APPLIED INTELLIGENCE

Business Becomes a Battle of Technology

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In this, the fifth of his five-part series on strategic systems, James Martin discusses how an information strategy may be used effectively to gain competitive advantage and to tie together all aspects of the operation of an organization.

In the near future, the competitive corporation will be run with a vast mesh of interacting computers and database systems. Computers in one corporation will interact on-line with computers in other corporations—its customers, suppliers, distributors and so on.

Innovative companies are realizing how computers, networks, workstations and other technology can enable them to launch pre-emptive market attacks on their competitors. Computing and information systems are now strategic weapons, not a backroom overhead.

Business is increasingly becoming a battle of technology, with competing computerized procedures and information systems. In such a battle, the corporation with backward IS development loses.

As technology widens the possibility of competitive opportunities and threats, the time for implementing computerized procedures narrows. It is essential to build new applications quickly and to develop them for swift modifications.

It will be impossible to manage and implement the procedures for this complex environment without using the advanced technology that is now available. These advances in technology include the spread of SQL-compatible database-management systems, as well as the rapid growth of powerful, microcomputer-based desktop workstations, computer-aided software engineering (CASE) and integrated CASE (I-CASE) tools, expert systems, local area communications networks and multilevel distributed computer architectures. These technologies, together with the growth of network standards, make it possible to tie together disparate computer systems and distribute information to key decision makers.

Given so many competing technologies, it is becoming harder for DP professionals to select an appropriate, effective combination of technologies to implement an information strategy for their organization.

Major trends in technology that will affect the development of information systems include the following:

• **Low-cost mips:** The cost of mips (million instructions per second) on an Intel 80386-based PC are one-hundredth the cost of mips on an IBM 3090 series mainframe. This large cost disparity is effectively driving users away from a mainframe-oriented environment toward an environment centered on the use of personal workstations.

• **Distributed computing environment:** End users are moving toward a multilayered, distributed computer architecture in which mainframes are used to store corporate data; minicomputers or file servers are used to support departmental operations; and networked personal computers are used to support local data manipulation.

• **CASE and I-CASE tools:** Highly integrated, encyclopedia-driven, computer-aided systems engineering tools are making it possible to generate application code directly from graphical specifications. I-CASE products combine a front-end CASE tool with a tightly integrated back-end code generator.

• **Forward/reverse engineering tools:** A new generation of CASE tools now under development will enable analysts to convert low-level data definitions and unstructured process code into high-level structures. These high-level data and process structures can then be used in a forward-engineering process to generate normalized data definitions and structured code for the same or another environment.

• **Expert system tools:** Major changes now under way are making expert-system technology far more accessible to the conventional DP environment. Early expert-system tools were oriented toward the development of large, complex, stand-alone applications requiring specialized hardware and knowledge-engineering skills. Current expert-system tools run on conventional DP hardware (including PCs) and they are closely integrated with the data-processing environment. These tools are oriented toward the solution of smaller rule-based problems and can be used by conventional DP personnel who may not have specialized training in knowledge engineering.

• **New development methodologies:** More efficient development life-cycle processes, such as rapid prototyping, information engineering, interactive JAD (Joint Application Design) and timebox methodologies, are making it possible to develop applications more rapidly and in closer coordination with end users.

• **Growth of standards:** Gradually, standards are emerging that will govern the future evolution of hardware and software. Standard environments include IBM's commitment to the Systems Application Architecture (SAA) and Digital Equipment Corp.'s development of a consistent, compatible network architecture that spans its entire product line. The availability of standard environments and interfaces will facilitate the professional management of PC networks and distributed information systems.

Competitive organizations are using these advances in technology to develop greatly improved information strategies. The seven primary objectives of an information strategy are the following:

1) Gain competitive advantage.
2) Use information as a strategic weapon to lock in customers but lock out competitors.
3) Tie the strategy directly to critical success factors identified for the organization.
4) Use advanced technology to put in place strategic systems that operate at the heart of the organization and run all aspects of the business.
5) Improve decision making by getting the right information to high-dollar-value decision makers.
6) Implement intercorporate networks that link manufacturers to suppliers, customers, distributors, retailers, financial organizations and so on.
7) Create entirely new businesses or major changes in the operation of current businesses using strategic information stored in the corporate database.

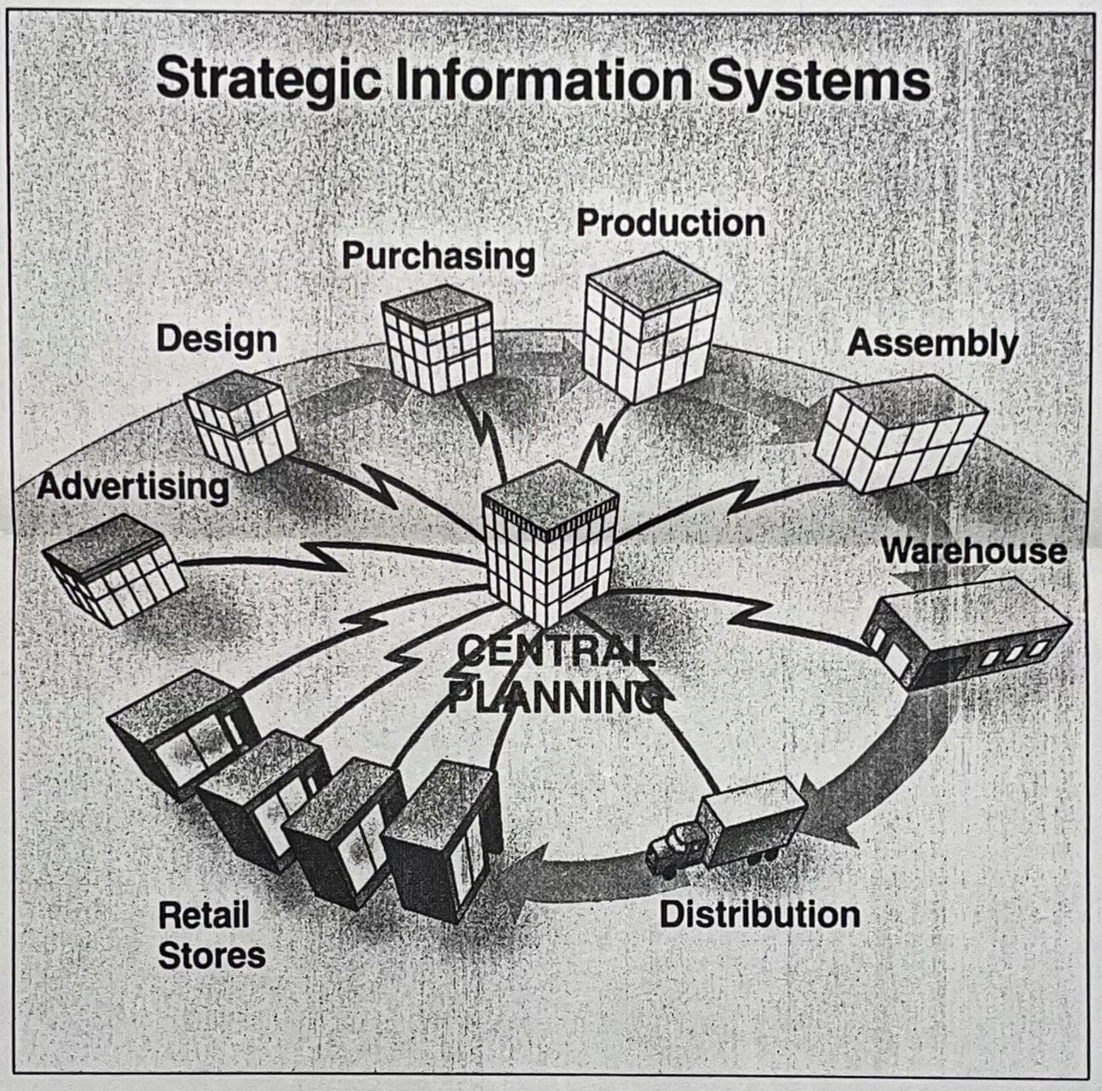
Organizations are increasingly using their computer systems for strategic purposes, rather than simply supporting back-office operations. It is important for DP professionals to recognize the importance of information to the goals of the organization and to provide proactive support for the development of strategic information systems.

As shown in the figure, strategic information systems (or mission-critical systems) operate at the heart of the enterprise and run every aspect of the organization. They tend to be large, complex systems that operate at high transaction volumes and run on distributed networks of computers. They frequently require a non-stop environment; if the systems fails, the business stops.

A commitment to strategic information systems involves risk because the organization is highly dependent on the continued operation of the system. In addition, due to the complexity inherent in these systems, they may be expensive and difficult to build.

The long-term benefits of strategic systems far outweigh the risks. They enable information to be used as a strategic resource to improve the decision-making process, increase the competitive capability of the enterprise and integrate all functions of the organization. Many corporations have used strategic information systems successfully to propel the organization far ahead of its competitors and to create entirely new or improved businesses. Companies that have successfully employed an advanced information strategy include American Airlines and First Boston Corp.

Next week I will evaluate the strategic importance of integrated CASE technology—the most important change in professional computing practice in three decades. ■



David Hannum

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The James Martin Productivity Series, an information service updated quarterly, is available through High Productivity Software Inc., of Marblehead, Mass. (800) 242-1240. For information on seminars, please contact (in the United States and Canada) Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402 (213) 394-8305. In Europe, contact Savant, 2 New St., Carnforth, Lancs., LA5 9BX United Kingdom (0524) 734 505.