Decision Support Systems

Managerial Tools to Enhance Decision Making

The DSS Difference

Need for decision-making support

To be an effective top-level manager today, you need automated support. With change now the rule rather than the exception, more decisions must be made more quickly than ever before. The entire decision-making process, from problem recognition to policy implementation, has become so accelerated it's simply impossible to rely on human response alone.

You need an automated system that will help you react and adapt to the constantly changing business environment you must relate to. Your internal data processing system, if you have one, can only offer minimum support because it is structured to perform the regular, scheduled operational tasks that keep your business running. Decision making can't wait for a schedule.

Role of a Decision Support System

What you need for maximum performance today is a Decision Support System (DSS). A DSS is intended for direct use by top managers to help them increase their effectiveness within their organizations.

A DSS combines the human skills used in decision making with the power and capabilities of the computer to give you efficient management of large volumes of data, flexible reporting, analytical and modeling capabilities, and a variety of visual display alternatives.



Examples of the kinds of dynamic activities a DSS supports appear in the pyramid-shaped diagram below. Contrast them to the types of structured activities traditional data processing systems support, and you have the DSS Difference. A Decision Support System supports those activities requiring decisions that involve some degree of judgement and individualized attention.

Reap the DSS benefits

Decision Support Systems are specifically designed to improve decision-making processes. The benefits of establishing a man/ machine relationship with a Decision Support System are many. Some of the immediate benefits you can expect to receive are:

Direct access to information.

A DSS is designed to be used directly by managers and analysts. There is no data processing intermediary between you and your data. You simply access the system and issue simple commands that tell the computer what you want it to do.

Access to the kind of infor-

mation you need. A DSS incorporates internal operating data with external industry data and economic indicators to provide you with the scope of information you need to make strategic decisions. New data is entered easily into the system, and changes are made with minimum disruption to the system.

Information when you want

it. A DSS gives you on-the-spot access to the information you need. Eliminated are the usual delays of waiting for information to be compiled, a report to be scheduled, or a graph to be drawn. Results are immediate, enabling decisions to be made more quickly.

Results the way you want to

see them. A DSS lets you control how your information is displayed without doing any work in advance. You access the system and, through simple commands, instruct the computer in the way you want a table formatted, which figures you want subtotaled, where you want percentages used, and so on.

Ability to make comparisons.

A DSS enables you to examine the impact alternative courses of action will have on your organization. It lets you design your own modeling relationships which, when applied to your information, indicate the consequence of proposed decisions. You can judge the effects of decisions before they are even made.

Freedom from timeconsuming tasks. A DSS takes over the computational burden inherent in analysis. It provides you with a wide selection of preprogrammed statistical and arithmetic tools, such as ratios and regressions, and performs complex mathematical computations in minutes.



The DSS Development

The development of Decision Support Systems was made possible by new technologies in the computer industry and new insights into how these technologies can best be applied to management decision making.

New Technologies

Timesharing computers. The advent of timesharing over a decade ago has enabled all sizes of companies to receive the benefits of computer power, without incurring the costs of ownership. Decision making is not necessarily routine or scheduled, making the expense of computer hardware to support that activity difficult to justify.

Interactive systems. Telephone lines linking computer-stored information directly to a terminal on-location have made the immediate availability of information a reality. Interactive systems allow quick two-way communication between computer and user. A user makes a simple request for information and receives it in minutes.

Sophisticated software. In recent years, computer experts have been able to simplify the use of the computer, giving nontechnical individuals hands-on access to elements of system operation that were previously restricted to specialized programmers. Advanced software now lets a person use familiar English words to designate complex operations to be performed. Through new software, data can also be more easily manipulated than before.



Video-display terminals and extensive graphics capabilities, representing significant advances in computer hardware and software, have become valuable aids in boardroom decision making.

With new developments in technology, managers now have direct access to massive computer power through office terminals.



New Insights

How decisions are made. Behavioral scientists have helped the computer industry to understand the decision-making process—problem identification, analysis of possible courses of action, and selection and implementation of one course. Computer experts have taken this knowledge and applied it to the computer so that now most phases of decision making can be supported through some form of automation.

Information needs of managers. Research has shown that the type of information needed by a manager depends on the type of activity the manager is engaged in. The chart below details the information needs of managers and how they vary from activity to activity. These results have exposed the limitations of the traditional total systems approach, where all computer systems within an organization are tightly linked together and are based on detailed operational data. This insight, in particular, paved the way for the DSS development.

New technologies and insights have contributed significantly to the development of the Decision Support System concept. Now turn the page and see how we have taken these developments and formed them into a useful system designed to support decision making.

Characteristics of Information	Operational Control	Management Control	Strategic Planning
Source	Largely internal		External
Scope	Well defined, narrow		Very wide
Level of Aggregation	Detailed		Aggregate
	dress private for ent		0
Time Horizon	Historical		Future
Currency	Highly current		Quite old
		6	
Frequency of Use	Very frequent		Infrequent
	Chart Information Requirements by D	ecision Category, taken from Man	aging the Data Resource Function

by Dr. Richard L. Nolan (ed.), @1974, West Publishing Company.

The DSS Ingredients

All Decision Support Systems contain the specific ingredients shown in the diagram here, but the character of each DSS is different, depending on its use within your organization. The most important thing to remember is that the success of a DSS hinges upon the active participation of management in its development. A DSS is only effective when it serves the needs of its direct users.

Terminals

Your terminal is your direct link to your information and need be your only investment in hardware. It is used to communicate with your DSS, and it displays the results of your specific requests. Various terminals are available, including large video-screen units, high print quality terminals, and what we call "intelligent" terminals that let you prepare certain information at your location, without being hooked up to a main computer.

Manager with Terminal

Models

Responsive, easy-to-use language

Since you will probably use the system yourself, you must be able to communicate easily with it. In turn, the system must respond quickly to your needs. High-level command languages and typewriterstyled terminals let you address complex matters in simple, easyto-understand English words and get the results from those commands immediately. You can make effective decisions without leaving your office.

Models

As a top manager, you perceive, often intuitively, how your organization works, what makes it work, and how it relates to the specific industry you're in and the overall economic environment. Formalizing these perceptions into working models is part and parcel to the success of a DSS. Your designed models enable you to effectively determine the outcomes of proposed decisions.

Analysis

With a DSS, you can manipulate data, not simply retrieve it. An effective DSS is backed by powerful software that lets you break down information, consolidate it, isolate particular elements, look at various combinations of data, and add new variables with ease-all contributing to the analysis of any given problem. A good DSS also provides statistical tools and allows you to easily perform ratios, comparisons, regressions, extrapolations, and tabulations. By assisting you in all phases of analysis, a DSS saves you valuable time and lets you engage in a more thorough analysis.

Manipulation

Environment

Reporting and graphics

A DSS meets your reporting and display needs with speed, accuracy, and simplicity. Formal consolidated financial statements, answers to ad hoc inquiries, as well as charts and graphs, can be printed in minutes right in your office. You simply tell the computer what you want. A flexible DSS has exceptionreporting mechanisms built into the system, extensive formatting capabilities, and the ability to print in different colors of ink.

Relevant information

Display

Data

Base

The key word is relevant. To merely accumulate and aggregate your detailed operational data will not necessarily provide you with relevant information; however, it will give you a strong base of historical data from which to determine trends, relationships, seasonal fluctuations, and long-term business cycles. But when making strategic decisions, internal data often isn't enough. You need to augment this internal data with relevant external data, such as industry standards, economic indicators, market research results, performance models, and securities information. A DSS lets you easily incorporate this vital external data with your internal data, giving you all the information you need to see how well your company is doing, what changes to expect in the marketplace, and what direction your strategy should take.

The DSS Implementation

Building a financial framework

A logical place to begin the implementation of a DSS is in finance because, most likely, it is the ultimate measure of success in your organization. Initially, you can enter into the system actual, budgeted, and forecasted data from income statements, balance sheets, and cash flow information. Financial results and projections can be broken down by lines of business, various periods of time, geographic areas, or by whatever you desire.

Once you firmly establish your financial framework, you can include key operating data and external industry and economic data. The more complete and relevant your information is, the more powerful your Decision Support System becomes.

Immediate and future needs met

A DSS can be implemented in a logical step-by-step fashion, letting you concentrate on your most immediate needs first. Ideally, a DSS is meant to be used by many departments, so if budget preparation is slowing you down, you can begin there. You enter only the information needed for budget preparation and apply to it the tools your DSS provides.

Once your budgeting process is smoothed out, you can easily extend the system to include reporting, forecasting, or long-range planning. You simply keep adding additional information into the system. Each manager or analyst can have his or her own terminal, or a few terminals can be centrally located for everyone's use. The important thing is each person operates independently.

A common, secure source of information

All relevant information for supporting critical activities is contained in one, comprehensive system that you continually expand as your DSS evolves. By providing a common source of information from which various managers draw, a DSS insures that every managerial decision is based on the *same* facts and figures.

You build security measures into the system as you go along. Ideally, one executive-level manager is responsible for determining which manager can see what information. Sophisticated software then restricts each individual's access to data accordingly.

Better support facilitates better decisions

When you have immediate access to relevant information, the ability to manipulate data easily, and freedom from time-consuming tasks, you can devote more time to analysis and planning. You can be developing long-range strategy instead of worrying over month-tomonth numbers.

The underlying philosophy of the Decision Support System concept is that by supporting the human skills you need for decision making, you can make better decisions. We believe it's true.

In the illustration to the right, the Go board represents a comprehensive data base of information. an integral part of a decision support system. The captions describe how several departments can share this common source of information and utilize DSS analytical tools to enhance their decision-making capabilities. Each manager learns the same language to access the system and request information, yet each receives his or her own unique results.

> **Budgets.** Since changes are incorporated into the system immediately, a controller can revise budgets with divisional managers over the phone. Revised reports can be printed in his office in minutes.

Long-range planning.

By changing a few numbers, the vice-president, longrange planning, can get answers to ad hoc inquiries about how inflation or specific cost-of-good increases will affect overall corporate earnings per share.

Ad hoc analysis. At any time, a staff analyst can look at actuals and forecasts in the form of a two-color bar graph. By breaking the results down by division, he can be alerted to developing problems.

Mergers and acquisitions. By loading financial figures from an external securities data base into the system, the vicepresident, business planning, can produce various

consolidated income statements and examine possible acquisitions.

Reporting. The manager of accounting can use simple commands to establish a corporate format for monthly reports and then store it in the computer. As divisional data is entered into the system, it is automatically arranged into the desired format.

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Forecasting. Wanting to know how much confidence to place in forecasts, the president may want to see the forecasts and actuals for all divisions for the previous two years. In minutes, a formal report is printed, with variances expressed in percentages.

Tymshare.

The DSS Advantage

Over a decade ago, Tymshare pioneered the concept of sharing not only time on a computer, but the expertise of people who know computers and their benefits. Our growth and the widespread acceptance of timesharing is evidence of our success.

Today, we're pioneering the implementation of Decision Support Systems, which represent another evolution of technical and management science techniques. We're confident DSS will be a success, too.

When you select Tymshare to install a Decision Support System, you receive several advantages.

Expertise. At Tymshare, people power and computer power work together to bring you the best of both. Tymshare's people are experts in the application of computers to meet management's needs. Many are specialists in particular industries. All of them are trained in implementing Decision Support Systems.

Software. Tymshare offers you the most advanced software available on the market today. By utilizing already-developed software, you save tremendously on programming costs. Tymshare also makes available standard data bases for several industries, from which you can draw valuable information.



expertise and advanced software combine to guarantee you a DSS that is up and running in your organization in the shortest possible period of time. Disruption is minimized. And you start realizing the benefits of a DSS immediately.

Communications network.

Tymshare's vast international communications network makes the system available to you on location, wherever you may go or wherever your divisions or subsidiaries may be.

Minimum investment in

hardware. The Tymshare network and remote computers mean you pay only for the time you use the system and the terminal that's installed in your office. Then, as your system grows, Tymshare continually applies its product knowledge and expertise to keep your system's expenses well within your reach.

At Tymshare, we know you're a decision maker, not a computer expert. Let us give you the decision support you need to guarantee a better future.



A game of strategy

Go is an ancient Japanese game of strategy in which two players compete to secure territory. Although Go is simple to learn, its mastery can take a lifetime because it requires the utmost in decision-making skills. The game embodies both the art and science of decision making, demanding from its players perception, intuition, flexibility, and a sharp, analytical mind. The challenges Go presents are endless. The game itself is timeless: it has been played in its original form for four thousand years.

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