CHAPTER 6

ANALYTIC MAPPINGS: FROM SUBSTRUCTURE PERFORMANCE AND ENVIRONMENTS TO OUTCOMES

1. Outcomes of the Operating Substructure

People in the organization choose the kind of outcome that their organization is to realize. It could be waging and winning a war, selling a huge amounts of a set of products, educating people to be good problem solvers, making a positive difference between income and costs, or whatever else. Any outcome is a variable, and each takes on values of appropriate logical form. The values for war may be to win or lose, or the number of enemy killed, or both. Though it is true that in some organizations the outcome is the performance itself, our interest is in those where the performance is not the object of creating the organization. There is no general set of outcomes for the operating substructures of all organizations. The Army seeks outcomes that are different from what the Catholic church seeks, except in the case of the Crusades. Whatever outcome they seek, all operating substructures are faced with functions that relate their performances to the outcomes that they seek. These outcome functions are stated in terms of the output variables of the organization and in terms of variables that are components of the environment of the organization. For outcome oriented, or purposive organizations, these outcome functions are very important, and without knowledge of what they might be, no meaningful design can be created. Some knowledge about the effects that performance variables and those of the environment have on the values of the variable that is the outcome is needed by the organization. Properties of this function may be defined and used to help the organization identify what it needs to do under what circumstances in order to get the outcome it wants. From there it can go to the next stage of determining how it is to structure itself to do these things. We define some properties of the function that maps the performance of the operating substructure and the environment into the outcomes. These outcomes are those that are defined by whatever goals the organization is created to meet.

2. Some Properties of The Outcome Function

The operating substructure does things that affect the state of the organization through the connection between performance and outcome. We define next some useful properties of this function that relates the operating structure performance and the environment to the outcomes which the organization seeks.

Sensitivity to performance: This property is defined in terms of the changes in outcome values that result from changes of performance values given fixed sets of environment values. What we want to know is what happens to the outcome when the performance is changed and the environment is in some fixed state. Where, as in most real life cases we don't have functions that are continuous and so on, we may have to be satisfied with knowing the results of changes in only some performances. This may be the performance we have now or the performance that is best, or of some quality, given the environment state. We may find it useful to know the effects on outcome of only one or a few components of performance, in a few of the states of the environment. If we do not know the optimum, we could investigate what is happening to outcome when we make changes in our existing performance. The specific measurement of the value taken by this property will be determined by the values of the starting point of performance and environment, but in all cases the value of this property is in terms of so much of outcome for so much of change of performance when the components of the environment are held at some fixed values. The relevance of this property stems from the fact that its value may tell us the returns to our efforts to change our performance, or to our efforts to find the optimum performance when we are pretty close to it. The answer here determines in part the structure we design and the optimality levels we want the performances it produces to have.

Suppose we have a situation in which the outcome is profit, and performance has three components x, x*, and x**, the environment has three components p, p*, and p**, and the outcome function of profit is $0 = g(x, x^*, x^{**}, p, p^*, p^{**})$. Suppose this function were continuous and differentiable. The first thing we do is find the optimal values of the decision variables for each state of the environment. To simplify further, we assume that there are only ten states of the environment which we will encounter. We find ten different performances, each being the optimal in one of the states of the