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# PANEL 3 MANAGEMENT SUPPORT SYSTEMS AND HYPERTEXT TECHNOLOGY

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## PANEL 3

### MANAGEMENT SUPPORT SYSTEMS AND HYPERTEXT TECHNOLOGY

**Panel Chair:** Leo C. Charalambides, University of Hartford

**Panelists:** Jeff Conklin, Microelectronics and Computer Technology Corporation  
Omar El Sawy, University of Southern California  
Paul Gray, Claremont Graduate School  
Stephen Loy, Indiana University  
Daniel Power, University of Maryland

#### THE NATURE OF HYPERTEXT

Hypertext (also known as nonlinear text) is an approach to information management in which data is stored in a network of nodes connected by links. "Data" can take the form of text, graphics, audio, video, as well as source code. The user can view the nodes, and in some systems the network itself, through an interactive, graphical browser. Furthermore, s/he can manipulate these nodes through a structure editor (Smith and Weiss 1988).

In his survey on hypertext, Conklin (1987) identifies the following as necessary features of a somewhat idealized hypertext system:

- the database is a network of textual nodes, i.e., processing of quantitative information, although possible, is not a primary objective of hypertext;
- the windows displaying the node contents may contain any number of link icons which represent pointers to other nodes in the database;
- the user may create new links to new nodes (e.g., annotation) or to existing nodes (for establishing new connections); and
- standard window system operations must be supported, i.e., both window and icon position and shape are visual cues to remembering the window contents.

Hypertext is certainly not new. By some accounts (Yankelovich, Meyrowitz and van Dam 1985), it is at least twenty years old. However, with the relatively recent surge of interest in computer support of collaborative professional work (Reitman-Olson, Conway and Atkins 1987), hypertext technology has started coming out of the computer science/software engineering "closet" and into the Management Support Systems (MSS) mainstream. Two other events have also contributed to this trend. One is the introduction of micro-computer based software programs during the last year, most notably HyperCard for the Apple line of MacIntosh computers (Goodman 1987), and the other is Hypertext '87, the first major conference devoted entirely to hypertext (van Dam 1988).

#### MANAGEMENT SUPPORT SYSTEMS

One can classify a number of related information system types under the MSS umbrella. These include DSSs, GDSSs (DeSanctis and Gallupe 1987) and EIS/ESSs (Rockart and De Long 1988). What all these systems have in common is the direct or indirect support of managers as problem subjects in the process of managing managerial problems--sometimes alone but most often with other "problem actors" in and/or out of the organization. These actors include the managers, their associates, stakeholders and competitors. Managing a problem implies that the manager must deal with it effectively and efficiently in the context of all the relevant actors in the problem's environment.

Problem actors may consider certain managerial problems to be partially or completely ill-structured or "wicked." These problems are usually encountered at the strategic level. Their attributes and the relationships among them are not a priori or uniquely identified. In other words, the view that a manager has of the problem is likely to be different from that of another actor. Due to the lack of inherent structure, the problem formulation/structuring/framing /diagnosis phase is the most important element in the process of coping with wicked problems.

In this phase, the problem subject(s) collect information about the problem and its environment from a wide variety of sources. In general, MSSs can be very useful to this phase (Iyer and Adams 1987). This is particularly true if conditions are favorable. By favorable conditions we mean a problematic phenomenon with a rather limited domain--organizationally as well as otherwise. That is, the associated database is primarily quantitative and implicitly pre-structured by the analyst/model builder. It usually resides in one storage location, in one medium or format and is rarely revised or expanded. Furthermore, incorporating in this database a trail of the arguments of the various problem actors is not considered to be crucial to the process.

## **THE UNDERLYING THESIS OF THIS PANEL SESSION**

What is unique about the process of dealing with (strategic) ill-structured problems is that the formulation phase is highly interactive and dynamic. That is, it is conducted in parallel with the other phases of alternative generation, alternative evaluation, choice and implementation (Mintzberg, Raisinghani and Theoret 1976). An actor's beliefs about the problem usually become an important input to the manager's formulation of the same problem. Furthermore, the manager participates in this phase under time pressures, intermittently, disjointedly and asynchronously (Isenberg 1984).

The panelists will approach the topic from the following position:

*Hypertext is an enabling technology that is necessary for the creation of MSSs that emphasize the support of ill-structured managerial problem formulation under "unfavorable" conditions.*

They will thus argue that hypertext can help the problem subject achieve continuity as s/he "digs into" the problem as well as "out of it." That is, in scanning his/her environment, the manager will now be able to link the formulation of one problem with that of another (which may belong to him/her or an actor) and thus perceive the "big picture." In effect, s/he will receive conceptualization and communication support for the entire management process.

## **HYPERTEXT AND MANAGEMENT SUPPORT SYSTEMS**

Hypertext can be used with MSSs that are oriented towards serving the needs of middle management specialists (e.g., DSSs and GDSSs) as well as MSSs that tend to offer general support to the work of top management generalists (e.g., EISs/ESSs).

When combined with powerful managerial problem formulation techniques, hypertext can become a central component of a (G)DSS. On the other hand, as a computer supported collaborative work technology, hypertext can also be combined with project management oriented EIS/ESSs such as Intelligent Electronic Message Systems (Malone et al. 1987) or devices that provide electronic support of meetings, e.g., the "electronic chalkboard" (Stefik et al. 1987).

## **MAJOR POSITIONS OF THE PANEL PARTICIPANTS**

Jeff Conklin will argue that the complexity and dynamic nature of formulating "wicked" problems should lead one to adopt the view that strategic planning as well software design are "conversation based." According to this view, the discussions among the various problem actors is not just a means but the most important end. Hypertext is a representation that allows the richness and informality of this process to be supported by computers. Conklin will describe a method for design and planning argumentation, called IBIS, and a hypertext tool called gIBIS that supports multi-user access to the evolving IBIS network.

Paul Gray will argue that commercially available EIS software products (such as Pilot, System W and Metaphor) possess hypertext-like capabilities in terms of access to a wide variety of corporate computer information sources. These systems tend to have a seamless interface between the mainframe and the micro. He will claim that, in order that a hypertext-based EIS be useful to managers scanning the strategic environment, the micro-based, hypertext-driven system should be an efficient navigational tool or "card catalog" to the mainframe based "library" of electronic documents and databases.

Daniel Power will argue that current microcomputer-based hypertext implementations vary greatly in capability. However, even the systems that are thought to be the most powerful (e.g., HyperCard) are limited. Examples of limitations are lack of color, clumsy data export and import and the available window size. Hypertext developers must

address these weaknesses in the next generation of hypertext systems before strategic "card catalogs" can be developed which the intended end-users will find useful in their work.

Stephen Loy will argue that the effectiveness of hypertext in supporting strategic problem formulation is likely to be influenced by the manager's cognitive ability to create and use mental models which will guide his/her use of these strategic "card catalogs." Recent research (Pracht and Courtney 1988; Loy 1988) on graphical, interactive problem-structuring tools have found that the effectiveness of these tools is related to such cognitive skills as visual thinking, logical reasoning and verbal skills, and perceptual style. These findings indicate that hypertext may not provide useful problem formulation support for some top managers.

Omar El Sawy will examine the potential influences of hypertext on the structural characteristics of the environmental scanning process. He will introduce the concept of "chunky scanning" and discuss how hypertext can influence the use of drill-down heuristics and pattern recognition. He will argue that such use will result in new modes of environmental scanning. These modes may have both beneficial as well as adverse effects on managerial problem formulation, diagnosis and structuring.

Leo Charalambides will argue that Conklin's "conversation based" view of strategic problem formulation is compatible with the stakeholder approach to strategic management. He will then explain that dissolving (rather than solving or resolving) strategic problems with the cooperation of stakeholders is presently not common due to the difficulty of conducting visually oriented environmental scanning from a truly systemic perspective (Ackoff 1971). The availability of suitable computer support is crucial to this task and the next generation of hypertext systems (Halasz 1988) appears to be the most promising information technology to do that.

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