CHAPTER 4

STRUCTURES: CONNECTIONS, CONSISTENCY AND COSTS

1. Levels of Decision Rule Connections

Organizations are connected sets of people, and among the many connections of organizations the defining one is the decision rule (Baligh, 1990). The specific decision rules of an organization affect its performance as we show later. It is reasonable to conclude that the relations between the decision rules of an organization also affect its performance. Decision rules may also be connected to the transformations which describe the ways by which the organization brings about changes in some part of the state of the world. When these transformations are connected together they describe the technology of the organization. When decision rules and transformations are connected in various combinations, the result may be called a decision process. Such a process is made up of parts of the structure of the organization, connected decision rules, parts of its technology, connected transformations, and the connections between the elements of the two parts. The organization's decision processes affect the performance of the organization. Performance, in turn, affects the attainment of goals the organization has.

Every property that involves decision rules is defined in terms of only one rule, and by extension defined for the set of rules that is the third component of the operating structure. Other properties may be defined in terms of pairs of rules, specifically in terms of the connections between two rules. Recall that a decision rule r is defined as (m, u, f), where m is a set of rule makers, u a set of rule users, and f a mapping which assigns a subset of the set of values which a given operating decision variable is logically allowed to take to a circumstance or state of part of the world. A circumstance can be thought of as a vector of some finite dimension. Decision rules are connected by way of their makers, users, and by the domains and ranges of their rule mappings. Transformations are mappings that describe changes in a part of the world which the organization

structure can bring about. When connected together through overlapping domains and ranges, these transformation mappings may also have intersecting domains or ranges and thus be connected. The structure, the technology, and the connection between them describe a decision process.

It is useful to relate the organization structure parts of decision processes to organization performance. Also of value to the analysis which we do below is the clear definition of what a decision process is. We need to indicate what the relation between a decision process and performance might be like. In what follows immediately we define decision rules, transformations, connections between decision rules, connections between transformations, and connections between rules and transformations. Though the first of these has just been done, we redo it in a manner that suits better the purposes of showing how rules are connected one to another. The definition will be slightly different in form, but logically identical to the earlier one. Next, a number of relations between any two decision rules are defined, all of which are in terms of logical connections between pairs of components, one from each of the two rules.

2. The Decision Rule and the Transformation

For each given organization we need to define two basic sets. The first is a basic set of people which contains all the decision makers of that organization. The second is a basic set of variables which contains all the variables the values of which are of concern to the organization. Every element in the first set has a unique identity and name, as does every element in the second set. In this set some elements are pure parameters, variables the values of which can not be set by the whole set of people or by any proper subset of it. These variables take values which are determined by forces or people outside the organization. Other elements in this set are decision variables, that is, variables the values of which may be set by the whole set of people or by any proper subset of it. Any decision variable may be treated as a parameter by any proper subset of the basic set of people.

A decision rule is defined by three components. The first is a set of people, the ones who make the rule, i.e., specify the third component of the rule. The second is also a set of people, the ones who are to use the rule, i.e., use the third component to give a value to a decision variable or to make another rule. Both the set of rule