

The idea that most people who occupy executive positions are primarily stewards of the inevitable is provocative.

The authors' second radical idea is to divorce leadership from personality traits. Charisma, boldness, even the capacity to generate organizational purpose are provocatively absent from their model. Instead, the central theme shining through their work is *mindfulness*. They highlight the capacity to discern when traditional solutions are not likely to produce the desired results. That discernment must be followed not by the exercise of personality traits or hard-to-acquire skills but by the discipline necessary to enroll the organization in seeking new solutions. Their conclusions are confirmed by my own research and consulting experience. Many people who make things happen that wouldn't happen anyway do not fit a heroic profile.

The third radical aspect of Heifetz and Laurie's work arises from their phrase *adaptive work*. Their use of the term coincides with the development of a new field that has arisen from parallel studies in particle physics, astronomy, molecular biology, paleontology, and ecology. The study of *complex adaptive systems* examines the common properties of complex systems in the universe. One common property is the tendency for systems of all kinds to self-organize when faced with discontinuity. This, it turns out, is true of the worldwide community of bacteria, ocean ecologies following an oil spill, beehives, ant colonies, and you and me. It has also been hypothesized that complex adaptive systems *move to the edge of chaos* when threatened with disintegration. It is in this region that the most productive mutation and experimentation take place.

Science is suggesting that the problems of leadership and organization are common in the universe. Personally, I find this quite comforting. We are released from the self-absorption that has characterized so much of management literature for the better part of 50 years. Heifetz and Laurie's notion of adaptive work will help those responsible for their organiza-

tions' survival to tap collective intelligence, mobilize the inherent capacities of the organisms we call companies, and move with greater assurance toward the edge of chaos, where adaptive work takes place.

MASS CUSTOMIZATION

Naser M. Chowdhury
 Manager of Design Engineering
 Air Products and Chemicals
 Allentown, Pennsylvania

In "The Four Faces of Mass Customization" (January-February 1997), James H. Gilmore and B. Joseph Pine II provide a framework to help companies choose the type of customization they should pursue. More and more companies are embracing the concept of mass customization, but implementing it can be painful unless the implementation steps are clearly defined and the program is well managed by a cross-functional team. For most companies, mass customization requires an organizational transformation. The product offering must be redefined and simplified through value engineering. Value engineering can simplify the product offering by focusing on the customer's basic functional requirements.

At Air Products and Chemicals, a *Fortune* 500 company, we recently implemented mass customization in the design and manufacture of Gasguard, a family of high-purity equipment used in delivering specialty chemicals to the semiconductor industry. We focused on applying value engineering during the product's design and manufacturing phases. Our efforts resulted in a simplification of the product design and a drastic reduction in unit cost.

A cross-functional core team led the project, and a management steering committee provided guidance. We maintained our emphasis on value engineering throughout the program's four stages.

Stage 1: Developing a Vision. We developed a clear picture of the proposed work process at the outset of the program, and we spread the vision throughout the company. A document detailing our project's

scope identified required resources, scheduled critical tasks, and listed accountabilities. The document was reviewed and approved by the management steering committee.

Stage 2: Analyzing Our Product's Systems. The core team subdivided our product's complex systems into manageable pieces. Those were further divided into modules, which were broken down and defined in order to generate a menu of required and optional components. Required components are defined as the basic components needed to meet a customer's functional requirements. Optional components include additional features and enhancements. All other components are treated as "engineered to order."

Stage 3: Implementing First-Time Engineering. We developed three-dimensional mechanical designs that included all possible options. We also developed a knowledge-based product configurator to manage the large number of design rules that a mass-customized product line requires. In addition to being effective for recording orders, the product configurator can also be used as a design tool because it contains all the current possible options. The configurator can also generate pricing information, proposals, and schematics that can be shared electronically with customers.

Stage 4: Maintaining Integrity of Design. Training and change management are important for maintaining the integrity of the product line's design. In our case, multiple levels of training programs were planned for engineering, marketing, and sales functions. We used the product configurator in training because it contained all the design rules and knowledge of the product line. Finally, all proposed changes to the design of the product line were approved by a formal process.

There is a risk that mass customization without value engineering may only add to market turbulence by introducing additional features and options. The secret is to foster ongoing value engineering that can coexist with mass customization in order to redefine the ground rules of the marketplace. 