The management information systems (MIS) field has never been short on concepts—views in people’s minds of phenomena. In fact, MIS itself is a concept—a view of how the computer can be used to provide managers with information for decision making (Aron, Dearden, Zani). The decision support system (DSS) is also a concept (Gorry and Scott Morton, Sprague). Since computer and management scientists have been free to view these systems as they see fit, there has always been a certain amount of disagreement concerning the concepts and their interrelationships.

The 1980s saw interest in computer use shift from applications that meet individual needs to those designed to meet organizational needs, and the idea that information can be used to achieve and maintain an advantage in the marketplace led to the concept known as competitive advantage (Porter and Millar).

In a like manner, the concept of strategic planning for information resources, or SPIR, was devised to describe the way that the firm’s executives develop long-range plans describing how their information resources will be used to support the attainment of the firm’s strategic objectives (King, 1988).

During this same period, a concept emerged that captured the idea of a person on the executive level having primary responsibility for all of the firm’s information resources. This idea assumed more than simply a title, and became known as the chief information officer (CIO) concept (Rockart, 1982).

These concepts—competitive advantage, SPIR, and the CIO—all reflect organizational views of computer use. Another concept of the same type, perhaps the loftiest of all in that it was intended to represent a global view of computer use at the top-management level, was named information resources...
management, or IRM. Several different views of IRM have been offered (Guimaraes; March and Kim; Cheng and Kanabar), but essentially it recognizes that data and information are given as much management attention as such physical resources as personnel, machines, and money.

Another concept that came to fruition during the 1980s probably stimulated more interest than all the others combined. This was the concept of end-user computing (EUC), which captured the capability of users to actively contribute to the development of their own computer-based systems (Yaverbaum). Although EUC would appear to focus on individual users, firms quickly recognized the potential impact on the organization. The interest in EUC grew so quickly that many firms lost control of their information resources and took inappropriate actions due to lack of proper technical training (Alavi and Weiss; O'Donnell and March). In response to this loss of centralized control, firms modified their organizational structure and enacted policies and practices aimed at ensuring the growth of EUC in a coordinated way (Munro, Huff, and Moore; Pyburn; Rockart and Flannery; Simmons, Burbridge, Harris, and Ames). So, end-user computing had its organizational implications.

Although one would suspect that all of these organizationally based concepts affect each other in some way, very little study has been aimed at identifying and explaining the interrelationships. Ein-Dor and Segev (1988) explained the relationship of EUC and IRM, and Henderson and Treacy (1986) related EUC to competitive advantage. But, there has been no effort aimed at establishing a structure to encompass all of the concepts.

If all of the concepts are interrelated, practically everyone in the firm would benefit from knowing what those interrelationships are. The firm's executives would benefit by better understanding the importance of strategic planning for the firm's information resources in achieving IRM, the need to accommodate end-user computing in IRM, and the role that the CIO plays in IRM. The CIO would benefit by understanding the need to participate with other executives in all aspects of IRM, and the role of the information systems (IS) unit in EUC. In a like manner, computer users throughout the firm would benefit by understanding the influence of strategic planning on their developmental efforts, and the way that responsibilities are to be shared with IS.

Whereas several approaches to exploring the interrelationships between these organizational views of computer use and responsibility no doubt are possible, one that would be expected to hold substantial promise is systems theory. Systems theory is appropriate because it has provided the basis for the design of computer-based systems. The computer is a physical system, as are the firm, and the people within the firm who use the computer. Computer applications take the form of input-processing-output modules that incorporate feedback mechanisms.

Also, such methodologies as the system development life cycle, prototyping, and rapid application development (RAD) are expressions of an application of systems theory known as the systems approach.

The task of this paper is to use systems theory as a means of understanding the constituent relationships within IRM, and projecting those relationships as they apply to the CIO and IS.

**Systems Theory**

Systems theory defines phenomena in systems terms. Ackoff (1971) recognized that a system must consist of multiple component parts by defining a system as "a set of interrelated elements." Churchman (1968) recognized that the elements exhibit goal-oriented behavior by stating that a system "is a set of parts coordinated to accomplish a set of goals."

**Open and Closed Systems**

Systems can be classified based on their relationships with their environments. The two types are open systems and closed systems. Andrew (1965) distinguished between the two as follows (Andrew’s italics): A closed system is isolated from its environment. There is no import or export of material and its final state is unequivocally determined by its initial conditions. An open system, on the other hand, exchanges materials with the environment and has the basic characteristic of self-regulation.

**System Elements**

An open system must include component elements that facilitate an interaction with its environment and contribute to the self-regulation. Von Bertalanffy (1962) used the diagram of a simple feedback model in Figure 1 to illustrate the basic structure of an open system.

As the system regulates itself so as to achieve its goals, it seeks to maintain a steady state, a constant composition that is achieved by a continuous exchange and flow of component material. This steady state is also known as the goal state (Andrew).

![Figure 1: An Open System](source: Ludwig von Bertalanffy, General Systems Theory: A Critical Review. General Systems (1962), p.6)
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