APPLIED INTELLIGENCE

DSS Tools Help Build, Analyze Models To Make Decisions

JAMES MARTIN

This is the last of a three-part series on executive information systems and decision support systems.

The function of a decision support system (DSS) is to get the right information to the right people at the right time.

Decision support systems are powerful tools in decision-making. Their role is to help managers gather facts about the internal operation of the organization as well as about competitors and external events. The tools permit managers and analysts to build detailed financial models, analyze these models and use this information to make decisions.

DSS tools are typically used by financial analysts, business managers, budget managers, product managers and brand managers. They support sophisticated financial-analysis functions, including exploratory data analysis, time-series analysis, forecasting, causal models, cross-sectional analysis and advanced analytical tools.

DSS products should provide the analyst with the facilities necessary to fully implement a DSS application. The particular type of application and the individual users determine the mix and depth of the facilities required in a single product. The available DSS products vary widely in terms of facilities.

The required features of a DSS data manager are different from those of a production database-management system. Very often a DSS application uses more than one type of data, and the types of data in an application tend to change over time.

As a result, the data-management facilities of a DSS tool must be very robust. For some applications, a two-dimensional spreadsheet is adequate. But to manage both time-series and cross-sectional data simultaneously, many DSS products incorporate a multidimensional data manager that allows the user to manage both types of data and view or analyze the data across any dimension or combination of dimensions.

In addition, these products provide facilities for performing consolidations along any dimension and to analyze or report specific user views.

To correctly manipulate the data, the DSS must maintain the associations between data elements, referred to as the data model. Many of the mainframe DSS products provide automatic navigation tools that ensure that the integrity of the data is maintained, usually through the use of an active dictionary that controls all access to the physical database.

A criticism of spreadsheets, such as Lotus 1-2-3, has been that they do not use a data dictionary. This can lead to data disintegration: A user could easily operate on monthly information as if it were quarterly data. Micro products such as Javelin and pcExpress incorporate an understanding of business operations and planning and provide data dictionaries that govern access to the data.

A DSS tool must be able to manage the diverse types of data and provide data-entry and editing capabilities. To do so, the data must first be loaded into the DSS data manager, as illustrated. Data for a DSS application generally comes from many internal and external sources, some of which are not machine readable.

The facilities incorporated in DSS products to handle these diverse types of data vary greatly. Micro spreadsheet products allow the user to import data from other spreadsheets, from standard databases (such as dBASE III) or text. These products generally do not provide data screening, error checking, checkpoint/restart or audit facilities or tools for user-defined menus, forms, screen painters or edit checking.

Because of their origins, mainframe DSS products do not have the same limitations as the spreadsheet products in the area of data entry and editing. Most mainframe DSS products provide some sort of standard file definition and input mechanism, and many are able to directly read external databases such as DB2, SQL/DS, IMS and Focus.

Perhaps the single most important facility with any DSS product is an integrated query language that is flexible enough to allow the user to specify simple, unstructured requests. These requests tie in directly to the data dictionary (if there is one) to ensure that the query is processed correctly.

Virtually all DSS products provide some degree of report-generation capability, but perhaps more important is the ability to generate graphs. The actual process of graphical analysis can itself provide a different insight into reported data and can act as a data-reduction mechanism for quick assimilation of information. These advantages have made graphics a key ingredient of DSS and EIS applications.

With the growing acceptance of the microcomputer as a DSS workstation, graphics are also being used more frequently as a dominant user interface. Using a touch-screen or pointing device, the analyst enters responses without using the keyboard. By pointing to an icon or an entry in a list, the user can control the operations of the system. The continued acceptance of graphical interface standards, such as the OS/2 Presentation Manager, GEM or Topview, will enable more products to provide such interfaces.

Unfortunately, the field of decision support has commonly been equated with financial modeling or financial analysis. In financial analysis, the user generally manipulates data using a series of mathematical operations and built-in financial functions (such as internal rate of return, present value, payback and growth rate) to better understand the relationships between the data. A financial model allows the user to consistently represent relationships between data elements.

While almost all DSS products have financial analysis and modeling facilities, the implementation of the modeling languages differs greatly.

The simplest implementation of a financial model allows the user to develop a model in the form of a financial report. The financial report becomes the user's view of the financial model. More robust modeling languages allow the user to reference data views not contained in the final report.

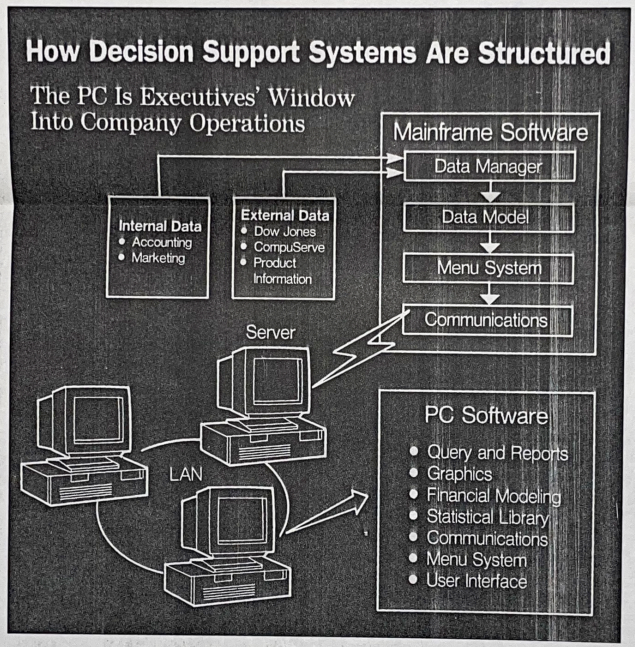
Procedural logic, such as "if-then-else" or "do while," can be specified as part of a data relationship. Also, more robust DSS products have facilities for multilevel consolidations and the automatic conversion of currency data using different exchange rates.

One component in the DSS architecture that varies the most from product to product is the statistical library. Statistical functions available in DSS products range from simple mathematical functions (square root, absolute value, minimum, maximum and so on) and simple descriptive statistics (mean, median, percentile and so on) to simple correlation and regression, time-series projections, cross-sectional analysis and forecasting routines.

A robust DSS product provides the developer with alternative ways to interact with an application. Ideally, user interaction should be controlled by the use of a mouse or some other pointing device. Another common method of interaction is natural English.

Vendors now provide various levels of support for mainframe and micro integration. The continued acceptance of the micro as a user workstation has encouraged mainframe DSS vendors to implement their products in the micro environment and provide communication capabilities to the mainframe product. Vendors of micro products are also including facilities for connecting to mainframes and for data transfers between the mainframe and popular micro products.

Next week I'll begin a series of articles on IBM's AS/400 family of midrange computers as a strategically vital element of IBM's Systems Application Architecture for implementing the distributed systems of the '90s. ■



Maryellen Zawatski

A DSS tool must be able to manage diverse types of data and provide data-entry and editing capabilities. Data for a DSS application comes from many internal and external sources.

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