

# MIT Sloan

## Management Review

**Peter M. Senge & Goran Carstedt**

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# Innovating Our Way to the Next Industrial Revolution

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What's so new about the New Economy?

Our real future lies in building sustainable enterprises and an economic reality that connects industry, society and the environment.

**Peter M. Senge and Goran Carstedt**

Much of what is being said about the New Economy is not all that new. Waves of discontinuous technological change have occurred before in the industrial age, sparked by innovations such as the steam engine in the 18th century; railroads, steel, electrification and telecommunications in the 19th century; and auto and air transport, synthetic fibers and television in the first half of the 20th century. Each of those technologies led to what economist Joseph Schumpeter called “creative destruction,” in which old industries died and new ones were born. Far from signaling the end of the industrial era, these waves of disruptive technologies accelerated and extended it.

What would constitute the beginnings of a truly postindustrial age? Only fundamental shifts in how the economic system affects the larger systems within which it resides — namely, society and nature. In many ways, the industrial age has been an era of harvesting natural and social capital in order to create financial and productive capital. So far there is little evidence that the New Economy is changing that.

The industrial-age assault on natural capital continues. Vague hopes about “bits for atoms” and “demassification” are naive at best, echoes of talk about “paperless offices” 20 years ago. The rate of losing species has not slowed.

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Most New Economy products end up where Old Economy products do: in increasingly scarce landfills. Globalization is destroying the last remnants of stewardship for natural resources in industries such as forest products: Today, buy-and-sell decisions are executed by faceless agents living on the other side of the world from the people and ecosystems whose futures they decide. Moreover, New Economy growth stimulates related growth in Old Economy industries — along with the familiar pattern of suburban sprawl, pollution, loss of habitat and competition for natural resources.

The New Economy's effects on social capital are more complex but no less disturbing.<sup>1</sup> Industrial progress has tended to destroy cultural as well as biological diversity, despite the protests of marginalized groups like the Provençal farmers who oppose the globalization of food production. Likewise, although changes in traditional family and community structures have brought greater freedom for women and many ethnic groups, the past decade also has brought worldwide increases in divorce rates, single-parent families and "street" children. Global markets, capital flows and e-commerce open up new opportunities for emerging economies, but they also create new generations of technological haves and have-nots. According to the World Bank, the poorest quartile of humankind has seen its share of global income fall from 2.5% to 1.25% over the past 25 years. More immediately, eroding social capital manifests in the isolation, violence and frenzy of modern living. Individuals and small circles of friends carve out increasingly private lives amidst increasingly distrustful strangers, preferring to "bowl alone." We almost take for granted road rage, deaths of spectators at sporting matches and kids shooting kids at school.<sup>2</sup> The "24-7" job has become the norm in many industries, the latest step in subjugating our lives to the clock, a process begun with the mechanization of work at the outset of the industrial era.

Judged by its impact on natural and social capital, so far the New Economy looks more like the next wave of the industrial era than a truly postindustrial era. Why should we care? Because the basic development patterns of the industrial era are not sustainable. As U.S. National Academy of Sciences home secretary Peter Raven says, quoting the Wildlife Conservation Society's George Schaller, "We cannot afford another century like the last one." Plus, there are other possibilities.

### Corporate Heretics

"Is genuine progress still possible? Is development sustainable? Or is one strand of progress — industrialization — now doing such damage to the environment that the next generation won't have a world worth living in?"<sup>3</sup>

Those are not the words of the Sierra Club or Greenpeace, but of BP chairman John Browne. In 1997, Browne broke rank with the oil industry to declare, "There is now an effective consensus among the world's leading scientists and serious and well-informed people outside the scientific community that there is a discernible human influence on the climate." Moreover, he argued that "the time to consider the policy dimensions of climate change is not when the link between greenhouse gases and climate change is conclusively proven, but when the possibility cannot be discounted."<sup>4</sup>

Equally important, BP looks at the situation as a business opportunity. "There are good commercial reasons for being ahead of the pack when it comes to issues to do with the environment," says Browne. Since 1997, the company has become active in public forums on global climate, has begun to reduce emissions in exploration and production, has started to market cleaner fuels and has invested significantly in alternative sources of energy (such as photovoltaic power and hydrogen). All the while, Browne has led an effort to build a more performance-oriented culture, and company profits have been at an all-time high.

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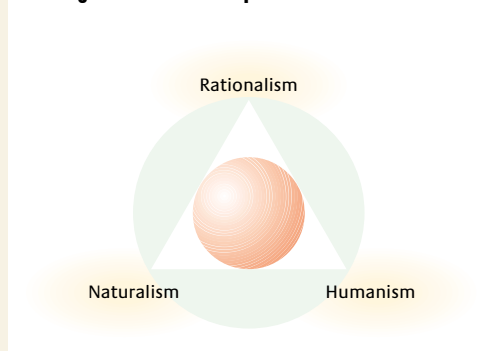
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## The Dimensions of Sustainability

Rationalism, the belief in reason, has dominated society throughout modern times. It remains the dominant perspective in business and education. Yet it has limits. It cannot explain the passion that motivates entrepreneurs committed to a new product idea nor the imagination of scientists testing an intuition. Nor does it explain why a quiet walk on a beach or a hike into the mountains may inspire both. These can only be understood by seeing how naturalism, humanism and rationalism infuse one another. Naturalism arises from our innate sense of being part of nature. Humanism arises from the rich interior life that connects reason, emotion and awareness — and ultimately allows us to connect with one another. Epochs in human history that have nurtured all three have stood out as golden ages.

### Three Worldviews Required for Building Sustainable Enterprises



BP is but one example of the shift in thinking that is becoming evident in many companies and industries. Appliance maker Electrolux uses water- and powder-based paints (rather than hazardous solvent-based paints), prioritizes the use of recycled materials, and has introduced the world's first family of refrigerators and freezers free of the chlorofluorocarbons that contribute to ozone depletion. In 1999, Toyota and Honda began selling hybrid cars that combine internal combustion and electric propulsion, perform comparably to competitors — and can achieve up to 70 miles per gallon today, with prospects for two to three times that mileage in a few years.<sup>5</sup> In 1998, Xerox introduced its first fully digitized copier, the Document Centre 265, which is more than 90% remanufacturable and 97% recyclable. The product has only about 200 parts, an order of magnitude less than its predecessor. Its sales have exceeded forecasts. According to Fortune, remanu-

facturing and waste reduction saved Xerox \$250 million in 1998. Some firms, such as Interface Inc., a \$1.3 billion manufacturer of commercial carpet tiles, which saved about \$140 million in sustainable waste reductions from 1995 to 1999, are even rethinking their basic business model. Interface's goal is to stop selling product altogether. Instead, it will provide floor-covering services, leasing products and later taking them back for 100% recycling. Assessing the environmental impact of the carpeting industry, chairman Ray Anderson says bluntly, "In the future, people like me will go to jail."<sup>6</sup>

These examples are all just initial steps, as each of these companies would readily admit. Ultimately, sustainability is a challenge to society as a whole. Nonetheless, business can play a legitimate leadership role as a catalyst for larger changes. We believe that a new environmentalism is emerging, driven by innovation, not regulation — radical new technologies, products, processes *and* business models. More and more businesses are recognizing the opportunities this creates. "Sustainability not only helps improve the world, but also energizes the company," says ABB's CEO Goran Lindahl.

The good news is that change through market-driven innovation is the type of change our society understands best. The problem is that much in today's business climate appears to run in the opposite direction. Short-term financial pressures, the free-agent work force, dramatic opportunities to start new companies and get rich quickly, often cynical mass media, and industrializing countries aspiring to catch up to the industrialized world's consumption standards — these hardly seem like the conditions for increasing stewardship of the earth.

The challenge today is to develop sustainable businesses that are compatible with the current economic reality. Innovative business models and products must work financially, or it won't matter how good they are ecologically and socially. To explore how to achieve this, the SoL Sustainability Consortium was formed to bring together like-minded corporate executives experienced in organizational learning who also see sustainability becoming a cornerstone of their business strategy.<sup>7</sup> Together, we are asking: Can organizations committed to sustainability work with the forces propelling most of the New Economy in the opposite direction? And, can organizational-learning principles and tools help in realizing the changes that this will require?

### Between Two Stories

The first reality confronting businesses that are serious about sustainability is ambiguity, starting with the question: What do we mean by *sustainability*? The ambiguity inherent in sustainability has deep cultural roots.

"We are in trouble just now because we do not have a good

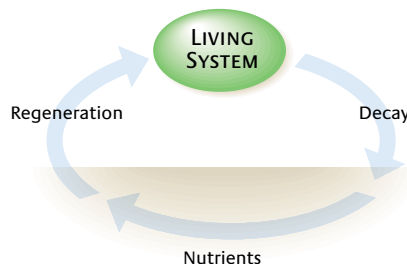
story,” says cultural historian Thomas Berry. “We are in between stories. The old story, the account of how the world came to be and how we fit into it...sustained us for a long period of time. It shaped our emotional attitudes, provided us with life purposes and energized our actions. It consecrated our suffering and integrated our knowledge. We awoke in the morning and knew where we were. We could answer the questions of our children.”<sup>8</sup> In a sense, sustainability requires letting go of the story of the supremacy of the human in nature, the story that the natural world exists as mere “resources” to serve human “progress.” But most of us grew up with this story, and it is still shared by the vast majority of modern society. It is not easy to let it go, especially when we are uncertain about what the new story will be. Businesses seeking sustainability can easily feel like a trapeze artist suspended in the air. They have let go of a secure worldview without knowing what they can hang on to.

Yet the dim outlines of a new story are emerging. At its root are two elements: a new picture of the universe and a new sense of human possibility. “We are just beginning to explore what it means to be part of a universe that is alive...not just cosmos but cosmogenesis,” in the words of Barry and physicist Brian Swimme. Moreover, the new universe story “carries with it a psychic-spiritual dimension as well as a physical-materialistic dimension. Otherwise, human consciousness emerges out of nowhere...an addendum [with] no real place in the story of the universe.”<sup>9</sup> Echoing Barry, Roger Saillant, former Ford executive and now Visteon vice president, says, “The new story will have to do with personal accountability...new communities in business and elsewhere based on knowing that there is no parent to take care of us and that we have a stewardship responsibility for future generations.” Saillant adds that gradually “a larger intelligence will emerge. Those special moments when we glimpse that our actions are informed by a larger whole will become more frequent.” Interface marketing vice president Joyce LaValle foresees a similar shift: “I think this will actually get easier as we proceed. But first we must go through a kind of eye of the needle.”

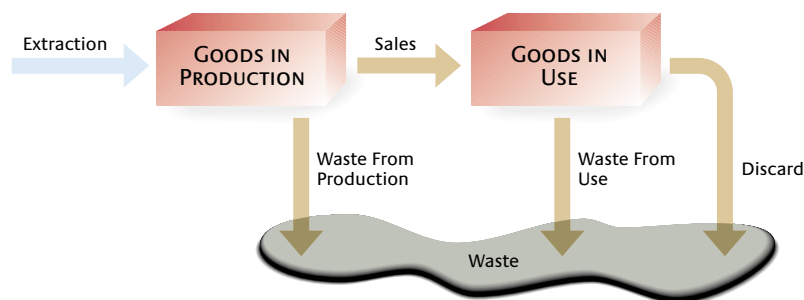
According to John Ehrenfeld, president of the International Society for Industrial Ecology, the challenge arises because sustainability “is a radical concept that stretches our current ideas about rationality. It has often been framed as environmentalists against business. But this generates polarization and misses the

## Why Industry Produces Waste

### LIVING SYSTEMS FOLLOW CYCLES



### INDUSTRIAL-AGE SYSTEMS DO NOT



three very different worldviews needed to move forward: rationalism, naturalism and humanism.” Only by embracing all three can we begin to understand what sustainability actually means. (See “The Dimensions of Sustainability.”)

## Naturalism: Biomimicry and the Logic of Natural Systems

The diverse innovations that created the first Industrial Revolution sprang from the same guiding image that inspired the preceding scientific revolution — the image of the machine. “My aim,” wrote 17th-century scientist Johannes Kepler, “is to show that the celestial machine is to be likened not to a divine organism but rather to a clockwork.”<sup>10</sup> The assembly line became the prototypical organization — with managers as controllers and workers operating in rigid routines, all coordinated by bells, whistles and production schedules. The assembly line was so successful it became the model for other types of organizations, including the 19th-century urban school system. Although the machine-age organization achieved previously unimaginable productivity, it also created a mechanized organizational environment that dehumanized and fragmented how people worked together.

If the machine inspired the industrial age, the image of the living system may inspire a genuine postindustrial age. This is what

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life-sciences writer Janine Benyus calls “biomimicry,” innovation inspired by understanding how living systems work. “What is consistent with life is sustainable,” says Benyus. For example, in nature there is no waste. All byproducts of one natural system are nutrients for another. Why should industrial systems be different? We would not ask engineers to build bridges that defy the laws of gravity nor chip designers to violate laws of physics. Why should we expect businesses to violate the law of zero waste?

All living systems follow cycles: produce, recycle, regenerate.

By contrast, industrial-age systems follow a linear flow of extract, produce, sell, use, discard — what “Ecology of Commerce” author Paul Hawken calls “take-make-waste.” (See “Why Industry Produces Waste,” p. 27.)

Indeed, the primary output of today’s production processes is waste. Across all industries, less than 10% of everything extracted from the earth (by weight) becomes usable products. The remaining 90% to 95% becomes waste from production.<sup>11</sup> Moreover, what is sold creates still more waste — from discard and from use (for example, from auto exhaust). So, while businesses obsess over labor and financial capital efficiency, we have created possibly the most inefficient system of production in human history.

What would industrial systems that conform to natural principles look like? First, they would be circular rather than linear, with significant reductions in all waste flows. (See “How Industry Can Reduce Waste.”) This implies three specific waste-reduction strategies: resource productivity, clean products, and remanufacturing, recycling and composting.<sup>12</sup>

**Strategy 1.** Resource productivity reduces waste from production through ecoefficient production technologies and the design of production processes in which wastes from one process become nutrients for another.

**Strategy 2.** Clean products (say, hybrid cars) reduce waste from goods in use through nonpolluting product technologies.

**Strategy 3.** Remanufacturing and recycling (creating “technical nutrients”) and designing more products that are biodegradable (creating “natural nutrients”) reduce waste from discard.

Architect William McDonough and chemist Michael Braungart summarize the three strategies with the simple dictum: “Waste equals food.”

Second, companies would invest in nature’s regenerative processes. They would do fewer things that compromise regeneration, such as paving over wetlands, and would invest some surpluses in restoring natural capital — for example, companies like Interface plant trees to match business miles traveled because increasing forest cover reduces greenhouse gases.

Third, following Buckminster Fuller’s dictum, companies would “learn how to live on our energy income [solar, wind, hydrogen] rather than off our principal [oil and gas].” Living on our income would not only reduce resource extraction, but also eliminate the side effects of using minerals, like auto emissions.

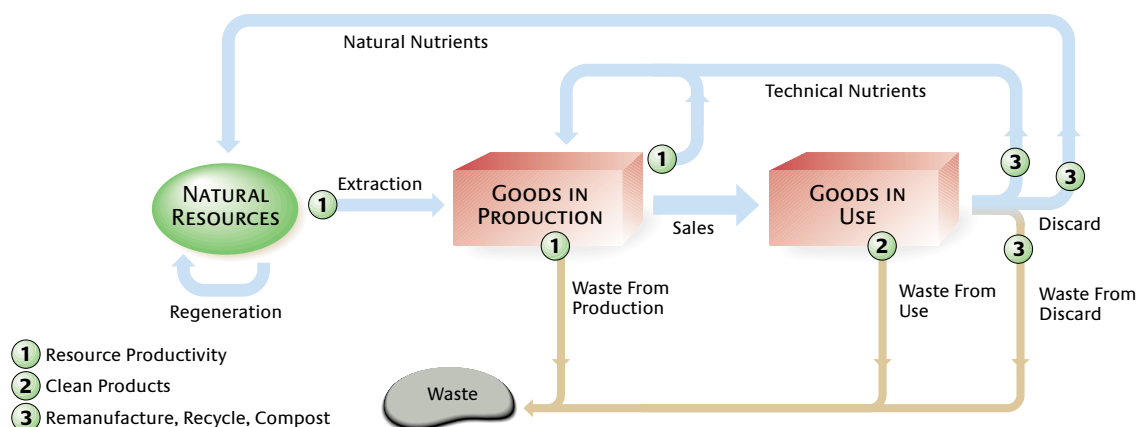
Thinking in more systemic terms may appear simple, but it raises important questions about current corporate environmentalism. For example, ecoefficiency has become a goal for companies worldwide, with many realizing significant cost savings from eliminating waste from production. That is good in some ways, but troubling in others. Thinking about the larger system shows that ecoefficiency innovations alone could actually worsen environmental stresses in the future.

Ecoefficiency innovations reduce waste from production, but this does not alter the number of products produced nor the waste generated from their use and discard. Indeed, most companies investing in cost-reducing ecoefficiency improvements are doing so with the aim of increased profits and growth. Moreover, there is no guarantee that increased economic growth from ecoefficiency will come in similarly ecoefficient ways. In today’s global capital markets, greater profits show up as investment capital that could easily be reinvested in old-style eco-inefficient industries.

To put it another way, nature does not care about the industrial system’s efficiency. Nature cares about its impact in *absolute terms*. If a vastly more ecoefficient industrial system grows much larger, it conceivably could generate more total waste and destroy more habitat and species than a smaller, less ecoefficient economy.

The answer is not necessarily zero growth. The implications of naturalism are more subtle: We can sustain growth only by reducing total material throughput and total accumulated waste. Ecoefficiency gains are laudable but dangerously incomplete, as is any strategy that fails to consider the industrial-nat-

## How Industry Can Reduce Waste: A Cyclic Industrial System That Mimics Nature



ural system as a whole. A systemic approach would reduce all sources of waste: from production, use and discard.

Managers' faith in ecoefficiency also illustrates the power of mental models. Industrial-age managerial practice has always been about increasing efficiency. Increased natural-resource productivity that translates directly into lower costs offers a compelling business case, one that does not challenge established thinking deeply. However, focusing on ecoefficiency may distract companies from pursuing radically different products and business models — changes that require shifts in mental models, not just shifting attention within existing mental models.

This is unlikely to happen without mastering the human dimensions of learning and change.

### Humanism: The Logic of Learning

"The prevailing system of management has destroyed our people," said total-quality pioneer W. Edwards Deming. "People are born with intrinsic motivation, self-esteem, dignity, curiosity to learn, joy in learning." Echoing Deming, anthropologist Edward Hall declares, "Humans are learning organisms *par excellence*. The drive to learn is as strong as the sexual drive — it begins earlier and lasts longer." The premise of work on learning organizations has been that thriving in today's knowledge-based marketplaces means reversing the destructiveness that Deming speaks about and cultivating people's drive to learn.

In fall 1999 the sustainability consortium was hosted by the Xerox "Lakes" team that had developed the Document Centre 265 copier. Already aware of the team's innovations in design for

remanufacture (more than 500 patents came from the Lakes project) and the product's success in the marketplace, we learned about how the team's zero-waste vision translated into a manufacturing facility with virtually no waste and eventually became embraced by many of the team's suppliers. But it still wasn't clear *how* the team had achieved those accomplishments.

Late in the day, Rhonda Staudt, a young engineer who was one of the lead designers, was talking about the team's innovations when she was interrupted by David Berdish, veteran of many organizational-learning projects at Ford. "Rhonda," Berdish said, "I understand what a great opportunity this was for you and how exciting it was. I work with engineers, and I know the excitement of pushing the technological envelope. But what I really want to know is why you did this. What I mean is: 'What was the stand you took and who were you taking that stand for?'"

Rhonda looked at David for a long time in silence and then, in front of many peers and a few superiors, began to cry. "I am a mom," she answered. We had all heard the Lakes motto, "Zero to landfill, for the sake of our children." But now we were in its presence. Roger Saillant of Visteon turned to Peter and whispered, "Seamlessness." Peter knew exactly what he meant: when what we do becomes inseparable from who we are.

We have all spent much of our lives in institutions that force us to be someone we are not. We commit ourselves to the company's agenda. We act professionally. After a while, we have lived so long in the house of mirrors that we mistake the image we are projecting for who we really are. The poet David Whyte quotes an AT&T manager who wrote, "Ten years ago, I turned my face



for a moment...and it became my life.”

Over the past decade, many companies have attempted to build learning organizations with little grasp of the depth of the changes required. They want to increase imagination and creativity without unleashing the passion that comes from personal vision. They seek to challenge established mental models without building real trust and openness. They espouse systems thinking, without realizing how threatening that can be to established “quick fix” management cultures. There is a difference between building more-sustainable enterprises because there is profit in it and because it is one’s life’s work. The journey ahead will require both.

If understanding natural systems establishes the guiding ideas for sustainability innovations, then learning provides the means to translate ideas into accomplishments. But, just as the logic of natural systems conflicts with take-make-waste industrial systems, so too does the logic of a learning culture conflict with traditional, control-oriented organizational cultures. To a controlling culture, a learning culture based on passion, curiosity and trust appears to be out of control. But, in fact, it is based on a different type of control. “We are not trying to eliminate control and discipline in our organizations,” says retired CEO William O’Brien, formerly with Hanover Insurance Co. “We are trying to substitute top-down discipline based on fear with self-discipline. This does not make life easier for people in organizations. It makes it more demanding — but also more exciting.”

These two tensions — between natural systems and industrial systems on the one hand and between learning and controlling on the other — may appear to make sustainable enterprises impossible. However, deeper currents in the New Economy could also cause those tensions to become immutable forces transforming traditional industrial-age management.

## A New Business Logic

Kevin Kelly, editor at large of Wired, observes that the “emerging new economic order...has three distinguishing characteristics. It is global. It favors intangibles — ideas, information and relationships. And it is intensely interlinked.” Kelly sees electronic networks generating new patterns of “organic behavior in a technological matrix.” But he suggests that the real changes are not ultimately about technology but communication. According to Kelly, in the world that is emerging, “Communication is the economy.”<sup>13</sup>

Today, perhaps the earth as a living system is communicating to us through increasingly turbulent weather patterns. Perhaps our frayed social structures are communicating to us through increasing acts of child violence. Are we listening? If the New Economy is revolutionizing communication, can it enable

## Organizational Learning’s Ten-Year March

To attain sustainability, executives should ponder Senge’s earlier writings and the experiences of those who have attempted to build learning organizations.

By Patrick L. Porter

Ten years ago Ford Motor Company executive Nick Zeniuk inherited the unenviable task of turning around the company’s storied Lincoln Continental franchise. Zeniuk, the business and launch leader for the Continental line, was asked to redesign the product, while cutting costs, improving quality and speeding time to market. Plagued by political infighting and disagreements among 1,000 engineers and managers, the billion-dollar project was four months behind schedule and failing on every measure.

Zeniuk’s transformation efforts might have ended then had he not learned about Peter Senge’s work on organizational learning. Zeniuk read Senge’s then new book, “The Fifth Discipline,” as well as a paper Senge had published at about the same time in MIT Sloan Management Review, “The Leader’s New Work: Building Learning Organizations” (fall 1990, pp. 7-23; reprint 3211). “I had an epiphany,” recalls Zeniuk. “Everything I needed was there.”

A year-long effort ensued in which Zeniuk, program manager Fred Simon and the leadership team practiced the now familiar techniques that foster organizational learning — systems thinking, personal mastery, surfacing and testing mental models, and building shared vision. Slowly, the ideas gained credence among rank-and-file engineers who began to use the learning tools in their work groups. “At first they thought it was a boondoggle,” says Zeniuk. “But then they noticed that we were beginning to behave differently. We had started asking them questions. We would stop and actually listen to them. We began to encourage them to do things in a different way.”

It took nearly three years, but Zeniuk and his colleagues completely transformed the troubled project. “We saved a couple of hundred million dollars in expenditures, including \$60 million of a \$92 million launch budget for the 1995 Lincoln,” says Zeniuk, who today travels the world teaching others about organizational learning. “We launched the car two weeks ahead of



schedule. And we were the first Ford program to produce a prototype that was almost product-ready. Many of the learning practices carried over to the highly successful 1998 Continental.”

Stories like Zeniuk’s abound. Since Senge’s 1990 writings on organizational learning, scores of companies, nonprofits, government agencies — even entire school districts — have used his learning tools to move away from industrial-age, command-and-control work environments to ones founded on individual commitment.

Senge is the first to admit that his work on organizational learning has many antecedents, including Jay Forrester’s groundbreaking work on systems dynamics, W. Edwards Deming’s half-century evocation of quality management, and the work of Chris Argyris on the impact of mental models on shared work. But it was Senge who pulled these and other threads together and connected them to organizational learning in a way that captured the imagination of business and government leaders.

What have we learned during the past decade about the value of organizational learning? Richard Teerlink, the recently retired chairman and CEO of Harley-Davidson, believes that it is the only way to build a lasting company that can adjust to changing times. “As Eric Hoffer, the longshoreman philosopher said, ‘In times of change it is the learners who will inherit the earth, while the dullards are beautifully equipped for a world that no longer exists,’ ” says Teerlink. “If you believe as I do that people are the only sustainable competitive advantage, then leaders have to view their responsibility differently. They must create an environment in which groups of people voluntarily come together around a shared vision and work toward shared goals. And that’s what Peter Senge’s learning tools enable you to do.”

Dave Meador, treasurer of DTE Energy in Detroit, Michigan, is using Senge’s learning tools to help the utility company profit from deregulation. “We’re going through a lot of change as the industry transforms,” says Meador. “These tools help us avoid getting stuck in an old mind-set. They help us stay open-minded to a changing marketplace, which enables us to build the internal capacity to learn and adapt.”

Meador first learned of Senge’s work a decade ago at Chrysler Corp., when he used organizational learning to engage line managers in activity-based costing. “We shifted from an environment of compliance to one of commit-

ment, in which people acted because they really believed it would help them accomplish their business objectives,” says Meador. “And I went from extreme frustration and fear of failure to really making a contribution and adding value to the enterprise.”

Today, Meador cannot imagine working for a company that fails to embrace organizational learning. “At DTE, we’re creating an environment in which people can raise questions and recommend alternative ideas, and do that in the spirit of learning and trying to grow the business. But we can engage many more people in solving complex issues, which avoids putting the burden of decision making on a handful of senior executives.”

If you were to take the time, you could find hundreds of stories like Dave Meador’s. Zeniuk says he knows dozens of teams that have transformed themselves with these methods. “But there aren’t a lot of stories about a whole company transforming itself into a learning organization,” he adds. “The immune system in big companies tends to resist this work. And the resistance is not necessarily conscious. It’s simply the inertia that’s naturally there. Ford continues to use these methods. Visteon does so too at very high levels. Shell is building a learning organization. And even the U.S. government is starting to use them. But I can’t tell you that a whole company has transformed itself using these tools.”

Perhaps someday a large company will institutionalize organizational learning to the point that it becomes part of the companywide cultural fabric. But many obstacles stand in the way, says Senge. Some groups master organizational learning only to backslide, ending up where they began when learning champions retire or move on. At other companies, short-term thinking makes managers and employees unwilling to tackle fundamental change.

Says Senge, “The number one impediment in this work is that it takes time, patience, perseverance and dedication. Most people in most organizations are not geared for that. Most management groups want things to happen quickly, because they’re planning to be in the job for only a short time and they tend to think that they’d better reap the benefits on their watch. This has been and continues to be the main reason that Deming’s work didn’t get applied and that our organizational-learning work still struggles.”

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deeper listening? If so, we may discern a new business logic emerging, one that starts with rethinking how firms create value and continues by redefining “customers,” “employees,” “suppliers” — and ultimately the company itself.

**From Things to the Value Provided by Things** “Production is increasingly not where value is created,” says Ting Ho, vice president of strategy for global-logistics Internet startup Zoho. “The traditional company produced something that it then had to sell. Today, we must understand a customer and serve a genuine need.”

At the heart of the industrial-age growth machine was a kind of mass hypnosis — convincing consumers that happiness meant owning a new thing. A new washing machine. A new computer. A new car. However, people do not want a hunk of steel in the driveway. They want the benefits it provides — whether they are tangible benefits like transport or intangible benefits like freedom or fun.

What does it mean to create new business models on the basis of that understanding? For Interface, it means shifting from selling carpets to providing floor-covering services, automatically taking back worn carpet tiles or replacing entire sections if a customer wants a different color. For Dow Chemical, it means leasing “dissolving services,” then reusing the solvents. For Carrier, the world’s leading manufacturer of air-conditioning equipment, it means renting cooling services rather than selling air conditioners. For IKEA, according to its published mission statement, it means providing services to help people “make a house or apartment into a home” rather than selling furniture. All these firms believe that “higher profits will come from providing better solutions rather than selling more equipment,” in the words of “Natural Capitalism” authors Amory and Hunter Lovins and Paul Hawken.

From the standpoint of sustainability, providing services rather than just selling products creates a potential new alignment between what is sound economically and what is sound environmentally. A company’s business model no longer requires designed-in obsolescence to push customers into buying new products. Instead, producers have an incentive to design for longevity, efficient servicing, improved functioning, and product take-back. Such design allows for maintaining relationships with customers by continually ensuring that products are providing the services that people desire — at the lowest cost to the provider.

The shift from “the value is in the stuff” to “the value is in the service the stuff provides” also may lead to a radical shift in the

concept of ownership. Swiss industry analyst Walter Stahel and chemist Braungart have proposed that, in the future, producers will own what they produce forever and therefore will have strong incentives to design products to be disassembled and remanufactured or recycled, whichever is more economical. Owning products forever would represent a powerful step toward changing companies’ attitudes about product discard.

Such ideas signal a radical shift in business models, one that will not come easily. It starts with how a company thinks of itself in relation to its customers: as a producer of things people buy or a provider of services through products made and remade? Marketing strategist Sandra Vandermerwe argues that such a view is essential to true customer focus, providing value for customers as well as obtaining value from customers.<sup>14</sup> It also shifts producers’ time horizons. As Volvo discovered years ago, when a company is only selling cars, its relationship with the customer ends with the purchase. When it is providing customer satisfaction, it just begins.

**From Producers and Consumers to Cocreators of Value** Focusing on the services provided by products also shifts the very meaning of “customer.” Customers are no longer passive; they are cocreators of value. Thirty years ago, futurist Alvin Toffler coined the term “prosumer,” people who actively participate in generating the value they derive from any product.<sup>15</sup> “Today, prosumers are everywhere,” says Kelly, “from restaurants where you assemble your own dinner to medical self-care arenas, where you serve as doctor and patient.” As Kelly says, the essence of prosumerism today is that “customers have a hand in the creation of the product.”<sup>16</sup>

Prosumerism is infiltrating diverse marketplaces, especially those where Internet technology is strong. One of Amazon.com’s most popular Web-site features is customer

reviews of books, CDs and other products. The five-year-old magazine Fast Company now rivals Business Week, Fortune and Forbes, partly because of its “Company of Friends,” a Web-site feature

that allows subscribers to get together to discuss common concerns, form support networks for projects, or tell the magazine their interests. “I can go to our Web site and determine which are the 10 most frequently forwarded articles,” says editor Alan Webber. “Our readers are no longer just an audience but cocreators of product.”

How does that shift to prosumers relate to sustainability? It starts with activist customers who think for themselves. And

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**Providing services rather than just selling products  
creates a potential new alignment between what is  
sound economically and what is sound environmentally.**

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**Most companies respond by trying to rework the old contract. They increase salary and benefits. They offer stock. They invent creative new perks. But in so doing, they miss entirely the change that might make the greatest difference: a mission worthy of people's commitment.**

activist customers are organizing themselves. "Thanks largely to the Internet," say C.K. Prahalad and V. Ramaswamy, "consumers have increasingly been engaging themselves in an active and explicit dialogue with manufacturers of products and services."<sup>17</sup> They add, "The market has become a forum." Or, as the popular "Cluetrain Manifesto" puts it, the market is becoming "a community of discourse."<sup>18</sup> With the inmates running the asylum, will they start to change the rules? What if people start talking to one another? What if they talk about the state of the world and how different types of products affect the quality of people's lives?

Leading Web-based companies, because they relate to their customers differently, also gain a different sense of what truly concerns customers. "Without a doubt, sustainability of our current lifestyle — personally and environmentally — matters to a lot of our readers," says Webber. "These were among the concerns that motivated us to start the magazine, and we've seen nothing to persuade us otherwise."

At this stage, it is speculation whether self-organizing networks of customers will unearth the deeper values essential to building sustainable societies. But it is no speculation that shifts in consumer behavior will be essential in creating such societies. One of the most significant concentrations of power in the industrial era has been the growth of a massive advertising industry applying psychological savvy to manipulate consumer preferences. "Soap operas" acquired their name because they were devised by Procter & Gamble and other consumer-goods companies to market soap. Could this be another form of centralized control that becomes history, the victim of the freer flow of information and interaction that allows people to know more and learn faster?

*Homo sapiens* has been around longer than *Homo consumer*. People still care deeply about the world their children will live in. Building sustainable enterprises will require tapping and harnessing that caring.

Many market-oriented companies sense just such a shift emerging in consumer preferences. For example, Nike has a host of recycled and recyclable products coming to market. For a company that sells the image of fitness, it is not surprising that Darcy Winslow, general manager of sustainable products and services,

says: "Corporations in the 21st century cannot be fit if we don't prioritize and neutralize our impact on the environment."

### **From Compliant Employees to Committed Members of Social Networks**

There are few companies today that do not struggle with the implications of the free-agent work force. The traditional employment contract based on good pay and benefits in exchange for loyalty is vanishing in many industries. Entrepreneurial opportunities are enticing, especially to young people. Most companies respond by trying to rework the old contract. They increase salary and benefits. They offer stock. They invent creative new perks. But in so doing, they miss entirely the change that might make the greatest difference: a mission worthy of people's commitment.

In 1991, IKEA faced the daunting challenge of extending its European business success to North America, the "graveyard of European retailers." It was clear from the outset that IKEA managers could not say, 'Here's how we do it in Sweden,' and expect much enthusiasm. Achieving strong returns for a distant corporate office was not enough. Being part of a proud and widely imitated European firm had limited meaning. It became clear that IKEA's North American management team had to find ways to truly engage people.

It turned out that North Americans, like Europeans, were concerned about the environment. Eventually, some 20,000 IKEA employees in North America and Europe participated voluntarily in a two-day training session on "The Natural Step," an intuitive introduction to the system conditions that must be met by a sustainable society. Not only did that engage people in selling the company's environmentally oriented products and creating related product and service ideas, it engaged them in working for IKEA. From 1990 through 1994, North American sales increased 300%.

The free-agent image connotes to many employers lack of commitment, people seeking a purely transactional relationship with a company. Perhaps the opposite is true. It may be a unique opportunity for organizations that truly value commitment. If we actually thought of people as free, we would have to approach them with respect, knowing that they can choose where to work. "It is amazing the commitment that people feel toward our focus on

sustainability and the environment,” says Vivienne Cox, BP vice president for marketing. “In a very tough business environment, it really matters to people who have many options in their lives.”

Most industrial-age companies wanted what *they* regarded as committed employees. Today, the definition of commitment is changing, and paternalism is giving way to more-adult relationships. “People stay with a firm, in many instances, because they see an alignment between their personal values and those they perceive the firm to be committed to,” says Ged Davis, who is Shell’s vice president for global business environment. If enterprises are not committed to anything beyond making money, why should managers be surprised that workers make transactional commitments?

Kelly also notes that in the competitive labor markets

found in fast-growing industries, people change companies but maintain their loyalty “to advancing technology or to the region.”<sup>19</sup> And to trusted colleagues. One key person may take groups of people from employer to employer like the Pied Piper.<sup>20</sup> Project teams form, un-form and then re-form like the teams of writers, actors and technical specialists that make movies. Yet larger social networks remain intact. Increasingly, such networks are the keepers of values and commitments and the subtle know-how that makes winners and losers. Longer-term relationships embedded in fluid but enduring social networks are a new phenomenon that most companies have not yet understood.

“Companies have felt that workers needed them more than they needed workers,” says Peter Drucker. “This is changing in ways that most companies still do not seem to grasp.”<sup>21</sup>

**From Separate Businesses to Ecological Communities** “The great benefits reaped by the New Economy in the coming decades,” says Kelly, “will be due in large part to exploring and exploiting the power of decentralized and autonomous networks,” which in many ways now resemble “an ecology of organisms, interlinked and coevolving, constantly in flux, deeply entangled, ever expanding at its edges.”

“In traditional businesses, everything was piecework,” says Zoho’s Ho. “Now we are all part of larger systems, and our success depends on understanding those systems.” For example, the traditional relationship between producer and supplier was neat and tidy. Producers wanted reliable supply at the lowest possible cost. Today, cost may be only one of several criteria that shape successful producer-supplier relationships. “Both as a supplier and with our suppliers, we are continually codesigning and co-innovating,” says Ho. “There is no other way to keep

pace with rapid changes and expanding knowledge.”

Paradoxically, the realization that all enterprises are part of complex, evolving systems imparts new meaning to relationships and trust. As Webber has said, “The New Economy starts with technology and ends with trust.”<sup>22</sup> People who are co-innovating must know each other and trust each other — in ways unnecessary in traditional relationships between providers and customers. That leads to the question: Can partners in complex supply networks co-innovate more-sustainable practices?

For example, Nike has programs in place with six of its material suppliers to collect 100% of their scrap and recycle it into the next round of products. The goal is to scale this up to all material suppliers. Similarly, all the big steps in design for remanufacture

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**Can organizations committed to sustainability work with the forces propelling most of the New Economy in the opposite direction?**

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require intense cooperation up and down supply chains. “If you don’t have suppliers hooked in, the whole thing will fail,” says former Lakes chief engineer John Elter. The Xerox team hosted “supplier symposiums” where “we taught suppliers what remanufacturing means and gave them the basic tools for remanufacture,” says Elter. Even more important, they assured suppliers that they would share in the cost savings — because used parts would go back to the suppliers for remanufacture. “The key is that suppliers participate in the economic benefit of remanufacturing because they don’t have to make everything new. This is a big deal. Plus, they are developing new expertise they can apply with other customers.”

Building the necessary alignment for product take-back among networks of wholesalers, retailers and customers is equally daunting. “Without doubt, one of the biggest challenges with our ‘Evergreen Service Contract’ [Interface’s model for selling floor-covering services rather than carpeting],” says chairman Ray Anderson, “is transforming mental models built up over generations” — such as those of purchasing departments in big companies whose incentives are based purely on cost of purchase, rather than on lifetime costs and aesthetic benefits.

Intense cooperative learning will never occur unless companies view their fates as linked. That is why the shift from seeing a world of suppliers and customers to one in which “we are all part of larger systems” is essential. Companies that do not recognize their interdependence with suppliers, distributors and customers will never build the trust needed to shift established mental models.

“Tennyson had it only half right when he said nature was ‘red in tooth and claw,’” writes Janine Benyus. “In mature ecosystems, cooperation seems as important as competition. [Species cooper-

ate] in order to diversify and...to fully use the habitat.” Companies that see one another only as competitors may likewise find their habitat disappearing as the world around them changes.

**From Closed Doors to Transparency** The world in which key corporate decisions could be made behind closed doors is disappearing. In 1995, Shell encountered a dramatic and unexpected reaction to its plans to sink in the North Sea its Brent Spar oil platform, which was approaching the end of its productive lifetime. Despite the fact that the company had gone through a three-year process to identify the best environmental option and had the concurrence of the U.K. government, the situation became a public-relations nightmare when other governments objected to the plan. Shell had failed to realize that its private decision had become a public one, a harsh lesson learned by many other companies, from Nike to Ford to Microsoft, in recent years.

There is an old saying in the field of ecology: “There is no ‘away.’” The old world of corporate inner sanctums isolated managers from many of their decisions’ social and environmental consequences, distant in time and space from those who made the decisions. As transparency increases, these feedback loops are closing, and consequences must be faced. In this sense, transparency is a powerful ally to naturalism and may drive many of the changes needed to implement more-naturalistic, circular business processes and models.

Growing transparency already has led to the inclusion of voices traditionally outside the inner circle. Several years ago, Greenpeace objected to the chlorides IKEA used in the printing of catalogs. Few in the industry thought there was any cost-effective alternative. But working together, Greenpeace and IKEA found a Finnish printing company that could produce catalogs without chlorides. IKEA presented its chloride-free catalog at an environmental conference in Washington and set a new industry standard. This experience showed that Greenpeace and IKEA could work together productively by focusing on tangible problems and by believing that breakthroughs were possible. Such trust can only be built over time.

Growing transparency is also leading to new accounting and performance-management practices. Shell and others are moving toward “triple-bottom-line” accounting — assessing economic, environmental and social performance in a balanced way. The Global Reporting Initiative provides practical guidelines for such changes. “Adopting GRI guidelines and triple-bottom-line practices is an enormously difficult step,” says consultant John Elkington. “But companies like Shell, Ford and many oth-

ers feel they must do this if they want to lead, rather than just react to change.”

But the path toward broader accountability is fraught with perils. Last spring, Ford’s first “Corporate Citizenship Report,” based loosely on GRI guidelines, was greeted with as much cynicism as appreciation. The New York Times ignored most of the report (which included lengthy sections on reducing emissions and radical redesign of manufacturing processes) to announce that “Ford Is Conceding SUV Drawbacks.”<sup>23</sup> The article focused on a three-page section of the 98-page report that discussed the

dilemma of having a profitable product line that had environmental and safety problems. The Wall Street Journal was more personal, suggesting that chairman William Clay Ford

was a hypocrite for both making and criticizing SUVs, a “guilt-ridden rich kid” who should either embrace his customers’ preferences or leave the business to those who do.<sup>24</sup>

Ultimately, transparency is about awareness. With increasing awareness will come pressures for greater accountability for social and natural capital as well as financial capital. Gradually, this will lead to innovations in the larger social context as well.

It is impossible to predict the range of social innovations that growing transparency will ultimately foster. Perhaps new collaborative action-research networks will create the right climate of objectivity and compassion, tough standards and fair reporting combined with a spirit of learning together. (See “The New Competencies,” p. 36.) Perhaps more-participative media, building on successful experiments such as those of Fast Company, will enable new levels of collaborative innovation. It may even be time to question the traditional limited-liability status of corporations, which uniquely favors owners of financial capital. Today’s world of abundant financial capital and limited natural and social capital differs profoundly from the world of a century ago, when there was a need to protect individual investors. “In a world where learning and knowledge generation are the basis for corporate survival and wealth creation, managers must see a company as a living being, a human community,” says writer and former Shell executive Arie de Geus. “Yet, today’s managers inherit a very different worldview, focused on the optimism of financial capital. Is it not inconsistent to emphasize knowledge creation, on the one hand, and then treat a company as a machine for producing money, which is owned by its financial investors on the other?”

Perhaps when we are able to rediscover “company” (from the Latin *com-panis*, sharing of bread) as “living community,” we

**The world in which key corporate decisions could be made behind closed doors is disappearing.**



## New Competencies

The challenges of building sustainable enterprises describe a strange new world few firms are equipped to understand, let alone navigate. The members of the SoL Sustainability Consortium came together believing that their preceding work with organizational-learning principles and tools might make a difference in meeting these challenges.

Today, Consortium members are engaged in projects on sustainability frameworks (from which the ideas on naturalism and humanism came), new energy sources, implementing new business models, and nurturing new leadership networks embodying competencies that build upon the leadership skills for learning organizations (published in the MIT Sloan Management Review 10 years ago\*):

- building shared vision,
- surfacing and testing mental models, and
- systems thinking.

Research on mental models and dialogue<sup>†</sup> needs to be scaled up to allow strategic conversations that involve hundreds and even thousands of people. As Juanita Brown, founder of Whole Systems Associates, says, “The questions we are facing will require members of organizations to learn together at an unprecedented rate, often on a global scale.” Starting in 1999, Brown’s colleagues Bo Gyllenpalm and David Isaacs helped several large Swedish organizations convene conversations on “Infocom (information and communications services) and the Environment.” Convening and hosting such large-scale conversations require particular methodologies. But Brown believes that the key lies in “questions that challenge current experiences and assumptions, while evoking new possibilities for collective discovery.” For example, “How can infocom technology and services support the evolution of a sustainable and renewable environment?”

Most attempts at large-scale change fail because otherwise competent leaders do not understand the complex forces maintaining the status quo. Getting a CEO to support sustainability is not enough. Bottom-up environmental innovations also often fail. Leaders at all levels must understand the multiple “balancing processes” that, on the one hand, make any complex organization viable, but on the other, consistently defeat large-scale change. Leadership strategies must address these balancing forces. For example: relevance (people asking, “What

does sustainability have to do with my job?”), believers vs. nonbelievers (the polarization that passionate advocates for social and environmental causes can create), the tyranny of established metrics (most current metrics reflect take-make-waste mental models, and new metrics aimed at life-cycle costs are useless without changes in mental models), and purpose (if the company’s core purpose is perceived as making money, people’s commitment may be below the threshold required to lead significant change).<sup>‡</sup>

All meaningful work on shared vision rests on distinguishing “creating” from “problem solving.” Problem solving seeks to make things we don’t like go away.

Creating seeks to make things we care about come into being. This is a vital distinction for innovation. When problem solving dominates an organizational culture, life is about survival rather than about bringing into reality things that people care about. Recent research on leadership among entrepreneurs and scientists reveals a particular creative capacity — sensing and actualizing emerging futures. Successful leaders see the world as “open, dynamic, interconnected and full of possibilities.”<sup>§</sup> They are both committed and “in a state of surrender,” as cognitive scientist Francisco Varela expresses it.

Economist W. Brian Arthur adds

that “cognizing” in business today follows three stages:

- “Observe, observe, observe: become one with the world.”
- “Reflect and retreat: listen from the inner place where knowing comes to the surface.”
- “Act in an instant: incubate and bring forth the new into reality.”

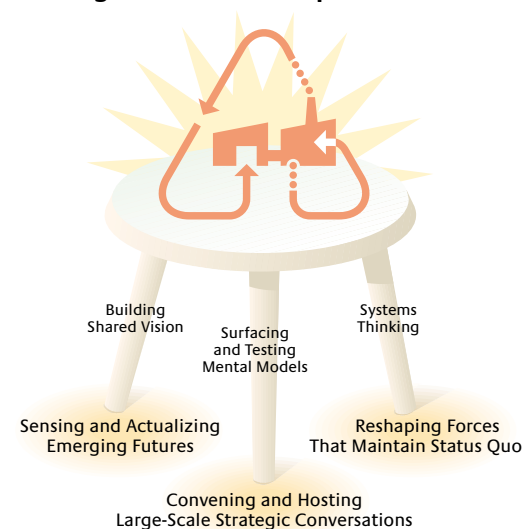
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### Core Learning Competencies for Building Sustainable Enterprises



will also rediscover its place within the larger community of living systems where it rightfully resides.

## The Logic of Revolutions

The New Economy is both not new and new. It continues industrial-age patterns, yet it also may hold the seeds for a truly postindustrial world. As such, it brings us to a crossroads. We can either continue moving ever more rapidly in a direction that cannot be sustained, or we can change. Perhaps, no time in history has afforded greater possibilities for a collective change in direction.

“Creative engineers understand the role of constraints,” says Elter of his Lakes experience. “Design engineers always deal with constraints: time, weight, operability. These are all real. The extraordinary creativity of [our] team had its source in recognizing a different constraint — the constraint of nature, to produce no waste. Zero to landfill is an uplifting constraint. It’s worth going after. It’s not manmade.” Constraint and creativity are always connected. No artist paints on an infinite canvas. The artist understands that rather than just being limits, constraints can be freeing, especially when those constraints that have gen-

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## ADDITIONAL RESOURCES

Several authors have made compelling business cases for environmental stewardship in recent years, including Paul Hawken, “The Ecology of Commerce” (HarperBusiness, 1993); Amory and Hunter Lovins, along with Hawken, “Natural Capitalism” (Little Brown and Co., 1999); and William McDonough and Michael Braungart, “The Next Industrial Revolution” (Atlantic Monthly, October 1998, 82-92; [www.theatlantic.com/issues/98oct/industry.htm](http://www.theatlantic.com/issues/98oct/industry.htm)). For radical ideas on performance management, John Elkington explains triple-bottom-line practices in “Cannibals With Forks” (Oxford: Capstone, 1997), while accounting theorist Tom Johnson, coinventor of activity-based costing, argues in “Profit Beyond Measure” (Free Press, 2000) that companies with outstanding performance, like Toyota, mimic nature in their accounting practices, focusing on complex patterns rather than fragmented metrics. Janine Benyus’ “Biomimicry: Innovation Inspired by Nature” (William Morrow, 1998) offers a different slant on naturalism, suggesting that technologies in harmony with nature will arise when biologists work with product designers. Lastly, Arie de Geus’ “The Living Company” (Harvard Business School Press, 1997) and Dee Hock’s “Birth of the Chaordic Age” (Berrett-Koehler, 1999) examine planning, leading and governing when organizations are seen as living human communities.

To support those interested in building more-sustainable enterprises,

uine meaning are recognized. What if product and business designers everywhere recognized that their constraints came from living systems? What if they adhered to the simple dictums: waste equals food; support nature’s regenerative processes; live off energy income, not principal; and, borrowing from Elter’s team, do it for the children. As occurred with the Lakes engineers, might this not free everyone’s creativity in previously unimaginable ways?

Such rethinking will not happen all at once. It will not arise from any central authority. It will come from everywhere and nowhere in particular. The first Industrial Revolution, according to author Daniel Quinn, was “the product of a million small beginnings. [It] didn’t proceed according to any theoretical design [and] was not a utopian undertaking.”<sup>25</sup> Likewise, the next Industrial Revolution, if it is to happen, will have no grand plan and no one in charge. It will advance, in Quinn’s words, on the basis of “an outpouring of human creativity,” innovations not just in the technological but in the human landscape as well — the only way a new story can arise.

there are several Web sites focused on environmental education and planning (The Natural Step at [www.naturalstep.org](http://www.naturalstep.org)), natural capitalism and hybrid cars (the Rocky Mountain Institute at [www.rmi.org](http://www.rmi.org)), ecoefficiency (the World Business Council for Sustainable Development at [WBCSD.org](http://WBCSD.org)), triple-bottom-line reporting ([www.sustainability.co.uk](http://www.sustainability.co.uk) and [www.globalreporting.org](http://www.globalreporting.org)) and organizational learning (SoL at [www.SoLonline.org](http://www.SoLonline.org)).

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