Organizational Impact of Decision Support Technology: What’s Ahead for the ‘90’s?

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Most modern organizations have been affected by the application of information technology. Computer-based Information Systems have become an integral part of organizations and their processes. As their role in organizations become more pervasive, it is appropriate to examine the effect that information systems have on the structure and processes of the organization. This article examines the effect of one type of information system, Decision Support Systems, on organizational structure, decision processes, managerial roles, reward systems, and communication systems. This article addresses a number of questions relating to how organizations will cope with the changes brought about by their use of Decision Support Systems.

It is becoming apparent that information technology is having a profound effect on today’s workplace. The diffusion of technology is changing not only the procedural methods used to conduct business, but also the way companies relate to customers, suppliers, and employees. The revolution is no longer solely a technological phenomenon. It is also a social phenomenon that will necessitate a comparable revolution in how we structure organizations (Reynolds, 1989). Information technology is bringing about fundamental changes which will take years to work through and become fully integrated into our workplaces and culture (Wagel and Levine, 1989). The most significant implication of the evolving nature of information technology concerns the structure of the organization. When the organization’s structure changes, decision processes, managerial roles, reward systems, communication systems, and types of people attracted to the organization also change. (Beer, 1980)

Decision Support Systems (DSS) are just one of many types of technological tools for improving end-user performance that are available to modern business professionals (LeBlanc and Kozar, 1990). Microcomputer-based productivity software, electronic messaging systems, integrated office systems, video-teleconferencing, and computer-conferencing are just some examples of relatively recent technological innovations designed to make organizations more efficient and effective in the marketplace. There is no doubt that the use of any of these tools, in lieu of their traditional counterparts, affects the organization’s work environment. However, it is more difficult to assess the impact of DSS on the environment than these other technologies. This paper will discuss some potential impacts of decision support
technology on various organizational components.

**Decision Support Systems**

Early development of DSS began in the 1970’s. This technology was the result of a logical evolutionary process which began with traditional Data Processing (DP) systems in the 50’s and 60’s, and progressed through Management Information Systems (MIS) in the 60’s and 70’s. DP systems are essentially transactional in nature, while MIS are more concerned with reporting the raw material of broadly defined decision making environments within the firm. At present, there is no generally accepted definition of a DSS, although most experts would agree on some basic terminology (Brown and Goslar, 1988). A DSS can be described as an interactive, computer-based software system which utilizes decision rules and models in conjunction with a comprehensive data base. Its function is to aid decision makers in solving unstructured or semi-structured problems (Iver and Schlade, 1987). Specifically, “DSS’s currently assemble and present the information that an individual needs to make a specific decision” (Anonymous, 1989). Numerous examples can be cited of how these systems are beginning to impact the decision making and organizational environments of industry and government (DiGiammarino and Kackuk, 1991; LeBlanc, 1991; Higby and Farah, 1991; Austin and Eom, 1991; Trippi, 1990; Te’eni, 1990). DSS integrate problem solving capabilities — countering the patchwork approach to information technology taken by many firms. The capabilities available to decision makers include not only summaries of substantial data analysis, but also detailed collection and verification of data needed for one-time, ad hoc, projects. The typical DSS uses several distinct tools, e.g., sophisticated graphics, report generators, query languages, financial and statistical modeling, simulation, and goal seeking programs (Aggarwal, 1990). This package of tools enables the user to specify tactical goals and variable values which can be adjusted incrementally, as necessary, in the decision making process (Anonymous, 1989).

**Areas of Organizational Impact**

The potential number of organizational variables impacted by DSS (or any wide-ranging technological innovation) is enormous. The discussion which follows is restricted to major, broadly defined areas and issues. Specifically, it focuses on the critical areas of structure, communications, and management roles. These are the areas within the organization which are most likely to be transformed as a result of widespread use of decision support technology.

**Transformations Within the Organization Structure**

A widely quoted article in the Harvard Business Review over thirty years ago (Leavitt, 1958) posed the question, “Is middle management obsolete?” The answer, even at that time, was a resounding yes. However, in some industries, instead of disappearing or shrinking, the number of mid-level professionals/managers, has actually been expanding. In the 1980’s middle management was not composed of levels of authority, decision making, or supervision. Middle management were relays for information, utilized to collect, amplify, repackage, and send on information. This situation has the effect of drastically slowing the organization’s decision processes and negatively affecting their ability to adapt to environmental change.

In many cases the disparity between the Harvard Business Review prediction of thirty years ago and what exists today is the result of the failure of technology to produce the spectacular increases in professional productivity which were forecast. The competitive thrust of the 1990’s—the globalization of major industrial and consumer markets—stresses the ability of firms to innovate, capture global levels of manufacturing efficiency, and understand international marketing and the diversity of the world’s markets. With the advent of true decision support technology, the paper shuffling duties of last decade’s middle managers will surely begin to disappear; bringing with it a drastic reduction in the size, or at least the roles, of today’s middle management (Feld, 1990).

Also, companies are becoming more aware of the importance of managing the interdependence of effort within the organization along multiple dimensions, e.g. functional departments, product lines, and geographic units (Rockart and Short, 1989). This trend is driving the formation of what are termed “stateless” and “boundaryless” companies. In this type of organization, everyone has access to the same information. The collection, validation, dissemination, and analysis of this information then becomes crucial to the organization’s survival. Over the last few years, breakthroughs in decision support technology have no longer been merely quantitative; i.e., simply crunching numbers faster. Emerging DSS can carry out the most logically complex and realistic “what if” tests, and run simulations which are so
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