



THE NEXT GREAT FRONTIER: DESIGNING MANAGERIAL AND SOCIAL SYSTEMS, PART 2

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The continued search for better understanding of social and economic systems represents the next great frontier in human development. Frontiers of the past have included creating the written literatures, exploring the geographical limits of earth and space, and penetrating the mysteries of physical science. Those are no longer frontiers; they have become a part of everyday activity. By contrast, insights into behavior of social systems have not advanced in step with our understanding of the natural world. We have been reluctant to see our social institutions as dynamics systems that have a strong influence over individual human behavior—and that we can influence, once we understand how they operate.

A systems analysis of a company draws on knowledge about how structure and policy relate to behavior. Information comes primarily from interviewing people in the company about how they make decisions at their individual operating points. Statements describing the basis for decisions are the rules or policies governing action ("policies" meaning all the reasons for action, not just formal written policy). There is substantial consistency throughout the organization as to the actual operational policies that are guiding decisions. Furthermore, the policies are justified in terms of how those policies are expected to correct the great difficulty that the company is experiencing.

Up to this point, the study of such a company follows the case-study approach to management education. That is, a comprehensive examination of all related parts of the company is made in the context of the problem that is to be solved. But if left at this point, the weakness of the case-study method would dominate the outcome. A descriptive model of the

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company would have been assembled, but the human mind is not able to deal with the inherent dynamic complexity of such a situation.

Such a descriptive model is equivalent to a high-order nonlinear differential equation. No scientist or mathematician can solve such a system mentally. Only computer simulation methods are capable of revealing the behavior implicit in the structure that can be built from knowledge about the many local decision-making individuals and how they are connected.

After obtaining a description of the important policies, information flows, and interconnections in a company, the next step is to translate that description into a computer simulation model. A simulation model does not involve complicated mathematics but instead is a language translation from the original description to computer instructions. Such a model allows the computer to act out the roles of each decision point in the model and feed the results to other connected decision points to become the

basis for the next round of decisions. In other words, a laboratory replica of the company then exists in the computer where one can observe the behavioral consequences of the policies that had been described in the interviews—policies that are intended to solve the company's problem.

To the surprise of those unfamiliar with the devious nature of such dynamic systems, the computer model, based on policies known to people in the company, will usually generate the very difficulties that the company had been experiencing. In short, the policies that were believed to solve the problem are, instead, the cause of the problem. Such a situation creates a serious trap and often a downward spiral. If the policies being followed are believed to alleviate the problem, but, in hidden ways, are causing the problem, then, as the

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problem gets worse, pressures increase to apply still more strongly the very policies that are causing the problem.

Similar misjudgments lie behind much of the foreign encroachment on American markets in the 1980s. Foreign infiltration was initially blamed by American companies on lower foreign wages and lower product price. In response, domestic prices were reduced until there were insufficient profit margins to permit fixing the real difficulties, which were usually more in design and in quality of product and service than in price. As so often happens, the domestic failure to compete arose more from mismatched internal policies than from external forces.

A New Kind of Management Education

All of this points to the need for a new kind of management education, one that we might call “enterprise design.” It also suggests a new kind of manager for the future—the “enterprise designer.”

A fundamental difference exists between an enterprise operator and an enterprise designer. To illustrate, consider the two most important people in the successful operation of an airplane. One is the airplane designer and the other is the airplane pilot. The designer creates an airplane that the ordinary pilot can fly successfully. Is not the usual manager more a pilot than a designer? A manager is appointed to run an organization. Often there is no one who consciously and intentionally fills the role of organizational designer.

Organizations built by committee, by intuition, and by historical happenstance often work no better than would an airplane built by the same methods. Time after time one sees venture capital groups backing a new enterprise in which the combination of corporate policies, characteristics of products, and nature of the market are mismatched in a way that predetermines failure. Like a bad airplane design that no pilot can fly successfully, such badly designed corporations lie beyond the ability of real-life managers.

Management education, in all management schools, has tended to train operators of corporations. But there has been rather little academic attention to the design of corporations. The determination of corporate success and failure seldom arises from functional specialties alone, but grows out of the interactions of functional specialties with one another and with markets and competitors. The policies

governing such interactions have not been adequately handled in management education. We need to deal with the way policies determine corporate stability and growth in an intellectual, challenging, quantitative, and effective way. Such management education leads to what I refer to as enterprise design. Such an education would build on three major innovations that have already occurred in this century: the case-study method of management education as pioneered by the Harvard Business School beginning around 1910; the development of theory and concepts related to dynamic behavior of feedback systems as first developed in engineering at the Bell Telephone Laboratories and MIT in the 1930s and 1940s; and computers that permit simulation modeling of systems that are too complex for mathematical analysis.

Bringing these three innovations together offers the potential for a major breakthrough in management education by adding a rigorous dynamic dimension to the rich policy and structural knowledge possessed by managers.

The difference between present management schools and those of the future will be as great as the difference between a trade school that trains airplane pilots and a university engineering department that trains aircraft designers.

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Pilots continue to be needed, and so will operating managers. But just as successful aircraft are possible only through skilled designers, so in the future will competition create the necessity for enterprise designers who can reduce the number of design mistakes in the structure and policies of corporations.

In management there is a tendency to identify a weakness, then try to find ways to relieve the symptoms. But it would be more fundamental to insist on understanding why the objectives are not already being met. What is it in the design of a corporation that is inhibiting success? A frontal assault on the symptoms, while the underlying causes remain in place, almost always fails. Success will follow when the designs of corporations give greater emphasis to removing the causes of problems rather than to trying to counteract the symptoms. ■

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