From Process Management to Complexity Management

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Last April, representatives of an elite group of pioneering companies gathered for two days in upstate New York to talk about the state of the art in process management and try to „push the envelope." These companies – Corning, DuPont, the Gartner Group, Hewlett-Packard, Marion Merrell Dow, MCI, PHH Vehicle Management Services, Texas Instruments, and Xerox – have already reaped substantial bottom-line benefits from their process redesign efforts. Global best practices are in place and efficiencies have been won, the result of analysis and insight. Process management is maturing at these companies, and they are moving on to a new cycle, the creation of learning organizations. The participants at the colloquium shared with each other highlights of what they've learned and discussed the issues they face as they redefine themselves for the future.

Best Practices in Process Management

At DuPont, as at other Best-of-the-Best companies, leaders realized that hierarchical organizational structures, with companies divided into functional areas, isolate both functions and people and diminish the vital exchange of ideas. Realizing also that value-adding business processes almost always cross functions, they decentralized the company, scrapping its functional „silos." DuPont now manages 19 strategic business units using just three core work processes: planning, delivery of the current offering, and renewal. Increased speed, compressed cycles with less rework, improved cash flow, and higher quality have all resulted. „We had to tear down some of our structure in order to see the company's value chain clearly," said Terence Ennis, Director of Continuous Business Improvement. „We would have had no overview otherwise."

Reduced cycle time and improved cash flow also marked PHH Corporation's process improvement efforts. PHH, a $2 billion, Maryland-based vehicle leasing, home mortgage, and home relocation services company, learned that aligning its information management systems with core processes enhanced the company's ability to customize. According to Senior Vice President Gregory Goolkasian, information technology enables PHH to individualize customer services by „applying unique client policies and needs to the delivery process."

Other companies have won substantial efficiencies through process mapping – starting with line management, attending to the details, eliminating extra hand-offs, and asking basic questions about each process. „We've found process mapping to be so valuable that we want to use it for the integration process with Hoechst," said Steven Dyer, Director of Cycle Time Reduction at Marion Merrell Dow, referring to the company's acquisition by Hoechst. Process mapping at Texas Instruments started small, with an examination of order fulfillment, the most basic interface with the customer. By analyzing and redesigning that and other processes, TI ultimately wrung a 60 percent reduction in cycle time out of its $5 billion semiconductor business. One key was improving communication within the company. What was required, said Director of Business and Strategic Services Janis Jesse, was „a culture change, making these engineers aware that they could talk to each other."

Similar modest, common-sense-based beginnings characterized process redesign at Corning Incorporated. „We asked questions like, 'Who supplies me? and, 'What's my immediate process?'„ said Director of Quality Martin Mariner. To turn around an alarming trend of plant closings, Corning redesigned discrete processes from the bottom up and is now working on an overhaul of companywide processes. „For us, reengineering was the next natural evolution of a grassroots search for quality," said Mariner.

While companies like PHH, Marion Merrell Dow, and Corning have approached process improvement somewhat mechanistically, focusing on the details and starting from the bottom up, others have taken a more organic, less structured approach to change. Hewlett-Packard, said Director of Corporate Quality Richard LeVitt, „is managed more by culture and values than it is by policies and procedures." Part of that culture involves seeing process change not „in the usual way, as unfreezing, transition, and refreezing, but as a continuous balancing act between the forces of chaos and stability." For the knowledge workers at HP, the learning that makes process change possible is often messy and chaotic, more accurately described by organic views of systemic change than by the algorithms and flow charts of „machine age" thinking.

Similarly, at MCI, whose founder institutionalized continuous change and looked askance at standardized operating procedures, the model of process change is impressively unstructured – but no less effective for it. According to Jon Theuerkauf, Manager of the International Customer Service Center, the company's operating principle is, simply, „find the pain and eliminate it."

At all these companies, whether their approach to process improvement leans toward the unstructured and organic or toward the programmatic, mapped, and mechanistic, two things have become clear. First, process redesign leading to

best practices is necessary for all companies that want to stay ahead and is still a vital area for further exploration. And second, because of its inherent limitations, process redesign can take you to the edge of the future, but perhaps not into it.

The Limitations of the Process Model

Colloquium participants identified two key limitations of the process model and its analogue for improvement, business process redesign. The first is that BPR simply doesn't work very well for some kinds of processes. The concepts and tools developed by companies doing BPR are most useful for processes with regular and predictable inputs and outcomes – "hard" processes such as manufacturing or the supply chain. But every company also engages in important processes that are not predictable or linear – "soft," organic processes such as strategy development and innovation – and BPR is not very useful for optimizing these. Thus it solves only half the problem.

The other limitation is that managing by process rather than by function often just substitutes one way of dividing the organization for another that is not so different. That is, whether you manage by function or by process, you're still managing *parts* and not the whole organization. BPR, while valid for what it does, is piecemeal. A well-executed redesign can make a single process highly efficient, but it often ignores the connections between processes. BPR efforts are limited because they are not systemic; they don't consider the whole.

So how do you manage a whole organization, both its hard and soft processes? How do you accommodate both the linear, operational-type processes and the nonlinear, „fuzzy" activities? You would need an organization that is both efficient and adaptable. It would be capable not only of optimizing regularized processes but also of approaching and solving problems creatively, accepting occasional chaos as the price of originality and adaptability. It would be structured enough to be stable, but not so structured as to be rigid and unchangeable. At the same time, it would be fluid and loose enough to experiment and try new ideas without worrying too much about breaking rules (or even failing at the experiments). Such an organization consciously chooses a middle way, attempting to balance itself between the extremes of chaos and boundarylessness on the one hand, and frozen rigidity on the other. We might say it is continuously poised on the edge of chaos.

Complexity Theory and Living Systems

In seeking analogies for such a dynamic model, the colloquium focused on the emerging science of complexity and the study of living systems. Much of the pioneering work in this area has been done at the Santa Fe Institute. Cross-disciplinary thinkers there agree that complex, living systems – biological, ecological, and immunological, for example – may have much to teach us because of their capacity to learn as systems. They not only have survived over long periods, but have changed and grown despite radical changes in their environments. What are the features of these self-learning systems? What allows them not only to survive but to thrive? And can these features be duplicated in a business organization? At Arthur D. Little, we have been following the theoretical discussion of these questions and exploring in practice their real-life business implications. This research has yielded new insight into the necessary conditions underlying organizational learning.

The Structural Base of Organizational Learning

Our research suggests that three parameters, or underlying conditions, are critical in self-learning systems, both human and natural:

- Minimal critical process specification, coupled with freedom to experiment
- Flexible resource architecture
- Permeable organizational boundaries

These three parameters must be „tuned," both individually and collectively, to the point at which they balance the organization between chaos and rigidity, creativity and order, organic variety and mechanistic efficiency. There must be just enough rules to run the organization efficiently, but not so many as to encumber it. Its resources must be flexible enough to change to fit altered circumstances. And the organization must support free and open communication across whatever structural boundaries it needs to maintain.

Minimal Critical Process Specification and the Freedom to Experiment. Another way of stating this parameter is simply „minimal rules." Scientists studying complex systems have found, first, that they require very few rules to govern themselves and perform; and second, that all successful systems engage in a continuous process of learning better rules. But not too many rules. In fact, the more rules a system attempts to follow, the more slowly it improves its performance.

Does the analogy apply to business organizations? It seems to. The companies furthest along in process management improvement are finding that having minimal rules works for businesses as well. Many people are familiar with the U.S. retailer Nordstrom's one-paragraph employee handbook, which concludes, „Use your good judgment in all situations. There will be no additional rules." Of course, this insight is nothing new. A century ago, referring to another kind of complex system, Henry David Thoreau said, „That government is best which governs least."

The few default rules that a system starts with might be thought of as constants, or values. These represent the best ways of doing certain things in a particular business. In addition, the system adopts certain „strong" rules which it believes may improve its performance. The system continuously compares its strong rules with other strong rules, either adopting the new rules or combining them with old ones in a „crossover" process that creates new strong rules. Simultaneously, it sheds older, weaker rules.

To accelerate this rule-learning process, a system or organization needs the freedom to experiment. In any given situation, the odds are against an experiment's succeeding. Experience shows that even in successful natural systems, only about one in five experiments results in a breakthrough. But that success rate is enough for progress. What this means in an organizational setting is that work teams must be given freedom to experiment, and to do so safely – that is, in such a way that the failure of an experiment does not jeopardize ongoing operations. Computer simulation models, experimental manufacturing lines, and prototype testing sites for new service processes are some ways to do this.

Flexible Resource Architecture. This parameter refers to all the organization's resources, or infrastructure, including information and communication systems, equipment, and other technologies. All these resources are structured to attain certain ends: rapid and efficient information transfer, maximum manufacturing capacity, and the like. Highly specialized and dedicated resources are actually embedded learning, in which each resource system is initially designed with a certain rigidity simply because it has been found to work best that way. A classic example is the assembly line on which Ford's original Model T was produced. The line produced Model T's with great efficiency. The problem came when Ford needed to produce a new model: the old assembly line was so totally dedicated that changing it nearly put the company out of business. The rigid architecture of its resources precluded experimentation with new learning.

Similarly, a major confectionery company with many franchised outlets recently ran afoul of its own information system. The system was highly automated in order to ensure that every store operated exactly the same way as the flagship. But when competition intensified and the market became increasingly health-conscious, the company could not change with the times and began to lose money. The culprit was the information system, which kept each store relentlessly plugging along doing things exactly the same way it always had. The system had no room to accommodate input from employees or customers and was not flexible enough to change.

Thus an organization's resources must balance adaptability with efficiency. They must be flexible enough to allow the organization to engage in a range of activities and to experiment with each at different settings. As the organization learns and changes, it should be able to adjust without having to invest in a new infrastructure. A simple metaphor is water. At a low enough temperature, it forms ice, a rigid lattice of molecules. At very high temperatures, the molecules are so active and chaotic that they take the form of a gas, steam. But at middling temperatures the substance holds together, yet flows and is flexible. The successful organization – whether biological system or business entity – must similarly find a middle way between stagnation and chaos. It must operate on the edge of chaos, because only there is innovation possible. *Yet* it must do this without compromising the order needed to accomplish day-to-day tasks.

Permeable Organizational Boundaries. A similar dynamic is at work in the structure of the organization. Within the somewhat rigid organizational boundaries that contain them, individuals, teams, and larger groups within the business normally can function quite efficiently. But as the boundaries grow more rigid and well-defined, communication across them lessens and finally ceases. This is a problem because, for the organization as a whole to learn and grow, knowledge usually must cross boundaries between functions or processes. When people with different perspectives work together, they have a much better chance of discovering new insights and creating new knowledge than people with similar backgrounds who have been doing the same kind of job over and over.

Creating permeable boundaries may be as simple (but revolutionary) as setting up factories, as one Fortune 50 company has done, in which no managers or supervisors are present. Employees function in self-directed work teams, rotating regularly among many assignments and making collective decisions regarding production.

As with minimal rules and flexible resources, an organization's boundaries and structure offer it the opportunity to strike a balance. Managers must be conscious of the need to find a middle way between a structure so loose as to be vaporous, in which people lose their sense of an organization, and one so tight as to be stifling. Bounded roles must be established; without them all efficiency breaks down. But if a person or a team is completely boxed into a role, that individual or group will find it hard or impossible to learn, change, and grow.

The Final Piece: Vision

In varying degrees, all living, self-learning systems have minimal rules, flexible resource architectures, and permeable organizational boundaries. But in addition to these three parameters, human learning organizations, such as businesses, are distinguished by a unique capability: self-awareness. They have the ability to project themselves into the future, to plan, to dream.

With this ability they can take advantage of the fourth parameter of success: a strong shared vision that guides and inspires all the organization's stakeholders. Equipped with a worthy, focused vision, the people of a company know exactly what unique, long-term achievement they are striving for. The vision complements and catalyzes the other three parameters by guiding the company upward and onward through change, and it suggests how the people in the organization can bring that achievement closer every day.

Employees embody the collective intelligence of a learning organization. They are its thinking machinery, and by their experimentation and learning they pull the organization toward its aspirational vision. Even so, there is a constant tension between the ideal reality of the vision and the concrete reality of the here-and-now. The people consciously choose that tension. They locate within it the creative middle way that will keep the organization balanced between accomplishing its day-to-day tasks and moving forward into its dreams. What enables the people to find the middle way is the architecture of the organization's processes – its minimal rules, flexible resources, and permeable boundaries.

Any organization that wants to learn and adapt and stay ahead in the future will strive to incorporate all four of these parameters into its operating philosophy. Only then will it be able to keep its balance and stay in rhythm with the unending dance of change.

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