The Management of Redundancy, Duplication and Overlap

Dr. Manuel Angel (Coco) Morales

Of all the professors I had during my stay at the universities of Berkeley and Stanford in California, Martin Landau was the best. He was a great philosophy of science scholar, a management guru, a superb organizational theorist and a formidable social scientist. Marty was an extraordinary professor, who loved working with students. He was a great mind. Among his many contributions; one can mention that he was the original father of the concept of the learning organization, or as he used to say the self-correcting organization. The point is that Martin Landau made huge contribution to the theory of management and to the theory of organizational design.

For example, when the distinguished scholar Harry Nyquist introduced the concept of redundancy as a technical expression in information theory, it referred to the useless portion of a message, those who could be eliminated without any loss of information. Nyquist thought of a nonredundant system, one which would permit the transmission of information with the absolutely minimal number of signs that could possibly be employed. It was Martin Landau who made the strong empirical argument that such a goal should not be entertained! He said that eliminating redundancy should be set aside not because it was an impossible of achievement, but because its realization would, in fact, increase the probability of failure, of false, misleading, and distorted messages.

It was Martin Landau's proposition that redundancy is a powerful device for the suppression of error and for insuring reliability of communication. Sometimes, simple repetition is the easiest way to introduce redundancy to insure required performance.

It is, however, the negative or the lexical evaluation of redundancy which prevails in enterprise management and public administration. Indeed, this view is to be seen as programmatic in such revitalization movements as Taylorism, scientific

and production management. These demanded the wholesale removal of duplication and overlap as they pressed for lean, streamlined organizations that would operate with the absolutely minimal number of units that could possibly be employed in the performance of a task. Zero redundancy constituted the measure of optimal efficiency, and this ideal is sometimes, fortified by the scarcity of resources. Landau's proposition is that efforts to improve organizations by eliminating duplication and overlap would, if successful, produce just the opposite effect!

An organization can be defined by the rules which determine the set of messages that can be received by its different members. Error occurs at the point of origin, where a message is selected from a whole ensemble of signs (stimuli) and at the point of reception. The receiver, often transforms the relation between the sign and its referent into a mystery.

Martin Landau favorite question (one that he cultivated all his life) was the following: Can we design an organization that is more reliable than any of its parts? He strong answer was yes! Using the work of John Von Neuman **Probabilistic Logics and the Synthesis of Reliable Organizations**, Landau demonstrated that it could be done by adding sufficient redundancy. THE SCIENTIFIC STATEMENT IS THAT THE PROBABILITY OF FAILURE IN A SYSTEM DECREASES EXPONENTIALLY AS REDUNDANCY FACTORS ARE INCEASED. Increasing reliability in this manner, of course raises the price to be paid and if fail-safe conditions are to be reached, the cost may be high. But an immediate corollary of the theorem eases this problem for it requires only arithmetic increases in redundancy to yield geometric increases in reliability. The cost may be quite manageable. THE THEORY OF REDUNDANCY IS A THEORY OF RELIABILITY.

Within the domain of self-organizing systems there is the term of EQUIPOTENTIALITY often referred to as overlapping. It denotes the tendency of neural networks to resist that kind of precise differentiation of function which is mutually exclusive. Within these biological systems there appears to be some overlap at all times which enables residual parts or subsidiary centers to take

over, though sometimes less efficiently, the functions of those which have been damaged. It is this overlap that permits the biological organism to exhibit high degree of adaptability to change its behavior in accordance with changes in stimuli. These lessons can be extrapolated to the task of designing artificial systems like organizations.

Marty Landau was constantly instructing that a prescription without diagnosis was mal practice. One of his key arguments was that many situational, social and structural factors contribute to the behavioral discrepancy between the organizational behavior performed and the behavior desired. For him, in reliability terms, this was the difference between at-risk and safe organizational action.

Most of the factors contributing to behavioral discrepancy, and thus to high potential of risk or failure, are due to the design and the context in which the task is executed or to the characteristics of the task itself. Common design and contextual variables are: 1) Unclear or misunderstood expectancies and requirements; 2) Upside-down contingencies that induce at risk or high vulnerability behaviors and discard reliability behaviors; 3) The lack of efficient redundancies within the system that can be activated in case of an emergency.

I still remember him saying that best efforts we not enough, and that you have to design for reliability! Of course, when designing organizations Landau's theory is that the challenge is to learn to distinguish between inefficient redundancies and those that are constructive and reinforcing, and this includes the kind of knowledge which will allow the introduction of adequate redundancies so they can work to increase both reliability and adaptability.

Organizations function as self-organizing systems and tend to develop their own parallel circuits: not the least of which is the transformation of such residual parts as informal groups into constructive redundancies.

Redundancy serves many vital functions in the management of organizations. It provides safety factors, allows flexible responses to anomalous situations and provides creative potential for those who are able to see it.