



# A new sciences outline for leadership development

Leadership  
development

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**Keywords** *Leadership, Training, Design and development, Chaos theory*

Received July 2003  
Revised January 2004  
Accepted January 2004

**Abstract** *The Newtonian physics that formed the foundation of physical and social science for centuries is unwinding in the face of the new sciences. The principles of the new sciences shed needed light on the technologies of leadership in modern organizations. This paper links specific leadership technologies to four general principles taken from the new sciences. Together, these technologies and principles provide a new metaphor for organizational life and the work of leadership. This metaphor offers an alternative explanation of the leadership phenomenon generally, helps organizational actors ground their leadership activity in terms of the new sciences theory, and points to better ways to prepare ourselves for the demands of leadership in organizations. This, in turn, provides a way for leaders to better understand their organizational environment and links that understanding to an outline of skills, behaviors, and attitudes that can be used in practical leadership development programs.*

## Introduction

Using a clockwork metaphor to explain the workings of the universe, Newtonian physics formed the foundation of physical and social sciences for over three centuries. Now, that metaphor is unwinding. Einstein's relativity and the quantum physics of subatomic particles have denied humankind its aura of mechanistic predictability. The new sciences (herein mainly comprising ideas found in quantum physics, autopoietic theories found in biology, chaos theory, and complexity science) mark a potential paradigmatic shift in the physical sciences. Nevertheless, scientists still observe an inherent order in the universe that exists even in the midst of uncertainty and apparent chaos.

Today, social scientists are recognizing that the organizational influence of new sciences principles conform more to observable realities of social relationships than traditional theory. These principles point to unifying threads among the surface confusion of multiple acts by multiple actors, which have few easily discernable connections. These changes in thinking are perplexing and, perhaps, even frightening to some analysts – they threaten the foundation of organizational orthodoxy. Nevertheless, as elements of the new sciences become clearer, our grasp of leadership – past, present, and future – is deepened. Our ability to define and predict leadership behavior is enhanced.

This paper assumes the reader understands the cultural and theoretical foundations of traditional organizational and leadership thought. From this base it attempts to reinterpret leadership theory and practice in terms of new sciences insights. It builds a foundation for leadership theory and practice based upon the evolving models of the new sciences[1]. These concepts affect how we view the structure and arrangement of our social organizations. Ultimately, this paper brings many of the leadership ideas



found in contemporary leadership literature, places them in a framework that is informed by the new sciences, and points to a specific outline of principles and skills that can be taught in leadership development contexts. The intent is to understand better how practical leadership applications (skills, behaviors, and attitudes) within organizations work because these applications are informed by the framework and perspective of the new sciences.

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### **Leadership through the lens of the new sciences**

Today's organizations operate in a rapidly changing environment. Traditional social science defined an organization characterized by control, prediction, measurement – in other words, by traditional management theory initially popularized by Max Weber, Frederick Taylor, and the like. The world of organizations has come to recognize the limitations of traditional management theories to describe fully the “hows” and “whats” of operating in a collective environment. Called for is a broader reconceptualization of organizational life.

Rethinking leadership and organizational metaphors from a new sciences perspective asks us to revisit the way we conceptualize our organizations themselves. Shelton and Darling (2001) present a model of “quantum skills” that attempts to ensure managers are able to overcome the limitations of a mechanistic organizational metaphor. Their model focuses on leader skills that help us understand why a new metaphor for organizations would be useful. This new way of looking at organizations asks us to concentrate on relationship and culture more than on control and measurement techniques. Just as the tools and principles of the new sciences have allowed us to see nature in different ways, this new organizational perspective lets us see leadership in novel, more precise ways.

Wheatley (1992/1999), an innovator in applying new sciences ideas to organizational leadership, is considered one of the pioneers in this effort to redefine how we “see” organizations. The publication of the first edition of *Leadership and the New Science* in the early 1990s made quite an impact and it quickly became a best seller in the US and elsewhere. She suggests important principles to consider in the work of leadership (wherever practiced), including the four main principles focused on herein, namely autopoietic systems, paradoxical perspectives and nonlinearity, field theory, and fractal organization patterns. These ideas come not from the traditional organizational and leadership theory literature, but rather from the research found in physics, biology, chemistry, chaos, and complexity science. Many found themselves intrigued by the new metaphors of organizational life, but the science escaped some and the application of these new ideas was even more elusive. Trained natural scientists even ridiculed the elementary or mistaken coverage of the topics. However, Wheatley's impact is profound and she has opened the door to much research and organizational understanding.

Wheatley's second edition tries to correct and refine the science and make it more accessible to those who found it difficult to apply. She also includes a new section on change and reflections about her personal journey into organizational understanding since the publication of the original book. The chapter on change is a critical addition to the traditional change literature and highlights a more holistic approach to change efforts, rather than a reductionist approach of fixing that which is found to be wrong (in ourselves or within our organizations).

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The outline below builds upon Wheatley's principles and offers technologies[2] to apply these principles in our leadership of organizations. Again, while much refinement could be made to Wheatley's explanation of scientific principles, this work focuses more on refining our understanding of the potential application of leadership technologies within the broad metaphor of the new sciences. Therefore, the scientific principles are only generally summarized. By briefly setting the scientific stage, though, the power of the leadership ideas is better grounded in the framework that the new sciences suggest.

Something to note is that within the broad context of thinking about organizations in terms of relationships and culture rather than prediction and control, the new sciences offer more in terms of organizational leadership than it does, perhaps, organizational management. Order based on predictable system and procedure is giving way to one keyed to relationships. This has caused many to reframe organizational questions from how we can best manage organizations to what "doing leadership" may mean in the world of complex organizations. New sciences principles give us a unique, and perhaps more accurate, way to explain the leadership phenomenon and to prepare ourselves for the demands of organizational leadership as they broaden our perspective of organizational life and the power of competing relationships.

What emerges from this discussion of the science and the leadership activities is an interlacing of leadership functions. Each principle, and the technologies associated with them, support and enhance the other principles. The linear feel of management is replaced by this interrelated latticework of leadership activities that are informed and encouraged by the organizational principles and metaphors that the new sciences create. The outline below describes the interconnectedness of the principles and suggests how the leadership technologies can work together (in non-linear ways) to support organizational success and individual growth.

Again, the leadership technologies are not new in contemporary leadership literature, nor are they new in the sense that real leaders have been behaving in concert with them for ages. However, much leadership literature is grounded in best practices, case studies or personal experience and has lacked a useful theoretical underpinning. This paper links leadership technologies to the principles of the new sciences, creating a framework and language for discussion both to understand better the power and interrelatedness of these technologies and to suggest how to implement them in organizations. The four principles and the related leadership technologies, which will be discussed in turn, evolved from linking the work of practitioners with the leadership literature. Through consulting and leadership seminars these principles have been refined and amplified, gaining the validation that comes from practitioners resonating with these new ideas and skills. These principles and technologies form an outline for leadership development activities that emerged from leadership literature, the work of leaders and managers in organizations, and the reflections of these practitioners as they discuss with peers their experiences of managing and leading in (mostly public) organizations[3]. Table I attempts to summarize the new sciences concepts and the related technologies.

### **Autopoiesis: information, interaction and issues of trust**

The new sciences clarify how individuals can act independently and still contribute to the orderly and unified purpose of the organization. The concept of autopoiesis, as used

**Table I.**  
Leadership principles and technologies: an outline for leadership development

Leadership principles	Leadership technologies
<p><i>Autopoiesis: information, interaction and issues of trust</i> Organizations (as open systems) have the ability to self-organize if the proper context is preserved</p>	<p>Allowing a free flow of information Designing feedback loops Maintaining a relationship focus Instilling and encouraging trust</p>
<p><i>Paradox: confidence amid uncertainty and ambiguity</i> Uncertainty and ambiguity are a part of organizational life</p>	<p>“Getting on the balcony” Fostering creative destruction Seeing all change as people change</p>
<p><i>Fields and attractors: the place and purpose of vision and values</i> Organizations and the people within them cluster around inherent structural forces</p>	<p>Emphasizing values Listening to and watching values Vision-setting Teaching and coaching</p>
<p><i>Fractals: the power of simple patterns</i> The new sciences reveal that simple principles and patterns may create complex structures through random (non-controlled), autonomous action</p>	<p>Focusing on small and simple things Encouraging autonomous structures Recognizing that qualitative concerns matter most Developing stewardship and delegation “Counciling-with” others</p>

here, highlights the power of relationship and interaction in the new sciences. Autopoiesis is a process whereby a system produces its own organization and maintains and constitutes itself in a space. Maturana and Varela (1980) used the term autopoiesis to characterize those systems which maintain their defining organization throughout a history of environmental perturbation and structural change, and regenerate their components in the course of their operation. Erich Jantsch (1980) defines autopoiesis as a tendency of living systems to renew themselves and regulate the renewal process in ways that maintain the basic integrity of their structure. While there is debate about ascribing autopoiesis to social systems, there is still much we can learn about leadership from the metaphor (see Benseler *et al.*, 1980; Mingers, 1994; Ulrich and Probst, 1984; Zeleny and Hufford, 1992).

Goldstein (1994) suggests that the concept of autopoiesis demonstrates how open systems can evolve into states of greater organization, complexity, and order. He notes that each open system (organization) has a unique identity and a clear boundary. However, the organization is not in isolation. The “boundary” of the organization is paradoxically semi-permeable – able to maintain an identifiable nature over time and allow environmental conditions to effect it. It merges with its environment, creating a constant ebb and flow of information that enhances the system. Organizationally, the principle of autopoiesis can ground a leader’s use of four technologies to maintain organizations as identifiable entities over time, while changing and adapting to meet future demands.

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*Allowing free flow of information*

Information serves an organizing and evolutionary purpose for an organization. We can learn from the new sciences that information is the lifeblood of any open system. Rather than restricting and controlling information coming from within and without an organization, leaders recognize the importance of free and easy access to information. To benefit the most, leaders must recognize that information must flow from and to all levels of the organization's hierarchy – from the outside in, inside out, top down, bottom up, and side to side. Previous notions of leadership that suggest the job of executives and senior managers is to buffer and filter information to and from internal and external environments lose their credibility. Though opening up the lines of communications may be a frightful prospect for some, the pay-off is clear. A sense of community develops which allows for trust and individual autonomy to flourish. The new sciences suggest, and ground, the order and self-organizing benefits of such a system of information flow.

*Ensuring feedback loops*

Ensuring feedback and institutionalizing feedback procedures is a sign of confident leadership. Self-organization depends upon a dialog between the internal organizational environment and the external environment (Goldstein, 1994; Harman, 1998). We can understand this necessary dialog as the feedback needed in organizations. The new sciences confirm the need for continuous feedback loops to capitalize on creativity, internal organizational culture, and external flows of information. Models are being developed to illustrate how organizations can do it (see Rinaldi, 1997).

*Maintaining a relationship focus*

Leadership has been described as relational, whereas management is positional. If information is the lifeblood of organizations, then the arteries and veins through which the information flows are relationships. At the subatomic level, the new sciences teach us that objects are understood meaningfully only as they relate to others. The leader must take on a relational slant in all aspects of organizational life because organizations differ from a mere collection of individuals in that the parts have an influence on each other (Goldstein, 1994; Stumpf, 1996).

The new sciences are clear that open systems are comprised of elements that relate to each other in unique, non-linear ways (Sweet, 1997). This demands the development of trust, inclusion, respect, and a concern for the “whole-soul” of the people we lead (see Bolman and Deal, 1995; DePree, 1992; Fairholm, 1997; Weisbord, 1987). Leadership must recognize that people are the “parts” of their organization and that relationships among people are the essential building blocks of a flexible and sustainable organization.

*Instilling and encouraging trust*

To lead, leaders create an environment characterized by mutual trust within which the quality of relationships and interpersonal interactions are united (Fairholm and Fairholm, 2000; Kouzes and Posner, 1993). Such a culture provides both leader and follower with a context in which each can be free to trust the purposes, actions, and intent of others and further the goals of the organization. A trust culture is integral to

solving organizational problems and creating new organizations that can cope with the complexities of today's workplace. Kotter and Heskett (1992) confirm this notion. They found that corporations with strong cultures based on a foundation of shared values and trust outperformed other firms by a huge margin. As leaders infuse the organization with trust, the interactions of group members encourage the self-organization and creativity that autopoiesis suggests can occur.

**Paradox: confidence amid uncertainty and ambiguity**

Pioneers of quantum theory, such as Niels Bohr and Werner Heisenberg, observed paradoxes – apparent incongruities, inconsistencies, and contradictions – in the way nature was behaving. They wondered how nature, once so reasonable and predictable, could be so absurd in the subatomic realm (Capra, 1983). They saw how classical attempts to measure position and momentum inevitably yielded uncertainty in the quantum world because the very act of measuring the particles changes them (in terms of location, speed, etc.) in significant ways. The universe held together somehow, though they were no longer able to measure it as they had before. Physicists finally began to make sense of these paradoxes and ambiguous observations by learning to ask nature different questions and to change their observational perspectives.

Life in organizations is replete with paradoxes – things that just do not make sense. This “social” ambiguity may shake the foundations of organizational theory just as deeply as in physics. The classical organizational models of Weber, Taylor, Fayol and the Gilbreths anticipate certainty and predictability. But the realities of organizational life are full of ambiguity, uncertainty, and surprise. Organizational theory is just beginning to describe the powerful impact of recognizing, not certainties and predictions, but preferences and principles.

For public leaders, a level of comfort and confidence with ambiguity is essential (Bolman and Deal, 1997; Cohen and March, 1986). Leaders understand that they influence organizational life; they do not ordain it (Gabriel, 1998; Nelson, 1997). This comfort with ambiguity emerges as leaders learn to ask the right questions – accepting their limited perspective while seeking to gain a higher one. Three technologies may help leaders to become comfortable amid uncertainty and act confidently within organizational ambiguity, using this uncertainty and ambiguity for the benefit of the organization and its people. The new sciences suggest this must, and can, be done.

*Getting on the balcony*

Leaders need to put their heads above the frenzy of organizational activity and see the contradictions, paradoxes, and complexities that are shaping organizational life, even while they are actively engaged in it (Morgan, 1998). This is what Heifetz (1994) calls “getting on the balcony” – getting above the day-to-day pressures to see the big picture. He warns that it may be easy to understand, but difficult to do – in the sense that seeing the flow of traffic on early morning news traffic reports is a much different experience than being in the traffic jam. With this balcony perspective, leaders become more aware of the order found in their organizations, rather than being swept away by the immediately apparent chaos. They are able to ask the right questions and see the organization for what it really is or for what it is becoming.

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*Fostering creative destruction*

Uncertainty and ambiguity go hand in hand with organizational change efforts. Leaders must recognize that an organization's laudable attempts at innovation sow the very seeds of future organizational change and discomfort, but that these attempts, though difficult, are ultimately beneficial. As Morgan describes it, an organization must be willing to "innovate in ways that will undermine current success so that new innovation can emerge" (Morgan, 1998, p. 252). He explains that innovation and development are a specific kind of organizational process. Paradoxically, innovation creates the seeds of its own downfall, by creating future areas of competition and, thereby, shaping the need for future innovation in response to current changes. This "creative destruction" occurs because the very change designed to push the organization towards success, actually begins a new process of improving upon or changing that change. Leaders who understand this phenomenon will encourage a level of uncertainty, change, and creativity. They will also foster confidence that change and development is helpful, even natural, to the overall organization.

*Seeing all change as people change*

Kotter (1990) suggests that leadership is coping with change. While organizational change efforts are important, by helping individuals cope with personal change, and profiting from the potential creativity emerging from it, leaders assist followers in experiencing organizational change as productive, rather than disruptive. Many, in their efforts to implement change, emphasize the plans and strategies more than the human element needed to accept and implement the change. This human side of change is as uncertain and ambiguous as the diversity of the workforce. Just as creative destruction allows us to cope with innovation and understand the possible obstacles to it, understanding how people cope with change and transition allows the leader to remain confident and comfortable amid a variety of individual reactions (Bridges, 1991). Embracing uncertainty and ambiguity, as the new sciences suggest we must, can sustain leaders in their change efforts.

**Fields and attractors: the place and purpose of vision and values**

An important concept in the new sciences is the idea of fields – invisible forces that structure space or behavior. Scientists use field theory to explain the connections they observe between apparently disparate and nonlinear activities. In a broad sense, field theory helps us understand the implicit interconnectedness of the universe, helping us understand how it all works together and how we can work within it (see Sheldrake, 1988). In a related idea of interconnectedness, Bohm (1980) suggests there is an unbroken wholeness in the universe – a web of relations at a deep, "nonmanifest" level – which can help us explore and understand "implicate" or "enfolded" order. In this sense, Stumpf (1996) concludes that seeing the order may not be as crucial as knowing it is there. All of this suggests metaphorically that organizations themselves may be representations of implicit order and interconnectedness.

Furthermore, another interesting organizational link is the concept of attractors. Though this concept is not completely developed in scientific circles, attractors can be thought of as the force within a field that shapes organizational elements and allows them to behave in distinct patterns. The idea of attractors in the organization is very compelling for the political leader because it defines the context that constrains the

behavior of a system – like a thermostat controls the temperature in a room within a comfortable zone (Goldstein, 1994; Morgan, 1998).

As we begin to think of vision and values as organizational attractors, it helps leaders understand the power of vision and values in setting and altering organizational contexts or cultures. Field theory and attractors help us understand that a compelling vision or a common set of values held by an increasing number of individuals can ultimately shape the interactions, behaviors, and perspectives of organization members.

A vision, thought of as a field of unseen connections that influence people's behaviors, will shape and bound behavior. However, individual behavior is also co-shaped through interactions with others. Visions, therefore, emerge from these interactions; they are co-shaped, though leader-inspired. Visions are always present (either in the foreground or the background) and become the articulation of who we are, what we care about, and why we do what we do. A vision wraps the organization in a value-laden field within which individuals view themselves and others in a certain way and act consistent with those values. People connect with an organization as it helps unify beliefs that fit into their underlying cultural contexts (Herzberg, 1984). Leaders make that connection explicitly. In this sense, vision setting involves more than articulating a desirable future state. Visions give meaning and purpose to organizations (see Bennis and Nanus, 1985; Drath and Palus, 1994). Leaders understand vision not as a description of an organization's desired future state (its mission), but rather as a statement of what makes the organization what it is – its essential nature – so that the organization can discover where it may go in the future. The new sciences concepts of fields and attractors make the following set of leadership technologies more concrete (at least more understandable) as we apply them in organizations.

#### *Emphasizing values*

Leadership asks leader and follower to deal with each other on a values-basis (Bennis and Nanus, 1985; Burns, 1978; Conger, 1991; Cuoto, 1993; Fairholm, 1991, 1994, 1997; Gardner, 1990; Gardner, 1987). The need for a clear statement of values becomes vitally apparent as we understand the power of vision noted above. Most of the work on organizational values says that values determine (even dictate) individual and organizational behavior. A person's values-set has a powerful influence on the way he/she perceives and acts in the world. Therefore, values and vision are inextricably linked. Both intend to impact individual behavior and perceptions. Not only do leaders themselves need to have a clear set of core values, but they also influence and shape the values of followers. Whether they explicitly share with followers their core beliefs and values or not, leaders' behavior expresses a personal philosophy and value-orientation that they bring with them to the organization (DePree, 1992; O'Toole, 1996). Leaders and followers need to recognize that values and vision shape their behaviors and interaction. Leaders and followers must emphasize the connection between values, vision, behavior and interactions. These connections become clearer as we understand the organizational fields that may be at work.

#### *Listening to and watching values*

An essential element of leadership is developing the ability to grasp the core beliefs and values of others, the followers. Leaders do this the same way followers learn the

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values-sets of their leaders – they listen and watch. Leaders engage in naïve listening (Fairholm, 1991, 1994) where they listen as if it were the first time they heard what they are hearing. It is an active process of respectfully attending to what the speaker wants to communicate. Listening to followers is neither just a common courtesy nor a management gimmick to obtain compliance. It is an essential skill leaders must acquire to ascertain the core values of others and to gauge commitment to a set of organizational values and an organizational vision. Watching is also important – not the supervision required to oversee process compliance – but rather the discerning observation of how people operate and relate to each other over time. In this way, good leaders may indeed be followers.

#### *Vision-setting*

Once a values orientation is accepted and adopted, leadership requires a translation of those values into a vitalizing vision – an organizational field, an attractor of perception and action. Two main methods have been devised to create a vision: by either the leader or the group. Those that rely on group consensus usually end up with a statement of aggregated interests that points more toward a mission for the organization than a statement of the essential nature or attraction of the group. While followers may help, ultimately a leader is responsible for articulating a vision that group members validate. Visioning is a leader-led activity, not a committee activity. While others, through relationship and co-shaping of behaviors, may contribute to and alter incrementally the vision of an organization, the leader instigates, creates, and facilitates the vision. The technology of vision-setting takes leaders from a personal discovery of their own inner convictions, to relating their values to the organizational setting and the values of others. In a real sense, a vision is the leader's perception of the inherent order of the organization that followers come to accept, adopt, and adapt.

#### *Teaching and coaching*

Sharing the vision and marshalling action are essential for making the organizational vision stick in an organization. Leaders must teach and coach followers to both accept and apply the vision and values connotation of the organization into the work they do (O'Toole, 1996). In a leadership context, teaching and coaching are focused on a very few goals: help followers understand the vision and its values context; accept as their own these values and the implications of the vision; and apply the principles inherent in the vision as they perform their organizational work. In this way, the inherent field of the organization becomes more explicit and the order, productivity, and unity that emerge from the attractor become a practical extension of a shared values context. If a leader does not teach his or her values and vision, other values and a different vision will guide the organization and may work against the leader's purposes. Teaching and coaching both help strengthen the attraction power of the vision and values. Teaching and coaching activities reinforce the power of trusting relationships and the power of vision as the basis for organizational action.

#### **Fractals: the power of simple patterns**

To appreciate fully the influence of values and vision in organizations, we must grasp the concept of fractals. In the world of mathematics, fractals appear as repeated iterations of simple nonlinear equations. Fractals, however, are pervasive in nature.

We can recognize fractals as we look at circulatory systems, broccoli, and fern leaves. In essence, fractals reflect the same basic pattern that can be seen regardless of the scale or level of magnification – a “simple organizing structure that creates unending complexity” (Wheatley, 1992, p. 132).

Classical hierarchy asks for rules, regulations, and strict authoritative controls flowing from legitimate power sources. In contrast, fractal organizations form through independent repetition of patterns emerging from vision and values that create and reinforce an organizational field. Fractal organizations are unique because a simple organizational concept, repeated at different levels of the organization, has the ability to yield order in what may appear to be a seemingly chaotic and very complex system. In fractal organizations, everyone comes to think and behave in ways that are similar to each other, because they are influenced by the organizational vision-field, attracted to the same goals and values, and allowed to act for themselves in fulfilling organizational tasks. The parts of the system (the members of an organization) act independently, but are drawn to an identifiable pattern of behavior shaped and bounded by the values and vision of the organization. Members trust each other to work for the good of the organization because they all accept its purposes and values and are shaped into effective representatives (or representations) of the organizing principles – the vision and values – of the organization. In such an organization, true delegation of authority and responsibility – where leadership repeats itself throughout the organization – becomes a natural and essential part of the organization.

The principle of fractals relates to distinct and implementable principles of organizational design and structure. However, they require a different perspective than past management theories. Whereas autonomy and order are most often pitted against each other in organizations (i.e. controlling the employees so that they do what the organization wants them to, the way it wants them to do it, or controlling the public administrator so that he/she does what the political leader wants them to), the new sciences propose that autonomy and order are and should be partners in creating viable complex systems.

Five technologies for leadership emerge from an understanding of fractals. All deal with culture and structure. This point, in itself, is an important lesson from the new sciences – culture and structure are not independent and discreet, but rather integrally linked in successful organizations.

*Focusing on small and simple things*

Leadership is more about shaping principles and patterns than about command and control. An insightful principle of fractals is the non-linear notion that from small and simple things can great and complex things (even organizations) come to be. Instead of searching for cause and effect activities that always seem to yield unintended consequences, the new sciences suggest a simpler way to encourage radical and creative change (Gleick, 1987; Goldstein, 1994; Wheatley and Kellner-Rogers, 1997). A paradox emerges that says the simplicity of an organization lies within its complexity, and the complexity of an organization is found in its simplicity. Standard operating procedures and policy manuals may not be the tools of leadership. Rather, short, simple statements reflecting the values and vision of the organization should be the focus of the leader’s communication. Leaders must have confidence that complex behavior can and does emerge from a few and simple guidelines that are interpreted and adopted by followers working in an organizational field informed by vision and values.

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*Encouraging autonomous action*

Leaders must learn to view autonomy and creativity in non-threatening ways. These leaders must allow individuals to be creative and make choices on their own so the organization can learn and grow along with the people that comprise it. Some managers view autonomy as being one step away from anarchy (Wheatley, 1999). However, what we learn from the new sciences is almost the exact opposite. Leaders must allow people to be the individuals they are, because they really cannot do anything about it. If we try to restrict freedom of action and choice in an organization (by excessive rules and regulations, for instance), organizations are doomed to fight the constant battles many face today – redirecting, resolving conflict, refocusing, and reorganizing. Contrary to orthodox theory, this new sciences framework suggests that stability is found in freedom, not in control. The paradox is that the order we seek in organizations comes as the parts of the organization are allowed to be independent in their interactions and in the way they choose to act. This is possible because autonomy and individuality are linked to the values-laden organizational vision-field. Simple principles, followed freely, can yield complex behavior; on the other hand, complex rules can yield simple (or simplistic) behavior.

*Recognizing that qualitative concerns matter the most*

Leaders need to focus on the qualitative aspects of the organization more than they do the quantitative measures. In other words, the contemporary focus on measurement, control, and predictability may need to be subordinated to a more holistic analysis of the organization. The quality of the system – its shape, its complexity, its uniqueness, its values, its vision – becomes important beyond our attempts to measure it quantitatively. If we are caught in the reductionist effort to measure ever more discrete parts of the system in order to improve it, we will never fully appreciate the organization as a whole or its potential for the future and we may stifle the creativity and autonomy essential for success. Of course, we need people to measure and control some aspects of our organizations, but the leader's job is to be attuned to the qualitative factors. These are the things that make an organization what it is and what it can be.

To do this, leaders must learn to measure what can be measured and not measure what actually cannot be measured. Leaders recognize that the very essence of the organization is not the organization chart or the financial statement, but rather consists of the intangibles and unmeasurables of culture and vision and values. This technology of leadership requires leaders to let go of counting and control and, rather, concentrate more on the feel, the sense, the essence of the organizations. Leaders understand this and learn to get the pulse of the organization by walking around, talking to people, observing operations and enjoying the interactions. In this way, the need for control and prediction is tempered by a confidence in the organizing principles of vision-fields, simple principles, and individual agency.

*Developing stewardship and delegation*

Leaders structure organizations to encourage quality performance and the development of new leaders. Managers rely on control, prediction, and ownership. Leaders, however, take a different perspective, understanding the idea of stewardship and its organizing power (Block, 1993; Fairholm, 1997; Greenleaf, 1977). Stewardship connotes holding resources in trust for a period of time for the good of the stewardship unit. It sheds

needed light on the oft-mentioned idea of empowerment and suggests specific structuring of organizations to encourage this empowerment. An organization based on stewardship principles expresses simple expectations of behavior and allows members the freedom to assert themselves towards accomplishing mutual goals. Members see themselves as essential to the organization's success and free within their stewardship responsibilities, unfettered by undue oversight, regulations or control. This does not mean that hierarchy no longer exists. In fact it does. The paradox is that hierarchy is used to relinquish control, not to hoard the financial, human, and informational resources of the organization (Goldstein, 1994). Order flows from these principles to create a structure made up of individuals who act within a vision-field, independently following a few simple principles within a structure of stewardship. In this way, stewardship patterns repeat themselves at all levels of the organization encouraging high performance and the growth of self-led followers.

*"Counseling-with" others*

For stewardship patterns to work up and down the organization, new ways of viewing the leader/follower interaction are necessary. Counseling-with followers is a new insight into the relationship between leader and follower (Fairholm, 1991, 1997, 1998/2001). The counseling role of typical leaders is unilateral action taken by the counselor toward the other person. In a word, counseling is telling. Counseling with followers is rather finding out together what is right, proper, and needed. Followers become advisors and leaders learn from the followers. This shared approach is often discussed in terms of participatory or democratic approaches to management. It is essential for the stewardship model of delegation to flourish, even, or perhaps, especially, when followers are not fully prepared or the environment is in a change mode. Sitting-in-council with followers puts the leader and follower together in an equal, sharing relationship, both committed to the stewardship at hand and both caring for the values of the others. Ideas flow freely as influence shifts from person to person. Any or all may propose or alter ideas, methods, problems, and solutions. This technology is based on relationship and meaningful interactions – the essential elements of leadership.

**Summary**

New sciences principles provide a better framework, even a better explanation, of the leadership phenomenon than past leadership theories. Those theories, in many ways, relied more on management science ideas. The new sciences principles also provide a better way to frame our mental models of organizations and prepare ourselves for the demands of leadership. More recent leadership theorists, recognizing the need for a more refined theory of leadership distinct from management, adopt approaches that have commonalities with some of the ideas outlined above. However, their frameworks mainly evolve from past theories of management. Placing these more contemporary leadership ideas in the framework of the new sciences provides a language and framework that is unique and powerful for leadership practitioners. The principles and technologies outlined in this paper are summarized below:

- For leaders, having followers organize themselves and work in harmony towards mutual objectives is the ideal. The followers grow and develop, as does the organization, when there is enough information, significant feedback, and a focus on the quality and effectiveness of relationships built on trust.

- When leaders get on the balcony, understand the creative destruction cycle, and lead people through transitions, the ambiguities of organizational (and political) life become less mysterious. The key is to learn to ask the right questions and remain open enough to learn that the apparent paradoxes and the twists in organizational planning are valuable lessons that help us move closer to our goals.
- Leaders realize that values are the basis of organizational vision and that vision, when adopted, is the organizational field that shapes individual and organizational action. They emphasize, teach, and make explicit the values of the organization and develop a vision that is essentially connected to what the organization stands for. Working within this vision field will yield productive and desirable outcomes, consistent with the implicit order of the organization.
- Leaders understand the role of relationships and meaningful interactions. Leaders dismiss the fallacy that total organizational control is possible, while retaining the idea that leadership has a very significant role to play in shaping and guiding individual and group behavior. Using a vision field, leaders shape the overall feel and structure of the organization, council-with others, adopt a few simple principles and encourage independent implementation of them, confident that the organization (and the individuals within it) will flourish and grow.

The new sciences present a metaphor or framework from which to view social interactions that suggests leadership technologies yielding practical, meaningful benefits to individuals, organizations, and societies. This outline of organizational principles and leadership technologies provides a practical path for leadership development based on a theoretical framework that is more descriptive of organizational realities.

### Notes

1. The term “new sciences” is used here to suggest two ideas about this new avenue of research: there are multiple scientific endeavors involved and there is a potential overarching theoretical framework within which the endeavors make sense (see Overman, 1996).
2. For many the word technology has a machine orientation. In its fullest sense (the usage here), technology is the way work is accomplished. One definition is “the practical application of knowledge, especially in a particular area.” Another is a “systematic treatment of an art.”
3. This framework forms the basis for a training course geared toward federal government senior executives. Participants have found the ideas and principles useful in dealing with their large, complex organizations.

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