

Leading at the Edge

How Leaders Influence Complex Systems

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At the cusp of the twenty-first century, we are experiencing unprecedented structural shifts in our economy brought about by the revolutions in computation and communication technologies. Today, the world is linked in ways that

would have been unimaginable just a decade ago. A new kind of economy is emerging—the connected economy, a shift that rivals the onset of the Industrial Revolution in its impact on society and the way commerce is transacted. And with this shift, the business world finds itself in the throes of revolutionary change. Where once companies imagined themselves to be masters of their own destiny, in a connected economy they are interdependent players in a fluid and vacillating economic web, where their fate, more than ever, is affected by the behavior of other members.

The change is not only real, it is also accelerating, driven by rapid technological innovation, the globalization of business, and, not least, the arrival of the internet and the new domain of internet commerce. Change—the pace of innovation, forming and reforming alliances among companies, corporate mergers, emerging markets, all driven by this connected economy—creates an environment of urgency in the workplace and a need to respond, adapt, and anticipate that is unprecedented in the world of business. Consequently, business leaders are preoccupied with change itself: how to generate it, how to respond to it, how to avoid being overcome by it. But, as Intel's Andy Grove indicates, change is not exactly a welcome guest in business: "With all the rhetoric about change, the fact is that we managers hate change, especially when it involves us."

During these changing times, leaders and managers are finding many of their background assumptions and time-honored business models inadequate to help them understand what is going on, let alone how to deal with it. Where managers once operated with a Taylor-esque, mechanistic model of their world, which was predicated on linear thinking, control, and predictability, they now find themselves struggling with something more nonlinear, where limited control and a restricted ability to predict outcomes are the order of the day. Consequently, many managers and executive professionals are uneasy and eagerly seeking new ways of dealing with change in their organizations, as the current \$17 billion-a-year management consulting business would indicate.

In the new connected economy, the limitations of the mechanistic model are becoming starkly apparent and a different mode of thinking is required. Leaders cannot afford to carry on with management methods that were developed in a different age and for a different type of business environment.

CHANGE AND COMPLEXITY SCIENCE

Science, too, is in the midst of an important Kuhnian shift that parallels what is happening in business; or, more accurately, is the vanguard of that change. Where once the natural world was viewed as linear and mechanistic, where simple cause-and-effect solutions were expected to explain the complex phenomena of nature, scientists now realize that most of the world is nonlinear and organic, characterized by uncertainty and unpredictability. In retrospect, it is amazing how far we have been able to take the linear model for understanding the world, both in science and in business.

Complexity science is still in its infancy, and is multifaceted, reflecting different avenues of study. The avenue most relevant to understanding organizational dynamics within companies and the web of economic activity among them is the study of complex adaptive systems. Simply defined, complex adaptive systems are composed of a diversity of agents that interact with each other, mutually affect each other, and in so doing generate novel behavior for the system as a whole. However, the pattern of behavior we see in these systems is not constant, because when a system's environment changes, so does the behavior of its agents, and, as a result, the behavior of the system as a whole. In other words, the system is constantly adapting to the conditions around it. Over time, it evolves through ceaseless adaptation.

Complexity scientists are learning about these dynamics of complex systems principally through computer models, but also through observation of the natural world. Complex adaptive systems are everywhere: ecosystems, the brain, ant colonies, stock markets, just to name a few. The point is that business organizations are also complex adaptive systems. This means that what complexity scientists are learning about natural systems has the potential to illuminate the fundamental dynamics of business organizations.

If complexity scientists are right in arguing that complex adaptive systems of all kinds—in the natural world and the world of business—share fundamental properties and processes, then the science offers something that most management theories do not. The argument here is that most management theories are not really theories at all, but rather techniques for managing in a certain way.

Complexity science is still nascent as a theory, but it has determined certain fundamental processes and characteristics of complex adaptive systems. In other words, when we speak of businesses as complex adaptive systems, we are not speaking of a metaphor or a technique. Rather, we are saying that by understanding the characteristics of complex adaptive systems, we can find a way to understand and work with the deep nature—that is, the fundamental processes—of organizations.

The significance of understanding the deep nature of organizations is that if companies are to survive in a fast-changing business environment, they need to be able to produce on-going innovation, to be continually adapting and anticipating, and to be engaged in continual evolution. Thus, companies are better able to work with change in optimal ways if they understand their organizations as complex adaptive systems and the processes that underline these systems.

A NATURALISTIC STUDY OF BUSINESSES AS COMPLEX ADAPTIVE SYSTEMS

In this context of change and at this juxtaposition of different ways of thinking about business, we conducted a naturalistic study, which involved interviewing people in a dozen companies, of different sizes and from different business sectors in the US and UK. Among those companies are DuPont—a chemical plant, with about 1,000 people; The Industrial Society—the largest nonprofit consulting organization in Europe, with 300 people; VeriFone—an American high-tech company with about 3,000 people acquired by Hewlett-Packard as a subsidiary; St.

Luke's Advertising Agency, with 100 people; Muhlenberg Medical Center; Babel's Paint and Decorating Store, with 35 people; life sciences company Monsanto, with 22,000 people. Some we interviewed several times, for a longitudinal perspective; often we did a cross-section of interviews, from CEO to secretary; a few times we spoke solely to the CEO.

We were interested in companies that were following principles from the new science of complexity in running their business. All we had to begin with was an understanding that businesses are complex adaptive systems, and some fundamental principles that underlie such systems. Most of the companies we talked to were using complexity principles explicitly to guide how they operated; others reached this place intuitively. It didn't matter which was the case for our work. We found these organizations mostly by word of mouth.

Companies whose management is guided by principles of complexity science are organizationally flat, have fewer levels of hierarchy, and promote open and plentiful communication and diversity. Complexity science argues that these properties enhance a system's capacity for adaptability, thus, in the case of business, giving them a cutting edge in these fast-changing times. The companies we chose for our study therefore shared the properties of being organizationally flat and having rich, open communication. But we had no idea what we would find in the realms of organizational dynamics, leadership and management style, and people's work experience.

What we did discover was a style of leadership that unleashed enormous human potential in these organizations. We saw similar patterns among the leaders—CEOs, executive directors, chairmen, senior executives, managers—in how they worked with their business as a complex system. Because these patterns in leadership style emerged in companies of very different sizes and in very different economic sectors, we infer that we are seeing something fundamental in how to lead change in organizations so that it is more adaptable, and how to cultivate a culture in the workplace that is better able to embrace and create change. What follows is a way of leading change—an organic approach that is informed by complexity principles—and a style of leadership, paradoxical leadership that cultivates conditions for constructive change in organizations.

ORGANIC APPROACH FOR CHANGE: A DIFFERENT WAY OF DOING

Because the dynamics of complex adaptive systems are themselves complex and largely unpredictable, accepting businesses as being such systems requires a different mindset that departs from a mechanistic approach. Organizations, like complex adaptive systems, cannot be controlled or predicted to the degree that the mechanistic perspective implies, but their direction and how they evolve can be influenced. The leaders we spoke to recognized that a mechanistic view of business had a very limited life in a global and connected economy, and that a holistic and biological approach was more appropriate for changing times. This perspective required an approach to an organization that was more organic.

What is an organic approach and how is it enacted? An organic approach addresses the complex and interdependent elements and relations of a system as they function in the whole. Addressing the interdependent elements and relations meant focusing on people in the organization and focusing on human processes as part of a system that is changeable.

Leaders worked organically with their organization by entering the existing processes at work; that is, working with people from where they were rather than imposing where they should be. As Dick Knowles of DuPont stated, as a leader it meant "stepping

into the process and becoming personally at risk in the process,” which in turn created a context for risk within the organization. Stepping into the process meant finding out what was really going on and how things were really being done. It meant breaking through what Hatim Tyabji of VeriFone called a “veneer of denial.”

In other words, an organic approach is not a spectator sport: at many of these companies before implementing change, people and processes were largely in a place of stasis or rigidity, command and control oriented, and set in patterns that were maladaptive or nonfunctioning. It often meant facing what was most feared and dreaded. Industrial Society chief executive Tony Morgan began by dealing with directors who basically weren’t talking to each other as the Society rapidly headed toward bankruptcy. For CEO Bob Shapiro at Monsanto, the challenge was seeing rocky times ahead and creating radical change in a very proud and successful institution. CEO Carol Hassan of the UK’s Watford City Council had to face what she called a “traumatized organization,” where there was little dialog and lines of communication did not exist on several levels within and outside the organization. All the leaders admitted that working organically with the organization was one of the toughest jobs they had ever had. As Tony Morgan told us, “If you work with boxes, it’s easy, because it’s not about people.”

Working organically with an organization involves not only focusing on people and work processes, but also seeing the collective and the organization in its wholeness as a living organism. As Bob Shapiro told us, his specialization was generalization. Leaders generally felt that it was their responsibility to enrich connections in the system—that is, to forge new connections where none existed or improve existing connections; and to identify the disconnections—that is, the blindnesses, denials, and limitations that constricted the organization’s ability to change and adapt, and then systematically and simultaneously to address them. As Bob Shapiro stated, “Dysfunction in an organization fits neatly ... in order to change you have to take the whole system at once and get everyone working on it.” To get everyone working on it required leaders to communicate extensively and repeatedly on what the company was all about, and on their collective role in the world.

Although we have talked about businesses being part of larger economic webs and complex systems, we will focus in this article on how internal change occurred in these organizations. There were several common elements among these leaders in how they engaged the system as a whole and the people in it, which in turn generated change and a more dynamic and organic way of working. All the leaders saw the workplace as an experiment in progress. In order to stimulate self-organization and a new way of working, they needed to develop trust, which led them counterintuitively to create chaos in varying degrees, which broke down the existing structures. Working with nonlinear processes led them to see relationships as a new bottom line. Their simple rules from which complexity emerged were values creating a strong ethical foundation that provided continuity in times of uncertainty and flux. These values cultivated conditions for a culture of care and connection to emerge that made the organizations more adaptable.

EXPERIMENT IN PROGRESS

Generally, in times of change flexibility is required. This means lots of experimentation to find what works and what doesn’t, to discover new ways. In many of these organizations, the leaders had to do something differently in order to survive. The question they faced was how to change existing structures of the organization to provide greater capacity to adapt and to embrace change. None of the leaders had a design, but rather they proceeded blindly: relying on their intuition, guided by a consciousness that there had to be a better way of working, and armed with a few complexity principles. The workplace itself became an experiment in progress for them, which meant embracing the organization as an unfolding, unpredictable complex system. Not knowing where the experiment would lead them, the leaders made it explicit to their people that together they were embarking on an uncertain journey. As leaders, they displayed a strength of conviction in embracing a new direction but accepting that this reality was not easy for any of them, as Tony Morgan at Industrial Society said, “If you’re really going to go for it, you’re going to be on a rollercoaster ride. You never know what big dips will be coming.”

The commitment to change and to take risks was very evident at St. Luke’s advertising agency, and symbolic for all the organizations with which we worked. CEO Andy Law drew a line across the floor and asked those who wanted to join in the uncertain journey to step over the line. By doing so, they collectively committed to an experiment in progress.

PUSHING TO THE EDGE OF CHAOS

Rather than a concerted effort to change the hierarchy and structure deliberately, the leaders pushed their organizations into a degree of chaos by creating uncertainty and ambiguity. Andy Grove, CEO of Intel, recognizes the necessity of this when he says, “The old order won’t give way to the new without a phase of experimentation and chaos in between.” From this chaos a new structure and another way of working could and did emerge. At Monsanto, CEO Bob Shapiro had to make his organization unsuccessful in the way it functioned in order for internal patterns to break down. He overloaded the business with impossible demands, so that people had to discover for themselves a new way of working together; that is, by self-organizing around the most immediate problems.

At the Industrial Society, CEO Tony Morgan created chaos by encouraging people to take risks. He engaged his people in nonlinear thinking by having them reach for what seemed to be unattainable goals, even though they had no idea of how to get

there. Trying crazy things became no longer crazy in an unpredictable and nonlinear context. They were, as he said, “seeking those nonlinear results.” Carol Hassan pushed Watford City Council to chaos by creating an environment of uncertainty: by not taking control and not providing answers. Instead, she encouraged and supported people to be more participatory in the creation of a new way of working. Andy Law of St. Luke’s created disorder by eliminating assigned desks so that people found themselves in a new physical configuration every day.

Each of these organizations had crossed a line where it was no longer business as usual but rather an environment of surprise. All the leaders disrupted existing patterns and thereby created an opportunity for something new to emerge out of the existing issues. They let the issues organize the structure rather than a structure organize the issues.

Uncertain ground was difficult for most people and there were inevitably those who left, what CEO John Kopicki of Muhlenberg Medical Center called “culture casualties.” But largely, the people who were part of the constricted system became the same people to change it into an open and thriving system.

RELATIONSHIPS: ENGAGING NONLINEAR PROCESSES

Most organizations are founded on a linear structure of hierarchy and bureaucracy, which impedes agility and flexibility, qualities so necessary in times of unprecedented change. The most effective way to change a linear structure and engage nonlinear processes is to attend to the nonlinear world of relationships. As Tony Morgan told us, “Relationships are the most important thing in a complex system. If you don’t have strong relationships, none of this works.” And as senior manager Patrick Burns of the Industrial Society noted, the root of organizational problems is often “abysmal relationships,” which create negative energy and limit what the organization as a whole can achieve.

We found in our work that this new science leads to a new theory of business that places relationships—how people interact with each other, the kinds of relationships they form—in dramatic relief. In a linear world, things may exist independently of each other, and when they interact, they do so in simple, predictable ways. In a nonlinear, dynamic world, everything exists only in relationship to everything else, and the interactions among agents in the system lead to complex, unpredictable outcomes.

We can restate this in the language of complexity science as follows: In complex adaptive systems, agents interact, and when they have a mutual effect on one another something novel emerges. Anything that enhances these interactions will enhance the potential creativity and adaptability of the system. In human organizations, this translates into agents as people, and interactions with mutual effect as being relationships that are grounded in a sense of mutuality: people have mutual respect, and mutual influence and impact on each other. Mutuality lends itself to an appreciation of the wholeness of the other person, which increases the range of responses and possibilities between people.

Mutuality in work relationships, despite a power difference that may exist between people, is critical for engaging nonlinear processes. Mutuality changes the meaning of relationships in the workplace from a hierarchical, linear structure to a nonlinear, interconnected and interdependent dynamic web. We know from complexity science that interactions and connections among agents of a system are the source of novelty, creativity, and adaptability. Thus, the source of novelty in human systems is dynamic connections within mutual relationships. In this way, mutual relationships are the organizing principle in businesses as complex adaptive systems.

Feedback loops exist in complex adaptive systems, and through their dynamics the system evolves over time. When relationships and connections are weak in an organization, there is a poor flow of information, limiting feedback loops and thus adaptability. In order to have more positive outcomes, positive and constructive relationships need to feed into those loops, and a great deal of interconnection among people is needed to enrich the loops. Mutual relationships where people are receptive to each other, open to being influenced and affected, and are responsive create those necessary rich connections and continually changing patterns in an organization that lends itself to generating a more robust, adaptive, and creative system. As Hatim Tyabji of VeriFone told us, it was strong, positive relationships that maintained his global organization at a high level of creativity and adaptability.

What we found within these organizations was a dynamic vortex of five levels of relationships that created a web of interdependence and defined the world of business: (1) to one’s work; (2) between individuals;

(3) to the shared purpose and values; (4) to other complex systems such as other companies in the business environment and in their economic web, and to the community in which they lived. Last of all, and most tenuously developed in most companies as yet, (5) a relationship to the natural environment. This nested set of relationships represents a new view of organizational dynamics, within and outside the organization.

Understanding these dynamics identifies the source of creativity and adaptability in business. In short, it is a new theory of business. It is a theory, rather than a collection of actions with desired outcomes, because addressing the quality of these relationships as a means toward business success flows from a new understanding of what organizations are and how they work, informed by the science of complexity. At VeriFone, they told us that strong relationships to their customers gave them more of an edge in the market than did the technology. Their commitment to relationships is apparent in that they have teams physically set up next to their customers in order to serve them better. At St. Luke’s Advertising Agency, the linear chain of

operation that is typical in the industry, where a project is handed down from person to person, was abandoned. It was replaced by a project-centered process that emphasized mutuality, which brought everyone together, including the customer, in one room, and where everyone had an equal say in developing a campaign strategy. At the Industrial Society, focusing on relationships led to a massive change in how people worked with others, to the extent that they would help those they would normally see as competitors. In this way, a relational view of business redefines the meaning of business itself, as Jeanne Babel of Babel Paint and Decorating Stores stated: “Business is bigger than your own organization ... our business is an ecosystem of different relationships.”

We expected that leaders guided by complexity science would in some manner attend to interactions among people; that is, relationships inside and outside their organizations. This could have simply manifested itself in a concern for prolific communication. Open and prolific communication was indeed what we found in these companies. But also universally for these leaders, relationships had become the new bottom line, not only for humanistic reasons, but as a way to promote adaptability and business success.

And we are not talking about networking, but rather mutual and connected relationships—a distinction made by most leaders in these organizations. As Tony Morgan said, “I can’t conceive of myself as a leader without the burden of responsibility to create positive and powerful relationships with everyone I interface with. And I mean relationships, where you can speak to me openly all the time and that’s really difficult because you have to be interactive and keep working at it.” Their ability to form relationships, in fact, identified them as leaders, as a senior executive at Muhlenberg said of CEO John Kopicki, “It’s John’s way of being in relationship to people that defines him as a leader, not his position.” Relationships in these organizations became a source that released enormous energy that ultimately enabled the organizations to evolve. As Dick Knowles of DuPont told us, “If you pay attention to relationships in an authentic way, the organization will be better able to adapt and change.”

AN ETHICAL FOUNDATION

In these organizations where value was placed on relationships, an ethic of care emerged. Care is not a typical business power word, but it proved to be a powerful action in a complex system because care engages people to be in relationship—to their work, to others, to the shared purpose. Care holds the potential for creating rich connections within the system. These leaders all recognized that care started with them as leaders. As Hatim Tyabji, former CEO of VeriFone, stated, “It starts with you. As a leader, you’ve got to care. It’s got to come from within you.” By caring, these leaders engaged one of the greatest and often untapped resources of the business community: the power of caring and connected relationships for creating constructive change.

These leaders cared for their people. They placed value in seeing people for who they were. As Andy Law of St. Luke’s put it, “Everyone is brilliant.” They assumed that everyone was worthwhile. These leaders saw their responsibility as nothing less than providing fulfilling work for people, creating opportunities for them to reach their potential, and supporting them in the work they cared about the most. They engaged their people more fully—that is, as full human beings in the workplace—by accommodating people more in terms of their interests and skills and who they were in the world, rather than fitting them into job descriptions. “When the leader,” said Dick Knowles, “creates the conditions that make it okay for the people to grow, an enormous energy gets released. People discover that they can make a difference, meaning begins to flow, you get discretionary energy flow. That’s the difference in energy between doing just what you have to to keep from being fired, and being fired up and doing the max.”

These leaders saw people with a greater depth—as people with hopes and dreams. Even in a paint store, owner Jeanne Babel saw “a potential in everyone to get excited about what they do at work.” This wasn’t a mechanistic view of a person as a cog in the machine. “It’s not about extorting more work,” Bob Shapiro told us, “but giving them an opportunity to grow and do things they care about.” He further argues that when people do work they care about, it taps into a different level of involvement, commitment, and work creation, which is ultimately good for the business.

Care was an ethical value that extended beyond the monetary bottom line. As Hatim Tyabji put it, “If you measure success only by financial parameters then I say shame on people for thinking like that.” For him, how caring and connected the organization was within itself and to its customers was a measure of success, because this dimension of care, he believed, kept the organization at a creative edge. Andy Law put it this way, “Profits are like breathing. You need it to live, but it’s not what you live for.” Ethical principles also provided continuity for people in times of flux and change, as Dick Knowles noted, “They’re like the poles you hold on to in a crowded jostling subway car so you don’t fall.”

In addition to care, all the leaders placed value on authenticity in the workplace, what Andy Law called “radical truth,” what Tony Morgan called “tracking your inauthenticity,” or what John Kopicki expressed as “no more secrets.” Trying to look good and be something else for someone is an efficiency as well as a mental health issue; it’s tiring and a waste of time and energy. As Bob Shapiro said, “If we get authenticity and if we get caring—then we’ve got it; the rest will fall into place.”

As leaders, they felt it was their responsibility to embody these values as best as they could, to walk the talk. As Hatim Tyabji would say, “Do as I do, not as I say.” At the Industrial Society, keeping your word was one of the guiding principles initiated by Tony Morgan, and when he personally failed to keep his word, he didn’t hesitate to apologize publicly. Obviously, his behavior

upheld a standard of integrity, but it was also a gesture that reflected an awareness of complex systems. As Tony told us, “Complex systems work on feedback loops; the feedback loop stopped. I wasn’t walking the talk and they shut down. People stopped being open and honest in talking to me. It’s truly a living organism.”

CULTURE OF CARE AND CONNECTION

One of the most important lessons of complexity science is that complex adaptive systems generate emergent, creative order and adapt to changes in their environment, through simple interactions among their agents. In other words, in business, how we interact and the kind of relationships we form have everything to do with what kind of culture emerges; with the emergence of creativity, productivity, and innovation in the workplace; with the organization’s ability to anticipate and adapt to changes. In turn, the emergent order influences the behavior of individuals in the system—a feedback loop. Similarly, the culture that emerges in a company will influence people’s behavior. From this continual interplay between people’s behavior and the emergent culture flows a dynamic feedback loop that can enable or disable greater adaptability.

What emerged in these organizations was a culture of care and connection: a culture where people cared about their work and about fellow workers, cared for the organization and its shared purpose—not everyone and not all the time, but enough to define the valued behavior. When people care about their work, care becomes a filter enabling people to sort out what is relevant in their information-rich world. When people care about their fellow workers, they go great distances in order to not let others down. When people care and are connected to a shared purpose, they are capable of doing more than they imagine, for it goes beyond an act of will and taps into the deep human desire to contribute.

Because people feel more personally fulfilled, they care about the organization and are more willing to contribute to its needs. As Arie de Geus, a former senior executive at Royal Dutch/Shell, stated, “Before they will give more, people need to know that the community is interested in them as individuals.” Those people we spoke to who had worked in companies other than their present ones told us that in their experience, this sense of connection and care was uncommon in the business world. They all felt they were part of a unique work experience.

We found that this sense of community, guided by shared values and a shared purpose, generated a feedback loop that helped the organization to be more adaptable and resilient. People said that when they felt part of a community where they mattered as people, they were more loyal to the organization and more willing to be flexible and adaptable, which, in turn, made their organizations more flexible and adaptable.

These elements of an organic approach to leading change are a different way of doing things in that these leaders didn’t make changes, they cultivated conditions for change to occur. Instead of implementing strategies or plans, they generated ambiguity and uncertainty, encouraged risks, attended to relationships that allowed the organization to rearrange itself. They engaged the whole person and forged connections between people, which in turn made their organization more whole and connected.

DIFFERENT WAY OF BEING

If organizations are complex systems, leading in an interconnected, dynamic system requires a different way of being a leader. Leading in a dynamic system is more like an improvisational dance with the system rather than a mechanistic imperative of doing things to the system, as if it were an object that could be fixed. This casts the meaning of leadership itself in a different light that dispels certain beliefs and myths about what it means to be a leader in a traditional sense. Following are three myths of leadership that a complexity view dispels: autonomy, control, and omniscience.

MYTH OF AUTONOMY

Adam Bryant’s comment in a *New York Times* article about teamwork that “In the age of celebrity CEO—the lone ranger who can ride into any troubled company and turn things around, reaping outsized rewards compared with the ‘team’ that helps him” underscores a denial common among many CEOs and their organizations. The leader is never a lone ranger; there are always many behind their success.

In other words, as part of a complex adaptive system, leaders don’t live in a vacuum. Leaders are not autonomous but interdependent. They are not apart from the system but a part of it, and how they behave has farreaching effects in the connected web of complex systems. And leaders can’t lead change alone, nor is that the wisest choice. It’s too complex. The Industrial Society’s board members saw Tony Morgan as the Society’s savior, but he insisted that they recognize the achievements of the people who had actually wrought the economic miracles that saved the Society, calling them heroes.

MYTH OF CONTROL

When the complexity-guided leader gives up the illusion of control, it is both liberating and terrifying. It’s liberating because

many leaders, as Muhlenberg's John Kopicki pointed out, feel burdened by the expectation that they have to provide the answers, when in fact they know that much in their world of work is beyond their, or anyone's, control.

It's terrifying for two reasons. First, control is often viewed as power, and many traditionally oriented leaders find it hard, if not impossible, to give up this veil of power. It's terrifying to discover that old modes of leading just don't work any more. As AlliedSignal's CEO Lawrence Bossidy puts it, "The day when you would yell and scream and beat people into good performance is over." Even though the Industrial Society's Tony Morgan recognized the limits of control in the modern business environment, he still woke up in the middle of the night, fearing that the Society was out of his control. Dick Knowles, at Dupont's Belle plant, felt he "had to struggle with the temptation to fall back to what seemed like the safety of the old command and control structures," when things were not going as he hoped.

Second, it requires a different confidence: not just in yourself but in your people. It's coming to terms with the fact that what emerges from the efforts of your people will be at least as good as what one leader can come up with.

Giving up control is the toughest thing to do for a leader, which all the leaders in these organizations admitted. But in their efforts to let go, they learned something else: flexibility and patience, apt qualities for our complex times.

MYTH OF OMNISCIENCE

It is impossible for leaders to have and know all the answers. Leaders who burden themselves with having to have all the answers are easier to find; it is more unusual to see a leader, like John Kopicki or Andy Law, in their staff meetings being forthright with the staff and not only willing to show themselves as not knowing but also as needing others. These leaders had redefined their authority. Rather than seeing themselves as the ultimate authority with all the answers, their authority rested in their ability to see the wholeness of the organization and the potential of people in their organization. They strove to extricate themselves rather than foster people's dependence on their expertise.

Since most of them came from a command-and-control tradition, this wasn't easy because often, they told us, people wanted them to just tell them what to do. But by turning choices over to the people, the people discovered for themselves that in fact they liked this way of working: selforganizing around issues that mattered to them, taking responsibility for their development and growth, and pursuing projects that widened their experience. "It works," said Bob Shapiro, "because this is what people want."

PARADOXICAL LEADERSHIP

These leaders shared a characteristic in their way of being and in their style of leadership: paradoxes. From a complexity perspective, paradoxes are not problematic, something that needs to be solved. Instead, they create a tension from which creative solutions can emerge. Paradoxes are something to embrace and to contain. These leaders had learned to live with paradox, knowing, as Heraclitus said, that "nothing endures but change." From a complexity perspective, seeing paradoxes in their leadership is an indicator that these leaders are leading from the edge.

Complexity science doesn't replace traditional models of leadership but, instead, expands them. It's not about throwing away everything we know and do as a leader, but rather augmenting and encompassing different skills and placing those skills in a wider context of a new understanding of business. Paradoxical leadership fluctuates at the edge of a mechanistic and organic style of leadership, between structure and less structure—and in the world of complexity, fluctuation is healthy.

The fundamental paradox in their leadership style was that they were leaders by not leading. Although we said they didn't just toss aside their command-and-control tendencies, their power rested not so much in control but in their capacity to allow; not in being omniscient but rather in being accessible; and not in asserting their autonomy but rather in honing their ability to be attuned.

ALLOWING: PARADOX OF DIRECTION WITHOUT DIRECTIVES

Paradoxical leaders allowed things to unfold, emerge, and self-organize. That meant allowing experimentation, mistakes, redundancies, contradictions. The paradox of allowing incorporates both the need for a leader to be strong, in terms of a strong sense of direction, a clear sense of self, and definitive values, and also the need to have an ability to let go and be open-ended. Leaders must allow the organization to evolve, respect that development, and let it take its own course.

Both guidance and open-endedness are needed to lead complex adaptive systems. It's not enough just to sit back and let things unfold—then you enter chaos. It's not enough to have an iron grip—then you enter stasis. The trick is—and it's a challenging one—to find a way to dance in between. The paradox here is freedom with guidance. In order to be adaptable, people need to have freedom for maximum flexibility, but with freedom comes a need for an even stronger sense of direction.

Dick Knowles's image of the bowl is a very useful metaphor for understanding this paradox, in that the bowl is a safe container

that gives people freedom to experiment, to create improvements, but it also provides order at the same time. To create this bowl, which has permeable walls that allows outside influence, he involved many people in a conversation about the values, the mission, principles, standards, and expectations for the organization. From these discussions a collective vision emerged, which was itself constructed and reconstructed over time. Once it was clarified, as Dick said, “Most people know what to do if they have a good sense of the bowl.”

ACCESSIBLE: PARADOX OF VISIBLE AND INVISIBLE

Paradoxical leaders make themselves accessible both physically and emotionally. As Andy Law stated, “I’m at your disposal.” These leaders spent a lot of time talking to their people and their customers, and they recognized that time spent on developing relationships was not wasting time but rather time spent on strengthening connections, which ultimately made for a more robust system. They opened themselves to people in the organization, which proved to be a powerful move because they were better informed and able to see more clearly what people really needed. Being accessible allowed information to flow from and to them, which helped them be more able to anticipate the needs of the organization.

Being physically accessible can be taxing, however. Consider Hatim Tyabji, who made himself accessible to everyone in VeriFone through email and accessible to his customers by traveling 500,000 miles a year.

Generally speaking, email proved to be a great equalizer in these organizations, for it cut through hierarchy and engaged more democratic, participatory processes by making people accessible to each other.

Because these leaders cared, this made them emotionally accessible. They were not limited to rational thinking, but spoke from the heart and feelings as well. They were accessible to being moved by others and didn’t hide it. Many of them told us how they “lost it” in front of their organizations. The paradox in this instance is that exposing their vulnerability was a show of strength. The underlying paradox is that they are visible as mutual and one of the people, and at the same time as a leader not mutual and invisible as a person.

ATTUNED: PARADOX OF KNOWING AND NOT KNOWING

Paradoxical leaders have a finger on the pulse of the organization, which they do, as we said previously, in two ways: by having a sense of the organization as a whole and making choices in the interest of the whole, which departs from a reductionistic, “parts” approach to the organization; and by being aware of the interactive level of the organization; that is, attuned to the quality of interactions between people in the organization. As Peter Senge pointed out, “The problems originate in basic ways of thinking and interacting, more than in peculiarities of organization structure and policy.”

These paradoxical leaders became attuned to their organization by developing their capacity to empathize, to put themselves in their employees’—and their customers’—shoes and imagine what work might be like for them or how they might experience changes occurring in the organization. As Hatim Tyabji put it, it’s not a dichotomy between touchyfeely or deliver the numbers; both can and do co-exist and inform each other.

The leaders attuned themselves by listening, responding, and letting go. As Tony Morgan said, the best thing you can do is “shut up and listen.” Listening for issues and responding to them was what guided organizational change rather than leaders imposing a change effort. They especially valued frontline wisdom, recognizing that those in the problem probably had good ideas of how to get out of it. And then they let go and got out of the way. As Jeanne Babel put it, once people understand the values, allow them to translate those values into actions. Stated in terms of complexity, a few simple rules can give enormous scope for people to make the environment work for them—from a deep simplicity, complexity emerges.

And last, the leaders attuned themselves by drawing on their intuition. They recognized that they couldn’t make decisions on facts alone, because they would never have all the facts; the situation was too complex. Instead, they trusted their gut and listened to their intuition, instinct, and impulse, without being impulsive. It was Hatim’s gut feeling that eventually led VeriFone to electronic commerce. The paradox here is holding rational goals while allowing irrational connections; holding fact and possibility simultaneously. Essentially, the paradox of attunement is knowing the whole system through hunches, intuition, and senses without knowing all the facts.

HUMAN-CENTERED MANAGEMENT FOR BUSINESS SUCCESS

We found that an organic approach to the organization and a paradoxical leadership style created opportunities for unleashing enormous potential in people that was previously dormant, which led to financial success for these organizations. By attending to agents and interactions—to people and relationships—a new way of working emerged and the organizations evolved from there. These organizations were agile and frequently operated in a state of creative adaptability, or the edge of chaos, because they engaged nonlinear processes that in turn affected people’s way of working.

Although each organization had its own distinct way of engaging nonlinear processes, they all managed to reinvent the workplace and accomplish goals they couldn't have anticipated and often didn't even imagine. At Dick Knowles's plant, the injury rates went down 95 percent and productivity increased by 45 percent, to name a couple of outcomes. At the Industrial Society, people were promising to bring in a million pounds over budget, which was already beyond what they had been doing—and achieving it. And in retrospect, the change occurred quickly in these organizations, from six months to two years.

We can see, therefore, that leadership guided by complexity science results in a very human orientation, which was a surprise, counterintuitive. Of course, there have been many human-centered approaches in management before, among the more notable being political scientist Mary Parker Follett's work done in the 1920s and 1930s in the United States, which has experienced a recent resurgence of interest. For more than half a century, there has been a constant battle between human-oriented management and scientific or mechanistic management, with the latter prevailing. But it is only now, and for the first time, that there is a science behind this way of thinking that gives a legitimacy to the whole realm of human-centered management. With complexity science, we have human-oriented management practice emerging from science, a novelty.

The link between economic success and a human-centered approach was apparent in these organizations. It is made explicit in Jeffrey Pfeffer's book *The Human Equation*, where he shows that human-oriented management practice consistently increases the economic performance of companies when compared with companies in the same economic sector without such management. Complexity science validates a human-centered leadership style, if you like, as good business sense.

Many of these aspects of leadership that are guided by the principles of complexity science are alive and well in leaders who know nothing about complexity, instead being guided either by their intuitions of what seems right or by parts of business theories, particularly in human relations management and Peter Drucker's work. What we have done is identify an intellectual framework, a scientific understanding of organizational dynamics, that puts these behaviors under one umbrella of complexity and shows why they are effective. We can see that these behaviors, such as mutuality and care, are efficacious in the business environment, not because being "nice" to people is a good and human thing to do—which, of course, it is—but because we are positively engaging the agents and the dynamics of the complex adaptive system, and moving it toward the zone of creative adaptability.

These leaders have shown us that we can make our workplaces more humane; people can become fulfilled; people can be whole people at work. And we can get good and at times spectacular business results, too. Most of all, they challenge our assumptions about what it is possible to achieve at work. Have we settled for less? Can we have it all? As Einstein said, "Only those who attempt the absurd will achieve the impossible."