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BUILDING SHARED UNDERSTANDING

A BRIEF WALK INTO THE FUTURE: SPECULATIONS ABOUT POST-INDUSTRIAL ORGANIZATIONS

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Editor's Note: The following article is based on Peter M. Senge's keynote talk at the eighth annual *Systems Thinking in Action*® Conference held this September in San Francisco, CA. Recordings of this session are available from Pegasus Communications, Inc.

As we look around the world at the fascinating variety of experiments aimed, in one way or another, at accelerating and deepening how organizations continually learn, adapt, and reinvent themselves, some interesting patterns are starting to emerge. At their heart, I believe these changes are gradually starting to shift very basic aspects of Industrial-Age organizations. They are doing so through working to undermine the core metaphor that has guided the Industrial Age—that of the machine.

The Machine Metaphor

The most significant guiding metaphor of the Industrial-Age organization has been the assembly line. In the 20th century, this image has led us to think of our organizations and, ultimately, of ourselves, as machines. In the 200 years of the Machine Age, we've made all aspects of our society conform to fit this metaphor. Think of the expressions that have become commonplace in our language: "It runs like clockwork," "The pace of change is accelerating," or "human resources." We've come to view humans as devices that we can program to behave in certain ways and that should be able to produce a given amount of output over a set period of time. Corporations are machines for making money. Schools are assembly lines for producing graduates—those who move more slowly than the assembly line are defined as "stupid" or "disabled." Managers' primary job is "control."

In his book, *The Living Company*, Arie de Geus poses the simple question, What would the implications be if we saw a company as a human community—a living being—rather than as a machine for making money? He goes on to explore that question from the perspective of governance, management, planning, financial control—a whole host of practical issues in any enterprise. In many organizations today, people are beginning to recognize the limits to the Machine-Age perspective. They come to accept that our traditional system of management, based on the purpose of maximizing the shareholders' return, is the most well-designed system imaginable to produce consistently mediocre results. Companies like VISA, Shell, Toyota, Scania, and Interface have found that the key to success isn't obsessively measuring costs and profits; it's nurturing the passion, imagination, creativeness, persistence, patience, caring, and desire to contribute of human beings. For, if you don't have those soft, unmeasurable things, you will never have an enterprise that can be highly successful. As we'll see below, these organizations are leading the way by nurturing change efforts and managing performance in a way that is more consistent with how nature works.

The Pitfalls of Quantitative Measurement

In the business world, we often hear statements like "People pay attention to what you measure." and "This is our target, here's how we'll know we're getting there."

One way that managers try to institute change is by focusing on particular measurable goals—"We have to build 100 more units a week." These quantitative targets then become the primary driver of change. Managers often attempt to control profits by measuring—and then

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controlling—costs.

But, interestingly, Toyota, the most successful automobile company in the world, has no standardized cost-control system used for centralized control. Toyota measures many things. They fully comply with regulations in the many countries in which they operate. But they do not use their cost measurements in ways that most other large corporations do. They measure for learning rather than controlling, for helping local people see how they are doing, and for continuous improvement, not for centralized control.

In their now-famous book, *Relevance Lost*, Tom Johnson and Robert Kaplan argued that cost accounting in business had been a primary reason for the deterioration of the American manufacturing base. Many companies were mistakenly deemed unprofitable because, using traditional cost-accounting methods, they misallocated overhead costs. As Johnson explains in a forthcoming book, written with Anders Bröms, *Profit Without Measure*, this example underscores the inherent difficulty in assessing the health of a complex system based on isolated measurements.

Still, people in business believe that measurement is important because it is the "hard stuff," the stuff that really counts. Learning, mental models, and so on are interesting and sometimes useful, but the hard, numerical results are what count. However, if you look at how so-called hard results are actually gathered and how the measures are defined, you will find that they are not derived from the laws of physics. These statistics and assessments are highly subjective, human inventions, often that very few people really understand.

Dr. Deming, who was a statistician, said that 97 percent of what matters cannot be measured. Unfortunately, management often seems to focus 97 percent of their attention on measurables, which means that we are spending most of our time on things that don't matter. In discussions with front-line managers, the subjectivity and inadequacy of measures becomes clear. You just ask people simple questions like, "How do you know a great team? What makes it successful?" People always say similar things—energy, vision, imagination, and excitement. But how can you measure any of those things? Nevertheless, we somehow regard the work of management as driving change and managing by what we can measure.

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"Nature Does Not Measure"

This focus on measurement started with the development of the Western scientific method—the belief that you need to measure separate aspects of a phenomenon in order to understand it. Galileo achieved the conceptual breakthrough—later elaborated by Descartes and Newton—that you can measure the speed or motion of an object separate from everything else about it. This finding had an extraordinary impact on the growth of Western science and eventually on our ideas about individuals and organizations—sometimes with unintended and undesirable consequences.

This penchant for quantifiable measures formed the foundation of the Industrial Revolution and the Machine Age. But the problem with the mechanistic view is that nature does not measure. Nowhere in nature will you find 98.6; that figure is a human abstraction. Knowing that your temperature is measured as 98.6 degrees Fahrenheit isn't useless, but it is a fragmented piece of information abstracted from an intricate web of connections and interrelationships.

Although precise measurements do not exist in nature, patterns do. Much of our perceptual apparatus is designed to give us the ability to perceive ratios—greater than and less than—not abstract numbers. These ratios make up the essence of all pattern information. What nature *does* do is provide us with the ability to recognize increasingly complex patterns. A lot of what we call intelligence is based on this capacity.

For the past five years, Tom Johnson has been studying Toyota and the Swedish company Scania, one of the world's biggest manufacturers of large trucks. For example, he has been investigating Scania's approach to product development. Over 30 years, they have developed a modularized approach to product design—working toward manufacturing all of their products from fewer and fewer different parts. They are continually expanding their product variety, while reducing the total number of parts they use. They claim they can now virtually custom-design a truck for any customer out of a relatively small set of standardized parts.

Scania measures many things that no other automotive manufacturer measures. For instance, they keep track of the total number of different parts used in all of their products. By reducing the diversity of parts they use, they spend significantly less on manufacturing than do their competitors. Scania engineers have developed a philosophy of measurement based on a vast array of ratio scales, rather than absolute quantities—if they use fewer parts per car, they reduce their costs. It's very intuitive, subtle, complex, and nonquantitative in the way we normally use the word quantitative. I would also argue that Scania's approach represents a model for the future of business. By generating ever greater variety from a small set of omni-potential building blocks, Scania's approach to product development and design matches how nature operates, just as do new ideas in governance.

New Trends in Governance

Some companies are beginning to find that the concentration of power in the hands of a few may not be the

best way to release creativity and maximize the generation of wealth. VISA International, one of the largest companies in the world in terms of market value, has a governance system that departs radically from the traditional hierarchical concentration of power. This organization is designed around one core driving premise—to distribute power and authority in order to release innovation and constant adaptability. VISA doesn't look like our stereotypical model of a company—it's a network of several thousand member organizations governed by elected boards whose powers are clearly specified in a written constitution. It has only 3,000 employees and is incorporated as a non-stock, member-owned for-profit business in the state of Delaware. Were it traded in public capital markets, its market value would exceed General Electric's by a factor of two and Microsoft's by a factor of six.

Shell Oil (the U.S. Shell operating company) represents another example of this trend. Up until several years ago, Shell was a classic authoritarian, hierarchical corporation based on traditional forms of governance. Like many great Industrial-Age companies, such as IBM, Eastman Kodak, and General Motors, Shell was extraordinarily successful. These organizations were benevolent and, by and large, paternalistic, concentrating power for the good of their people. They didn't just provide an honest day's pay for an honest day's work; lifetime employment was virtually guaranteed. Until, in the early 1990s, Shell experienced the worst financial crisis in its history.

Today, Shell Oil has only about 6,000 employees—not primarily because of downsizing, but because the company created a fundamentally different governance system. The business is now a network of enterprises. Many of the changes that began in the U.S. are starting to spread worldwide through the Royal-Dutch Shell group. Although Shell had no formal contact with VISA during its transition, the structure of these two organizations has striking similarities.

The core idea of what is happening at VISA and at Shell is one that we teach our kids in school and then promptly ignore in our institutions—the essence of all democratic theories of governance is that power flows from *ideas*, not from *people*. And when a human community takes the stand of genuine conviction around certain core principles, those principles then become the basis for how it governs itself. The founders of VISA took two years to articulate an eleven-word statement of purpose: "to create the world's premier system for the exchange of value." The purpose, along with a broader set of principles, then became the basis for VISA's constitution and articles of incorporation. Shell did something similar. They

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articulated a set of core premises that they believed in deeply. They then created autonomous, free-standing profit centers out of their downstream operations, their upstream operations, their chemical operations, and even their internal services. These businesses have their own internal boards, so they are truly autonomous, virtually free from interference by the corporate center. Before the recent decline in oil prices, Shell had gone from a little over a million dollars in profit to over a billion dollars in profit in four years, with a tremendous release of entrepreneurial energy.

I am not saying that hierarchy is disappearing—hierarchy is an organizing principle in nature. VISA and Shell have hierarchies. But their hierarchies do not concentrate power in the center in the same way the old Industrial-Age hierarchies did.

Rethinking Strategy: Beyond the "Bottleneck"

One main undercurrent of change in strategy is closely related to that occurring in governance. The power to set strategy has been one of the keys to our authoritarian hierarchical organizations. Top management traditionally sets strategy. But we've seen an increasing number of counter-examples. The idea for Intel to expand from memory chips to microprocessors came from middle management, not from the top. Canon, the photo company, got into photocopiers because their salespeople kept trying to repair the copiers in the photo shops they were calling on. They felt that Canon had the technology to make a much better product. The stories go on and on and on.

As strategy theorist Gary Hamel puts it, "The bottleneck is at the top of the bottle"; that is, managers in traditional command-and-control structures often stand in the way of innovation and fundamental shifts in strategy. His view is that the key to strategic inventiveness and adaptability of all enterprises today is to harness the best thinking of people throughout the organization.

The key to strategy that energizes and focuses an entire enterprise without constraining imagination lies in a deep sense of purposefulness. Ray Anderson, CEO of Interface, the world's largest manufacturer of industrial carpeting, says, "I have asked my people to join with me in inventing the next Industrial Revolution because the first Industrial Revolution is not sustainable." Anderson points out that the way that our present production systems operate, 97 percent of their material output ultimately ends up as waste. For this reason, he and his colleagues at Interface are pursuing a dramatic business vision: to never sell another carpet. Their aim is 100 percent recycling, to rent carpets that they will eventually take back, break down (to the molecular level if needed), and remake into new carpets.

The most pernicious idea that has permeated management in the past

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50 years is that the purpose of a business is to maximize shareholder investment (rather than that being a key consequence of a healthy business). People in many companies are starting to realize that pursuing a "noble purpose" is not just idealistic but pragmatic as well.

Leadership and Change

Fomenting these kinds of changes in measurement, governance, and strategy obviously requires leadership. However, we do not have a collectively recognized definition of leadership. In most corporations, when people talk about the leaders, they are referring to top management. But if leadership means top management, then the term itself is superfluous—it has no independent meaning. What if we considered leadership to be the capacity of a human community to create a new future? What if we saw leadership as inevitably connected to bringing forth a new reality and creating new possibilities? From that perspective, leadership doesn't have to do with hierarchies or distribution of decision-making authority. Instead, if a human community is reasonably successful at creating its future and influencing its destiny, then it has good leadership. And if it isn't, it doesn't.

We often hear the expression, "What we need around here are leaders who will drive change." Again, the idea of "driving change" reflects the machine metaphor. We think the people at the top will make this machine—our organization—change. But machines can only change when somebody from the outside causes them to change—they cannot change themselves. Most of our efforts to bring about change in organizations come from the outside—in new organizational structures, new designs, new bosses, new initiatives. We rearrange, we reorganize, we merge, we acquire. All of these different strategies for change are based on the premise that, if we arrange things differently, then things will get better.

But how do things grow in nature—do we drive them to grow? Do we say, "You must grow five inches a quarter or you're out of here!" No, gardeners succeed by attending to the host of conditions that could prevent growth from occurring. They ensure that the seeds have adequate nutrients in the soil, ample water, a suitable temperature, and, once the plant starts to poke above the surface, sunlight and space to spread its leaves. We all know how to support growth, and yet we typically operate in exactly the opposite ways in our organizations. We try to force growth instead of creating the conditions for genuine growth and change. This is not a passive process—if anything, it takes more work than commanding people to change, because we must acknowledge that, as human communities, organizations, businesses, schools, and hospitals create themselves.

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If we understood two aspects about how growth occurs in nature, we would never again try to drive our organizations to change. First, the seed and its medium together must have the potential to produce the sort of reinforcing processes that lead to growth. Those first little feelers come out from the seed and start to suck up water and nutrients, and then they extend further, suck in more water and nutrients, and so on. Nothing starts full size, and nothing matures in three steps. Nevertheless, in business, when we seek to expand or make major changes, we do pilots. We begin with one or two pilots, then we roll out the initiative to 180 facilities. Nature would do one or two pilots, which would lead to four pilots, which would then maybe lead to eight, then 16, and so on. Nature generates exponential growth. So, the next time you worry that change efforts in your organization don't seem to be going fast enough, remember that all growth in nature starts small.

Second, we need to understand the forces that keep our organizations from growing. Ninety percent of effective leadership is attending to the things that could prevent growth, such as fear, which stifles creativity, imagination, and commitment. Distrust stifles openness. How do we address and overcome fear and distrust? Systems of governance that concentrate power in the hands of a few and frustrate, discourage, and demoralize everyone else limit growth. Quantitative measurements that divert people's attention and lead to endless efforts to "make the numbers" stifle growth. To really learn and grow, we need to figure out how nature works and follow its lead.

Revolution

How is any of this going to happen? Such fundamental shifts as described above seem daunting, even overwhelming. But this perspective again reflects our machine-age thinking. Such changes are daunting if we think that someone has to figure them out and manage them. Ironically, the Industrial Revolution, which gave us the machine metaphor, illustrates a very different process at work in large-scale change.

Arguably the most significant change in human affairs of the last several hundred years, the Industrial Revolution wasn't planned or coordinated. It wasn't orchestrated by a central planning office, based on a grand strategy. This kind of profound revolution seems to organize around a few key ideas, not a carefully designed scheme. The Industrial Revolution unfolded as an emergent phenomenon. But it was not random. Gradually, it became more and more coherent. It was "organized," so to speak, by a guiding image—the image of the machine.

What might be the guiding image for "the next Industrial Revolution," as Ray Anderson calls it? Perhaps it will be the image of nature, of the natural system. Perhaps it will be

the picture of earth, the natural system that is our home.

If our way of living is not sustainable, then we are going to have to change some things. But although we may acknowledge this need to alter the way we live, we often claim that the change can't be achieved. This is a profound paradox: We recognize that human society can't function for long based on principles that aren't consistent with how nature works, but at the same time hold that it's not possible for us to change to become more in line with nature.

Most of us cannot conceive of our organizations being structured any other way. We still run our economy based on maximizing the output per labor, not output per natural resource, even though we're experiencing increasing environmental constraints and rising unemployment worldwide, social inequity, and injustice.

Creating more sustainable organizations means accepting that the way we organize our society is a human invention; it's not based on the laws of physics, but rather on a set of habits. Once we acknowledge this reality, we can begin to create deep, meaningful changes in the way we do business.

Suggested Further Reading

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