CHAPTER 12

DESIGN RULES FOR ORGANIZATION SUBSTRUCTURE PROPERTIES AND COMPONENTS: PART A

1. Rules to Design the Structure Itself

Only the rules to be used to design the structure itself remain to be identified. Design rules will be stated in terms of structure properties. Because these are defined in terms of the components of the structure, the design rules are easily connected to these components. Properties stated in terms of the former are easily transferable into the latter. Forms the rules take will be dictated by the analytic statements from which they are derived. Not every design rule will come from one analytic statement. It may be necessary at times to combine a number of these to get the one meaningful design rule. Also, a rule may tell the designer to choose from a number of equally acceptable values of different structure properties, or it may specify a required combination of values of different structure properties. When all the rules of design are specified, their use will involve a number of steps and a process of iterating these steps. The steps and the iterations are the means by which one can get the design of a structure with an output to its performance and a cost of its operation, which are an optimal pair. In a design problem of this magnitude and complexity, there is no way of getting the best in one single move from output to performance properties to structure properties to the design of a structure, and the specification of the components of a structure. That is why we have an iterative process which uses the design rules over and over in an adjustment process. At the end of this process there emerges a design of the structure that is efficient, given the circumstances of environment, technology, and the costs of the structure. These costs may be quite significant and play a major role in determining the efficiency of the different structures. They must be included in our process of creating such designs, even though most of the literature on organization structure design ignores them as elements of the problem of designing efficient structures. Before the rules of design are derived, the general problem of

combining the analytic propositions and the general form of combinations to be used are discussed. Also, the logical steps to be taken in combining these rules together is discussed, and the basis for determining the order in which the rules are to be used to get a design is defined. Finally, the issue of determining the number of times that the whole sequence of design steps is to be used is taken up.

Subsets of design rules will be created on two different bases. First, the rules will be grouped on the basis of outcome. The subset will be that of all rules that deal with the level of a given performance property. All rules involving a performance property will be in one subset. For example, those that get us the performance property of flexibility will be together in one subset, those that get us responsiveness in another, so on. We will also create another sorting procedure which will group design rules on the basis of a design variable which is a dimension of their range spaces. One group will be made up of all the design rules that deal with the choice of the level of decision rule comprehensiveness, another on the decision rule explicitness, etc. The rules that make up the elements of these sets are to be derived from the analytic propositions. The forms these take determine the forms the former may take, and these determine the ease with which the designer may use them. As we now turn to this issue, we will find that the clarity and correctness of the analytic propositions are obtained at the cost of complexity and repetitiveness in the use of the design rules derived from these propositions.

2. Rule Mappings: The Relation or the Slope

Rules of design can be in any one of many forms. The form taken determines the ease with which they may be used and the quality of the results they give. Simple rules are ones that are defined in real number space by mappings that are in the simplest algebraic forms, such as, set the value of design variable X in terms of the values y and z of variables Y and Z to be that given by $x = f(y, z)$. All values are in real numbers, and using the rule is a simple process. Next, one might have to deal with rules that are less clear. There are rules, for example, that are in terms of design variables the values of which are not real numbers, but are well ordered and in identifiable form, such as set x at a low level if both y and z are at low levels. If the variable levels are observable and controllable, then this rule is useful, but not as precise as the preceding one. Weaker still and even less useful are rules that