data an MIS needs to serve management most effectively.

(4) Have all applicable staff been educated as to available functions? Even if an MIS is used at all levels, it may be employed only by a handful of supervisory and management personnel. The information system administrator should consider himself/herself an educator as well as planner. Simple, concise instructions on the available functions (identified for each management level) should be at each person's fingertips. Short, teaching-by-example sessions are often best for clerical personnel who must use the system in their daily work. Individual training sessions for mid- and upper-level management help to overcome the fear of the unknown and instill a level of confidence that encourages exploration of the information system functions. In this respect the MIS itself (if it has been designed with human factors in mind incorporating clear, non-cryptic messages with simple, natural input formats) can often be the information system administrator's best ally.

(5) Is the MIS dynamic? The worst thing that can happen to a management information system is to set it in concrete. Organizations change continually to survive; their MIS's must do the same. It is a not too difficult matter (although it does involve some run-time overhead) to keep logs on functions used and problems encountered using those functions. This information may reveal functions that are no longer being accessed. Are they no longer relevant to the organization or are they too difficult to use? It may also suggest areas of interest in which new functions would find an audience. Furthermore, the problem information can be used for directing maintenance. In addition to MIS-collected data on its functions, management at all levels should be periodically tapped for suggestions on MIS.
enhancements. This can often be combined with training sessions. However, this whole area of dynamism must be placed in the context of the long range planning for the information system.

The Organization without an MIS

The aspiring management information system planner who is assigned the task of implementing an MIS for an organization should consider one paramount point, "If nothing has been done yet, then nothing has been done wrong yet." Certainly a lot of work faces such an information system administrator, and the points made in the last section will be important as time passes. But, there are some more immediate considerations presented below. Conversely, it is assumed that these activities have been or are being done correctly in organizations with an existing MIS.

(1) Use good politics. Far too often the MIS planner is a computer scientist or management scientist who considers all divisions, departments, and personnel as basically deterministic systems. The feeling is that if the "perfect" MIS is designed and implemented, then the organization will easily adapt to it. This is simply not the case. Since the organization has been functioning without the MIS, there will be general cynicism concerning it.

The MIS administrator must begin by "learning" the organization. What is the organizational structure? Where are the control paths? Where are the communication paths? What is being used now in lieu of an MIS? When, throughout information system development, the planner should assume the role of a salesperson relating to management hopes, personnel fears, and existing situations within the organization as the utility of the MIS is "sold" to the organization.

(2) Avoid buzzwords and jargon. An outgrowth of good politics that deserves special attention is the communication skill of the MIS staff. Questions and suggestions should be discussed with organization personnel using language that relates them rather than computer systems.

Example: How will I be able to check on the status of work in progress?

Bad Answer: You will simply enter query mode, input the primary key, and scan the display.

Better Answer: You will say you want to ask a question, give the work-number, and the information will appear on your terminal.

Just as we expect a mechanic to discuss our engine problems in understandable terms, we expect our "MIS mechanic" to describe why a function is acting improperly without referring to dumps, indexed sequential files, and program status words. We computer scientists have been impressive too long with our jargon; we must concentrate on impressing with results.

(3) Encourage positive involvement in planning at all levels. The commencement of MIS planning presents a perfect opportunity to overcome some of the natural cynicism by involving individuals from all levels of the organization. This must not be a cosmetic task force to meet occasionally to rubber-stamp the latest MIS plans.

Organization personnel have unique perspectives and definite interests in the shape the information system takes. From the clerical employee to the chief executive officer, each can provide expectations of output and limitations on input that otherwise would escape the MIS staff.

(4) Build on existing hardware, software, and databases. Even an organization which professes to have no management information system probably has some data processing facilities, several transactional application programs, and some type of a database. Their existence verifies their usefulness to the organization. Considering the cynicism that usually coincides with change of any kind, the intelligent MIS administrator is one who builds on existing hardware, programs, and data as a starting point for an information system. Organization personnel can be led more easily into more complete and powerful facilities using existing ones as a departure point.

This is not to suggest that the existing hardware, programs, and data will form the basis for the MIS. The long range plan may be to replace the hardware, phase out the software, and drastically change the database. But, this need not be done immediately. In addition, the capital expenditures required for overnight MIS installation are generally infeasible for most organizations. Amortizing this amount over time is usually expedient.

(5) Be very careful about data accessibility and security. One of the most frightening aspects of an information system to management is the database situation in which a good deal of information is brought together and accessed by a variety of application programs and MIS functions. There must be assurance that sensitive data (salaries, sales figures, corporate earnings, etc.) cannot be accessed by unauthorized individuals. Furthermore, even potentially more damaging is the lack of data security. This includes the loss of information by accident (information is an
organizational resource that can be costly or impossible to regenerate), as well as the changing of information by unauthorized persons.

Standard hardware and software provide some levels of security, but the database management portion of the MIS must incorporate organization-specific accessing and security provisions. Promises to management must be backed up by information system design and practices.

Conclusion

It is tempting to want to consider a management information system as a rather large software system which can be judged on its own merit: How well has it been written? How well has it been documented? Does it employ state of the art source languages? Does it use graphics? Is it interactive? What about size and speed? But, in reality these questions are much less important than the organizational imperative that a management information system must handle transactions effectively and provide information that has value in management planning and decision making.

The future of management information systems seems bright as management becomes aware of their utility, hardware becomes faster and cheaper, and storage becomes faster and larger. The challenge of the next decade is how best to design and implement these systems.

References


