

Information Management: An Investment for the Future

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We are all witnesses to the current information explosion that affects every aspect of our lives. Some of us may well wonder if this explosion can be contained and controlled.

Computer technology has nurtured the evolution of devices that perform data storage and manipulation functions at reasonable costs. Government, industry and commerce have rapidly made use of such devices in an effort to improve information systems for decision-making processes. The better the quality and timeliness of information, the more powerful and competitive the user can become.

Unfortunately, the technologies that support the effective utilization of information systems have trailed the dramatic advances in computer hardware and software. There is still not a general awareness that data is an organizational resource that requires management control, administration and involvement. Figure 1 draws an analogy to other resource management areas in an organization; namely that good data management will directly benefit information systems needed for decision-making. Data management is, however, a far less developed area than either financial or personnel management. Very few organizations that have attempted to establish a corporate database resource have been completely successful. The history of integrated management information systems contains many failures and, in some cases, the downfall of the organization.

Like many technological advances, those related to information handling are full of promise, yet also hide many dangers and pitfalls. Failures can generally be attributed to two major causes: the incomplete and incorrect application of the technologies and resulting information handling facilities; and the lack of necessary changes to the organizational structure to complement the integrated information structure.

It is relatively easy for senior executives to decide upon a data resource management strategy, but it is a far different matter to understand all of the different components necessary for the success of the strategy. These problems are compounded by the fact that there are still very few professionals in this area with adequate levels of experience.

Figure 2 highlights the resistance that corporate man-

agement typically meets in the introduction of database technology. Resistance can occur in both data processing and user departments as the need for new responsibilities and procedures becomes evident. Few executives are equipped with all of the correct rebuttals to the criticisms that result from the resistance. So intense can the resistance become that often the database approach is introduced in a compromised manner and one that is far from being optimal for the organization.

Corporate opportunities that can be realized by the database approach are immeasurable and there is an ever increasing responsibility on the data processing profession to ensure that the approach is fully understood and supported. Figure 2 also enumerates the respective benefits that can accrue to the organization but, in order to achieve these benefits, the organization must be willing to invest the necessary developmental resources into the database approach.

Once the database approach has been adopted as a means of achieving data resource management, it is important to realize that a data sharing concept has been introduced within the organization. That is, the common data in the corporate database is to be shared by all those in the organization that have a right and need to access the data. The major technical facility that supports data sharing is a database management system (DBMS). Such a system is often presented as a solution to the problem of data sharing but, in reality, it is simply just one of the facilities needed to achieve data sharing in a resource management environment.

Crucial to the success of data sharing is data administration, sometimes referred to as database administration. Data administration encompasses other facilities, procedures and tools needed to manage the corporate database. Figure 3 shows the major aspects of data administration. The degree to which an organization addresses and implements facilities in these areas should depend on the complexity, integration and value of the data together with any reasonable limitations imposed by the budget available for data management.

First and foremost of the required data administration facilities is a data dictionary and directory (Dictionary). The Dictionary is essentially an information system about the data and data processing systems used in the organization. To the person or persons responsible for

data administration, it represents a tool to document and control the corporate database facility. If database driven information systems are an integral part of the operations of the organization then the database will normally have to be flexible and changeable in order to reflect and support the business dynamics. The Dictionary should be designed and organized to provide for this type of environment.

For some organizations the Dictionary will evolve into the hub, or nerve-center, of their data processing facilities. It will control, monitor and service the corporate database together with the associated information systems.

There are many other data administration facilities which complement the Dictionary. Some of them are still in the evolutionary stage but collectively they address such considerations as ensuring that the corporate database is always organized in the most efficient manner; is normally available for access; and is recoverable in the event of system failures and errors.

A further important aspect of information systems concerns auditability and performance measurement. These are typically topics that are considered only at system implementation but, a data administration function can ensure that system audit becomes a design parameter during system analysis and development.

Figure 4 shows the responsibilities of the person (Data Administrator) or persons performing the data administration function. Like other resource managers, the Data Administrator must be placed in an organizational structure such that he or she can be held responsible for all of the technical and administrative components needed to effect the data sharing. The Data Administrator is responsible to the corporate executives to inform them of matters and situations that demand their participation and decision-making; and then to enact and administer the resulting policies and data control measures. The Data Administrator is responsible to the data processing users in terms of responding to queries, service requests and the provision of facilities to make the data more accessible and useable by those having the right to share it. The Data Administrator interfaces with the systems group in order to obtain hardware and software required to provide and support the database and processing environment for which he or she is responsible. The fourth and final interface within the organization is to the corporate data management system which encompasses all of the facilities needed to provide the control and administration of the corporate database.

With a perception of these data administration requirements the specification of a suitable Dictionary can be detailed. Figure 5 lists the major components of a data dictionary and directory. The content and complexity of the Dictionary should again be a reasonable balance between the requirements and budget of the organization. The Dictionary contents cover the documentation of how data is perceived in the organiza-

tion (documents, forms, usage by function or department, etc.); how data is structured in the database and file designs; and how data is used in the data processing systems. Supporting these directories are dictionary entries which document the attributes of the data processing components, specify any data validation and security rules, and detail any data processing component alias naming conventions.

Figure 6 depicts the role of the Dictionary in the organization. It is the tool by which the Data Administrator documents, controls and administers the corporate database and information systems. It is a source of information and a design capture facility for database and information system designers. It is a source of information and a change capture facility for the maintenance group as existing databases and information systems are modified and enhanced. It is a source of information to data processing users who can discover what data and processing systems are available without the need to contact the data administration staff. This is particularly true of an online Dictionary supporting ad-hoc user queries.

One data administration topic currently receiving a lot of attention is data security and privacy. Figure 7 contains a list of items needing protection considerations and a list of events that can constitute a threat to data and system security. The first list highlights the fact that security measures applied to databases and files are of little value if complementary security measures are not applied to the computer memory and storage devices used during data processing; the hard copy data listings and reports distributed within the organization; the data transmission lines used by remote terminals, work stations and computers; and the security measures themselves. In a similar manner to security provided by a lock and key, database and processing security is only a deterrent and each extra level of security will typically involve exponential increases in the cost and time of the security measure implementation and practice. These extra measures should only be applied where warranted by the sensitivity of the particular data or process.

The second list in figure 7 covers the major threats to the security and availability of the corporate database. These are important considerations in a data sharing environment since the data has been organized in a logically or physically central location and it is collectively more vulnerable to security violation. One of the most crucial tasks for the Data Administrator is the achievement of a correct balance between data accessibility and security for the organization.

The challenge facing most organizations at this time is the effective creation of the data sharing environment. It requires an investment in terms of people, funds and organizational change; but the future benefits of a well managed data resource to aid and make possible decision-making are immeasurable.

The presentation of the paper will enlarge upon these

topics and suggest various methods of evaluating and implementing data administration facilities and proce-

dures in the HP3000 computer system environment.

Figure 1. Resource Management

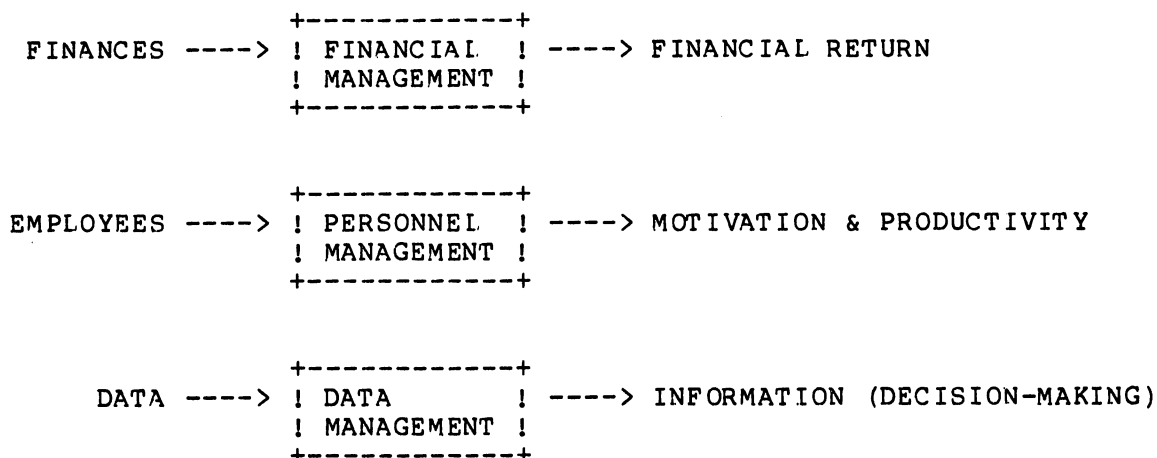


Figure 2. Introducing Database Technology to an Organization

RESISTANCE TO:	CORPORATE OPPORTUNITY:
- CHANGE IN METHODS AND PROCEDURES	- IMPROVED METHODS AND PROCEDURES
- LOSS OF DATA OWNERSHIP	- CORPORATE DATA MANAGEMENT
- LOSS OF DATA CONTROL	- CORPORATE CONTROL STANDARDS
- CHANGE IN POWER STRUCTURE	- PROFESSIONAL DATA MANAGEMENT
- CHANGE IN THE STATUS OF DATA PROCESSING USERS	- IMPROVED DATA UTILIZATION
- CHANGE IN STAFF REQUIREMENTS	- REDUCED COST AND ABILITY TO CONTROL

Figure 3. Data Sharing Requirements

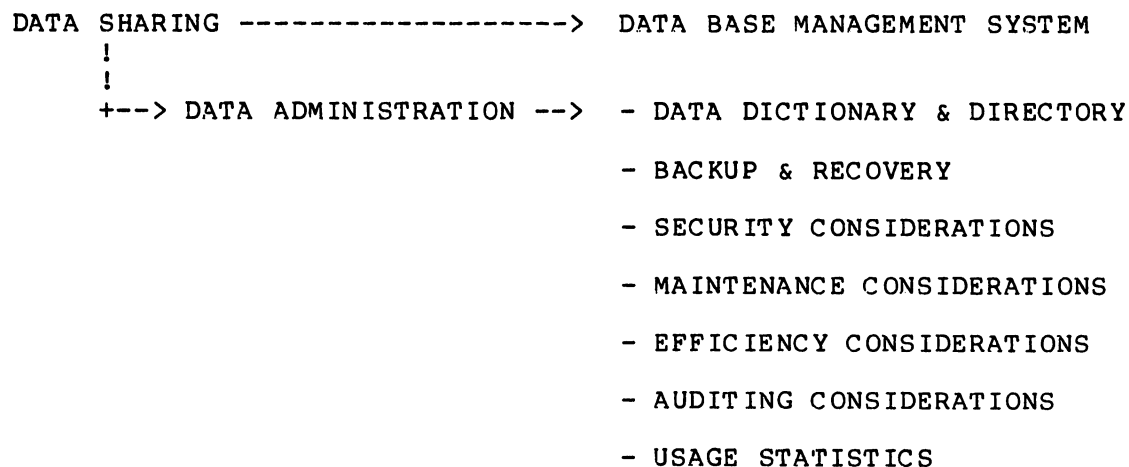


Figure 5. Role of the Data Administrator

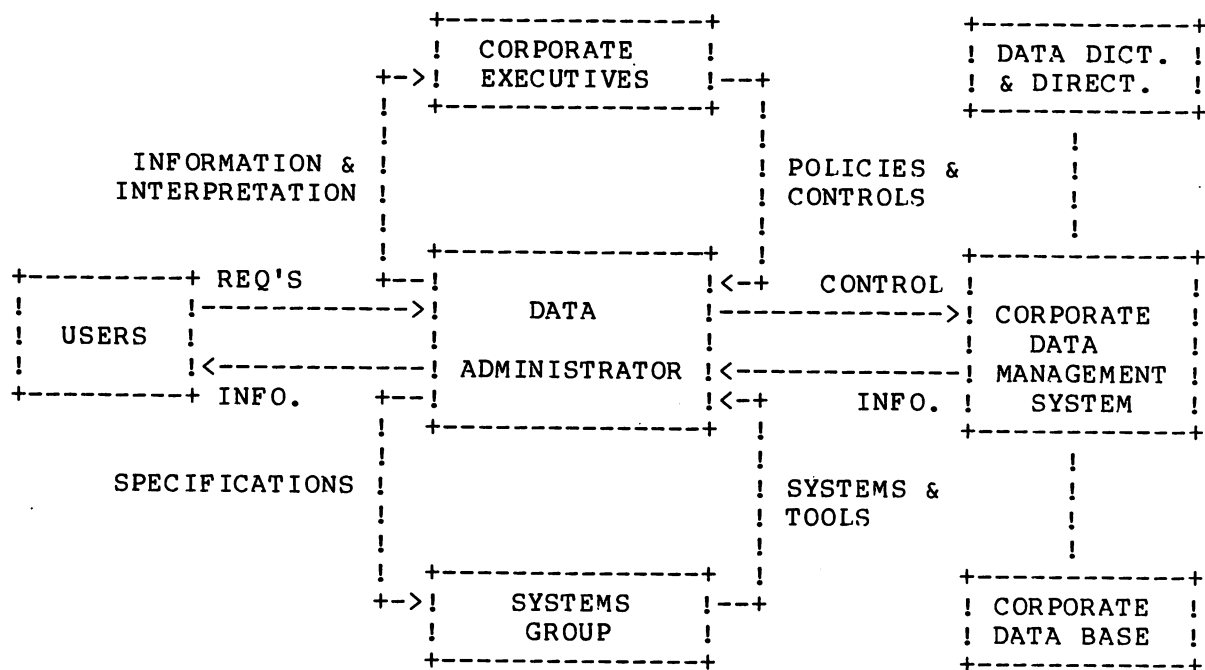


Figure 6. Data Dictionary & Directory Contents

- DICTIONARY & DIRECTORY OF THE NATURAL DATA ITEMS AND DATA ITEM GROUPINGS IN AN ORGANIZATION
- DICTIONARY & DIRECTORY OF THE DATA STRUCTURES DESIGNED FOR THE CORPORATE DATA BASE(S)
- DICTIONARY OF THE ATTRIBUTES OF DATA ITEMS, DATA FILES, DATA PROCESSES, ETC.
- DICTIONARY OF DATA ITEM VALIDATION RULES
- DIRECTORY OF DATA ITEM AND FILE SECURITY RULES
- DIRECTORY OF DATA ITEM SYNONYMS (ALIASES)
- DIRECTORY OF RELATIONSHIPS BETWEEN DATA ITEMS, DATA BASES, DATA FILES, DATA PROCESSES, DOCUMENTS, FUNCTIONS, PHYSICAL STORAGE DEVICES, ETC.

Figure 7. Role of the Dictionary & Directory

