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Virtual work and leadership: the role of the Internet, complexity, creativity, and knowledge workers.

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Abstract:

This chapter presents the case for strong leadership to develop an internationally distributed virtual workforce. It is a speculative approach to how work and workers may behave in a future where most of their work and interactions will be virtual and disconnected from their physical location. The lessons that can be learned from the natural world are explored especially from complexity theories. Examples are provided of natural systems in action and the insights others have drawn from these theories and how this may inform decision-making, risk-taking and the management of virtual workers. The impact of the Internet on knowledge creation and discovery is explored. These theories and trends have important implications for leaders and managers and for stimulating creativity and innovation. One can speculate that in future digital workers will live in two realities; the @-Home-culture and the @-Large-culture. Knowledge workers of the future will be able to create a healthy balance between these two realities by working digitally in a global system and benefiting financially, but also living and participating fully in their local or national culture. Ultimately this may lead to more tolerance and opportunities to distribute work and wealth in ways that equalize rather than divide people.

Introduction

This is a speculative approach to how work and workers may behave in a future where most of their work and interactions will be virtual and disconnected from their physical location. One can envision a potentially virtual workplace where the nationality, race, color, and creed of knowledge workers are increasingly less important but where their skills, creativity and ability to relate to others in a complex, sometimes disconnected workplace (in time, space and place) is evermore important. This idea is not far-fetched and occurs today in organizations with an international reach and membership. In the heyday of the dot-com revolution, many workers were tied to more than one initiative or company, working simultaneously on multiple projects for more than one “boss”. This continues but on a more measured and sustainable scale. There are lessons to be learned from such “e-lance” workers (Malone & Laubacher, 1998), their distributed work and workplaces, and the leaders who lead them and manage their role in organizational outcomes. These organizations and their distributed workers would display exceptional abilities to handle complexity, ambiguity, uncertainty, and turbulence (CAUT). What I have referred to as being “caut” between a way that was and one that can be (van Reenen, 1997). There are a number of theories about complexity and chaos that function in the natural world that may provide insights into how to sustain an organization with

traditional components but that also needs to work in non-traditional ways and rely increasingly on virtual work and a distributed workforce. I will review the insight others have drawn from these theories and how this may inform decision-making, risk-taking and the management of virtual workers.

Why is such an understanding important? The world is divided along social, economic, political and cultural lines; into north-south, have and have-not countries, skilled and unskilled populations, and the like. Yet there is a digitally connected culture developing that have risen above nationalism, local politics and culture, and that exist on the Internet. Natural communities of common interest are forming based on shared sets of Internet-based skills and life experiences. Many companies and organizations have capitalized on these emerging trends to add flexibility to their operations. Knowledge workers in less-advantaged and developed countries generally move to developed areas to work at their full potential. The trends I discuss below will allow them to live and participate fully in their local culture but also participate globally and benefit financially. Ultimately this may lead to more tolerance and opportunities to distribute work in ways that equalize rather than divide people.

Tetenbaum (1998) identified other important factors that will require different approaches to leading and managing in the digital environment. He predicts that organizations that want to succeed in the 21st Century will have to cope with and adjust to the following realities:

1. **Technology:** The ‘infomedia’ industry is developing into one of the largest sectors of the global economy. Infomedia refers to the integration of computers, communications technologies, and consumer electronics. The new technologies increase efficiency and productivity, the speed of production, and places more decision making in the hands of the consumer. This creates an attractor condition (Friedman, 1998) that leads still more people to adopt technology as it becomes increasingly more affordable.
2. **Globalization:** Increasingly large numbers of people all over the world are interconnected in the flow of information, money, goods, or ideas; thus interdependence is growing.
3. **Competition:** Globalization and technology have led businesses to compete fiercely for a share in the worldwide market. Small companies can out-compete large, established companies based on flexibility and technological innovation.
4. **Change:** The changes we are currently experiencing are discontinuous and happening at an ever-faster rate. Organizations must be sufficiently agile to be instantly re-configurable to meet constantly changing conditions. The disequilibrium created by this type of change is unprecedented in our history. The environmental changes occurring are so different from earlier conditions that organizations are disconnected from experiences that informed past decisions and it becomes less and less feasible to learn from experience and tradition.
“The increase in the degree of connectedness constitutes the greatest change in life today. For it is not just that there is more change than ever before, but the inter-connectedness has changed the nature of change itself, making it more un-

plannable and unpredictable, more abrupt and dynamic than it has ever been or than our traditional organizational systems can handle.” (Wilson & Hayward,1999).

5. Speed: Increased technological speed is matched in business by fast paced product life cycles. This in turn, leads to escalating competition that may leave employees and managers in constant anxiety to keep up and eventually drain the organization of its staying power.
6. Complexity and Paradox: Paradoxes will be ubiquitous in the new millennium and will present a significant challenge to managers. Complexity may be seen as too overwhelming to make sense of and not allow for reflective decision-making. Later in this chapter we will explore the effects of complexity in greater detail.
7. Social inventions: The work of Talisayon (2001) leads me to add a seventh factor to this list, Social inventions. He says: “Social inventions - such as new business models now being spawned by the e-commerce revolution - are strategic knowledge products of human creativity. They change the way people live in dramatic, long- term and large-scale fashion.” In Toynbee’s final volume on A Study of History (London: Oxford University Press, 19975) A.J. (1975) identifies the two basic processes underpinning human progress: invention of new knowledge and tools (genesis) and copying by other peoples or societies (mimesis). Both processes are now disseminated globally at Internet-speed. Thus social invention occurs more rapidly and widely than it did in the Industrial Era.

All of these trends present challenges but also offer opportunities to improvise and innovate that will be explored in this chapter. For instance, the incorporation of ideas derived from Chaos and Complexity theories into management thinking is a significant new trend. Such theories enable us to understand why the power of new technology and electronic networks can unexpectedly and fundamentally change the way we work.

The Natural World and the Internet

Knowledge work is the fastest growing component of the 21st Century workplace. Although such workers are in high demand, there is a chronic shortage and they burn out quickly due to the level of complexity, uncertainty and ambiguity of the workplace. As we have discussed above, organizations compete more fiercely than ever in a global market place that can change direction on very short notice, vis a vis the collapse of many dot-com companies in the late 1990’s. One of the major factors responsible for increasing complexity and uncertainty is the Internet, and the resulting speed, turn-around, and unpredictable market forces.

Such chaotic behavior is not new to the natural world. Many theories exist for exploring such phenomena that may have applications for the emerging Internet-based virtual workplace. Mathews, White, & Long (1999) reviewed such theories that could potentially provide insight into social systems, including: Nonlinear dynamic systems theory, non-

equilibrium thermodynamics, dissipative structures, the theory of self-organization, catastrophe theory, the theory of self-organized criticality, anti-chaos, and chaos theory (collectively referred to as the complexity sciences). Their study is still one of the best extrapolations from the exact sciences to understand human systems.

Others have made even stronger connections between the complexity sciences and organizational systems. Istvan, as early as 1992, began exploring the role of the complexity sciences in productivity research. He points out that "a decade of observed large differences in productivity driven competitive advantage cannot be explained by traditional productivity notions or conventional strategic analysis" and that "large competitive differences appear to arise from a new productivity source, nonlinear systems dynamics in business organizations."

In the past it was reasonably easy for organizations to engage in strategic planning, setting new mandates and visions, and finding the people to act on these. When the environment is fairly predictable and there is even moderate agreement among people in the organization about future needs and challenges it is possible to plan but when uncertainty escalates and there is therefore less internal agreement, organizations function in what Stacey (1991, 1992) calls the "creativity space" at the edge of chaos.

Complexity theories, as we will see, provide potentially useful ways for looking at external systems, organizations' response to change and such external "threats", and how people can deal with complexity and ambiguity. First, we learn that successful systems transition between order and chaos. Second, that selection or learning drives systems towards this edge of chaos. Third, that systems that are too simple do not survive in a competitive environment, they are outperformed by more sophisticated systems with the ability to exploit their regularities (Mathews, White, & Long, 1999). However, complex systems that are too random do not survive either. It pays in survival terms to be as complicated as possible, without becoming totally "structureless". (Stewart 1993). According to Mathews, White, & Long (1999) "it is at this transition point between order and disorder (i.e., at the edge of chaos) where new structural arrangements and morphogenic changes are most likely to emerge"

The original and basic principles of complexity can be summarized from the classical works of Kauffman (1995), Holland (1995), and Gell-Mann (1994):

- Complex adaptive systems (CAS) are at risk when in equilibrium, therefore equilibrium eventually leads to devolution or death.
- Complex adaptive systems exhibit the capacity of self-organization and emergent complexity.

"Self-organization arises from intelligence in the remote clusters (or "nodes") within a network. Emergent complexity is generated by the propensity of simple structures to generate novel patterns, infinite variety, and often, a sum that is greater than the parts" (Pascale 1999).

- CAS tend to move toward the edge of chaos when provoked by a complex task. Bounded instability is more conducive to evolution than either stable equilibrium or explosive instability.
- Living systems cannot be directed only disturbed and are characterized by weak cause-and-effect linkages. One relatively small and isolated variation can produce huge effects while large changes may have little effect.
“This phenomenon is common in the information industry. Massive efforts to promote a superior operating system may come to naught, whereas a series of serendipitous events may establish an inferior operating system -- such as MS-DOS - as the industry standard”(Pascale 1999).

The damaging fires that wiped out 25 percent of Yellowstone National Park in the USA in 1992 is an example of the first principle. By suppressing natural fires for almost 100 years, the park managers had prevented the forest floor from being cleansed in a natural rhythm. The accumulation of deadfall generated extreme temperatures when fires did occur. The fire incinerated large trees and the living components of topsoil that would otherwise have survived. This is the price of enforced equilibrium. Below are more examples.

Examples of Natural Systems in Action

Examples of Complex Adaptive Systems that resemble nonlinear feedback systems abound in nature and are also observable in socio-economic systems. Such systems are composed of autonomous agents whose interactions with each other produce the emergent structures that form the unique properties of a system. CAS are based on a few rules and much randomness that create unexpectedly complex and sometimes useful results. The flocking behavior of geese - i.e. flying in a V-formation – is a popular example from the literature that illustrates this concept. Geese appear to follow a few simple rules when flying in formation:

- don't bump into each other
- match up with the speed of other geese flying nearby
- replace the lead goose when it gets tired
- always remain with the group.

A complex and efficient flying pattern emerges from these few rules. The group relies on constant feedback and adaptation to achieve its goal of remaining resilient in the face of changing circumstances such as encountering geographic or weather obstacles.

Three examples of socio-economic systems based on the paradox of rules and randomness are discussed below.

Silicon Valley

The phenomenal success of Silicon Valley is often pointed to as the start of the new ‘information economy’. The inevitable questions then arise: How was it ‘created or

managed”? Could it be re-created elsewhere? Other high-tech economic areas have emerged elsewhere in the world, especially in Ireland, England and Germany. In the United States those in Austin, Texas, the Triangle Research Area of North Carolina, and the Boston area’s Route 128, imitates Silicon Valley.

Clear patterns of emergence can be detected:

- Excellent educational institutions and large pools of skilled labor
- Availability of advanced technology
- Electronics manufacturers who form around these resources
- Component suppliers who are attracted by manufacturers and support companies.

The “rules” or common features in these patterns of geographical economic development would seem to suggest that they can be deliberately created, yet when governments attempt to artificially create these geographic concentrations, they often fail (Eisenhardt & Brown 1998). This is the “randomness” of chaotic systems. Chaos is self-organizing and no individual or organization was in charge of creating a high-tech industry in Silicon Valley, it “emerged” based on some natural rules and capitalizing on randomness. It is a prime example of how spontaneous self-organizing systems produce extraordinary outcomes out of chaos.

The Global Internet Economy

The Internet and its global marketplaces represent another type of self-organizing system. No one is really in charge of the Internet or planned its “emergence”. No particular country or organization is in charge of global markets, yet considerable coherence emerges from millions of independent, but connected, decisions. Malone & Laubacher (1998) point out that managing such a massive and unpredictable explosion of capacity and creativity would have been beyond the skills of even the most astute and capable executives. The Internet had to be self-managed and they speculate that “The Internet is the greatest model of a network organization that has yet emerged, and it reveals a startling truth: in an e-lance economy, the role of the traditional business manager changes dramatically and sometimes disappears completely.” We will explore the latter statement in more detail later.

The LINUX operating system

The Linux version of the UNIX operating system is an elegant illustration of a distributed complex adaptive system. The operating system was developed as free-ware that soon attracted the attention of more and more programmers. Software developers with similarly altruistic attitudes contributed their own ideas and improvements. The Linux community grew steadily, soon encompassing thousands of people around the world, all sharing their work freely with one another. Soon, this loose, informal group, working without managers and connected mainly through the Internet, had turned Linux into one of the best versions of UNIX ever created (Malone & Laubacher 1998).

How would such a software development project have been organized by one of today's major software companies or in our own organizations? Malone & Laubacher (1998) speculate that "decisions and funds would have been filtered through layers of managers. Formal teams of programmers, quality assurance testers, and technical writers would have been established and assigned tasks. Customer surveys and focus groups would have been conducted, their findings documented in thick reports. There would have been budgets, milestones, deadlines, status meetings, performance reviews, [and] approvals. There would have been turf wars, burnouts, overruns, [and] delays. The project would have cost an enormous amount of money, taken longer to complete, and quite possibly produced a system less valuable to users than Linux."

They suggest that the Linux community, a temporary, self-managed gathering of diverse individuals engaged in a common task, is a model for a new kind of organization, whether business, academic or research, that could form the basis for a new kind of economy.

Knowledge and the Internet

"All aspects of work and business -all products, all activities, all methods - have an information structure at their core that has long been hidden, just like the genetic codes of plants." (Maruca, 1999)

Managing an organization's information to improve organizational learning and success is knowledge management. We generally focus on the qualities of information that are relatively easy to manage, such as its capacity to be stored, processed, and transferred in vast quantities. Information is treated as an entity compatible with established organizational systems and channels of communication. However, information by itself has little value, as will be shown below; it is only when information interacts with other information and users that it acquires significance and value. Organizations that understand this generally have formalized ways for transforming information into useful knowledge. However, informal networks, often personal rather than institutional in nature, have proved most effective (Maas, 1998). The managerial qualities of experience and judgment, not more systems, Maas' study suggests, are what enable organizations to make effective use of information gathered serendipitously.

We know that the Internet is about information, but is it also about knowledge? It is neuronal, connected, central to present day communications, but does it add to the knowledge base of individuals and organizations without mediation? Can it inform the way we live, work and interact with others in ways that is "emergent" and result in unexpected changes in our attitudes to the world and its diverse peoples and cultures? To answer these questions we need to understand how value is created from data by working it into useful information that can form the basis of individual and organizational knowledge and growth.

Talisayon (2001) believes that value is created when useful knowledge is transferred to others who can utilize it and that “the exponential power to transfer information and knowledge to millions of other users is the reason why the Internet is a unique medium for creating potentially immense value.” Metcalf’s Law implies that the value of a network is proportional to the square of the number of its users. A recent ISC domain survey found that there are 109 million hosts (computers with IP address or domain name) in the Internet as of January 2001. Because the number of users connected to the Internet worldwide is usually estimated at about 10 times the number of hosts, Talisayon (2001) estimates that the Internet may soon reach the one-billion-user mark. The Internet best illustrates why information and knowledge networks are of strategic value to organizations and why businesses capitalize on this value as evidenced by the growth of e-commerce. These organizations are beginning to organize internal (company) and external information and manipulate its structure for economic advantage. According to Maruca (1999), traditional companies share characteristics with traditional farmers. Farmers followed the same farming practices for centuries by applying improved methods of cultivation incrementally. This served them well until genetic engineering became feasible. Genetic engineers changed the nature of corn, soybeans, orange trees, and other crops. They increased yields by hundreds of percentage points while resistance to disease are continually improving. Genetic engineers eventually also found ways to improve other aspects such as taste and color. They did this at the genetic level by manipulating the information within the seeds. Farmers can ignore the genetic engineers and go on using all the old, established methods, but they would find it more and more difficult to compete in a marketplace where others are using these advances. The benefits of genetic engineering are too revolutionary to ignore, i.e. “emergent” in terms of complexity theories.

The greatest value in business will ultimately reside in the information within business methods rather than their outputs. Maruca (1999) says that “There is, after all, more value in manipulating the information structure of the gene than there is in being a farmer. There is more value in being a user of electricity than in being a producer of electricity. There is more value in Microsoft’s intellectual property than in its products. Any business that thinks it is somehow insulated from the information revolution isn’t likely to succeed in tomorrow’s economy.”

Dell Computers™ provide another example of the importance of utilizing the information imbedded in processes. Dell™ sold about 70,000 computers in 2001. Whenever a computer is sold, a signal is propagated through the Dell system back to the suppliers. Thus the suppliers know immediately when and what materials to deliver to Dell factories so that the orders can be filled. Michael Dell says: “So you get out of this business of having inventory problems. You don’t have any inventory, what you have is information, and information is a lot easier to manage than inventory” (Anonymous, 2001).

The increasing importance of intellectual assets has compelled executives to examine the knowledge underlying their businesses and how it is used. Some companies automate

knowledge management; others rely on their people to share knowledge through more traditional means. The demands to build effective organizational learning processes in distributed environments are likely to accelerate especially when combined with the rapid developments in information technology. The role and supply of knowledge workers is crucial to this process.

Knowledge Workers in the 21st Century

Family and community structures have been adversely affected by the growth of industrial age institutions, the corporation in particular. When workers have home-life problems they are essentially “processed” by the corporation. Organizational managers generally see it as a human resource problem and commonly get somebody to counsel them. Peter Senge (quoted in Abernathy 1999) suggest we ask, "What is it about the way we organize and work that might be contributing to or creating the conditions for those problems?" As we will see, the Information Age may be returning workers to a more balanced family life, but first we have to discover how work is changing.

We are just now beginning to understand the implications of virtual work and distributed teams on the capacity to learn and to create “emergence”. Peter Senge says that “Over the last 100 years, the thrust of industrial development has been to destroy the family and community structures--the settings where we learn how to communicate--while the physical impediments to communication have been lowered. All of a sudden, you find a world of a few billion people able to communicate in real time, but they know less and less how to.”(Quoted in Abernathy 1999).

The nature of the workplace, the worker, and the work has been radically altered by the shift from an industrial to information age. Workers in the Industrial Era were usually located in urban factories doing repetitive and routine work, often on an assembly line. Productive workers were seen as those who were reliable, who did not challenge company rules and who were good at manual work. Workers in the Information Era, however, can work anywhere with electronic connectivity and can work flexible time schedules. They are required to be innovative, learn quickly and continuously, work collaboratively, and be comfortable with experimentation and risk taking. They require less supervision and more coaching and vision from their leadership.

Demographic changes will drive new ways of working based on Internet connectivity. It is estimated that 51 million so-called Generation Xers will be available in the US to fill the vacancies expected and resulting from the retirement of about 76 million baby boomers in the next 5 to ten years. These younger workers expect different rewards and challenges from the workplace. Gandossy (2001) says that loyalty and opportunities to contribute is more important to them than tenure.

“Gen Xers are looking for rapid growth, unique experiences and a constantly changing environment. Telecommuting is expected to increase significantly. The 21st century

employee is looking for meaning and will choose an employer that provides a higher order purpose. The 21st century Corporation needs to strike a healthy balance between agility and alignment. Employees respond to a sense of passion...Top performers, especially Gen Xers, expect and demand a fast track, or they will not think twice about leaving. Management should ensure that the best talent are being identified, developed, nurtured and rewarded in line with their contributions to the company.” (Gandossy 2001)

Because virtual work focuses on the level of managerial flexibility in the context of control and autonomy in the workplace, it fits nicely with the needs of this generation of workers. There will be significant benefits for organizations that empower virtual workers to self-manage actively through the development of trust, commitment and autonomy. Secondly, complexity thinking suggests that relationships between parts are more important than the parts themselves and that minimum specifications yield more creativity than detailed plans. Both these concepts fit well with the expectations of these types of workers and with Internet-based work.

According to US General Accounting Office statistics, 30 percent of U.S. workers are temporary, part-time or independent contractors, and this number is expected to increase with time. In fact, the number of people in nonpermanent positions is expected to eventually surpass those in full-time permanent positions. In 1999, nearly 20 million people in the USA teleworked, and that number should reach 30 million by 2004, according to Telework America. The Gartner Group estimates that telecommuting improves productivity by as much as 40 percent, making this trend a win-win situation for both employees and employers. More about this later in the section on Telework.

Implications for Leading and Managing 21st Century knowledge workers

We have seen that one of the most significant implications of the complexity sciences is that dynamic, nonlinear systems may exhibit surprising and counterintuitive behavior, making prediction, control, and traditional management and strategic planning problematic. Cartwright (1991) notes that one implication for planners is that even if the "rules of the game" are completely known and understood at the local level, it may be impossible to predict global results and ". . . this problem is inherent rather than situational . . . planning based on prediction is not merely impractical in some cases; it is logically impossible". In the past it was reasonably easy for organizations to engage in strategic planning, setting new mandates and visions, and finding the people to act on these. When the environment is fairly predictable and there is moderate agreement among people in the organization about future needs and challenges it is possible to plan. However when uncertainty escalates and there is less internal agreement, organizations function in what Stacey (1991,1992) calls the "creativity space" at the edge of chaos, where adaptation is at the heart of competing on the edge.

The lesson here is that rather than stifling chaos, managers should allow it to flourish in parallel with traditional business and research activities. In nimble organizations leaders should ensure that the work environment encourages interaction and creativity and they should not provide answers but create the flexibility that encourage employees to come up with the solutions. In complex turbulent environments the mechanistic, authoritarian and hierarchical decision-making process is too slow and too cumbersome to react to the situation. Employees at every level of the organization may hold a piece of the puzzle that is critical to completing the picture.

We can begin to extrapolate the new requirements for leadership in the emerging electronic workplace from the above discussions. Wilson & Hayward (1999) provide excellent real life demonstrations of the principles of complexity in organization and, although I have not used their examples below, is essential reading for leaders seeking a practical understanding of the these concepts.

New Leadership Requirements in the Digital Environment:

- Leaders give up control to achieve innovation

‘So, when you insist on your vision, when you try to stick to your blueprint, when you cling with so much determination to control, are you destroying the capacity of your organization for complex learning?’ (Stacey 1996 b).

- Leaders foster communication and build relationships

‘In this new world span-of-control mentalities must give way to span-of-communication mentalities.’(Leinberger and Tucker, 1991)

Leaders communicate obsessively and share intelligence, information and meaning *directly* to employees. They create opportunities for discussion and use every communications technology available to the organization. This will encourage two critical components of creativity: posing questions and involving unlikely partners in conversations, discussions and meetings.

Leaders need to communicate both formally and informally to forge relationships and knowledge networks. Research suggests that it is a mistake to think about knowledge networks only in terms of technology. It is important to study the web of relationships that exist among the parts of an organization. The way a group is linked to others has a dramatic effect on its performance (Cliffe 1998). The difference in performance can largely be traced to two organizational factors: a group’s centrality in the corporate network and the types of relationships it maintains with other parts of the organization. The relationship between two units, or in the case of this chapter topic, distributed virtual teams, should be tailored to the type of knowledge that needs to flow between them.

- Leaders create a “boundaryless” learning culture

Jack Welch, the CEO of General Electric Company coined this term to describe his company's system of Work-Out (Abernathy 1999). The latter process brings people of all ranks and functions--managers, secretaries, engineers, line workers, customers and suppliers--together into a room to focus on a problem or an opportunity and then to act rapidly and decisively on the best ideas developed, regardless of their source. Welch says:

“This boundaryless learning culture killed any view that assumed the GE way was the only way or even the best way. The assumption is that some one, somewhere has a better idea; the compulsion is to find who has that better idea, learn it, and put it into action--fast. In the early 1990s, after we had finished defining ourselves as a company of boundaryless people with a thirst for learning and a compulsion to share, it became unthinkable for any of us to tolerate--much less hire or promote—the tyrant, the turf defender, the autocrat, the big shot. They were simply ‘yesterday’ ” (As quoted in Abernathy 1999)

- Leaders develop resilient employees who can absorb future shocks

We have discussed the need for interactivity and sharing intelligence but to manage the unknown future an organization must have the capacity to absorb shocks in times of uncertainty and chaos. All information-based organizations such as libraries, healthcare organizations, universities, and governments are experiencing such times. Employees will need certain characteristics to become more resilient. They will need to be focused, organized, proactive, and must develop confidence in their ability to deal with change. This is encouraged through training, building an understanding of the external world and global socio-economic changes, and by creating an organizational culture of continuous improvement, sharing, and learning.

- Leaders create diversity and variety

Organizations tend to equilibrium as discussed above, to counteract this and encourage “emergence”, leaders need to insert the unexpected and create diversity (i.e. disturbing a living system). One of the Internet's main characteristics is the diversity of participants and ideas, thus it is the ideal tool toward this end. Resistance to change and diversity of all sorts is, however, as inevitable in virtual distributed workplaces as in traditional ones, but necessary as it creates useful tension and conflict. Pascale (1999) makes a useful analogy with biological emergent systems such as mutation. He says:

“The ‘exchanges of DNA’ attempted within social systems are not nearly as reliable as those driven by the mechanics of reproductive chemistry. True, organizations can hire from the outside, bring seniors into frequent contact with iconoclasts from the ranks, or confront engineers and designers with disgruntled customers. But the enemy of these methods is, of course, the existing social order, which, like the body's immune defense

system, seeks to neutralize, isolate, or destroy foreign invaders. 'Antibodies' in the form of social norms, corporate values, and orthodox beliefs nullify the advantages of diversity. An executive team may include divergent interests, only to engage in stereotyped listening (e.g., "There goes Techie again") or freeze iconoclasts out of important informal discussions. If authentic diversity is sought, all executives, in particular the seniors, must be more seeker than guru."

- Leaders ensure effective decision making and encourage risk taking

Clearly, leaders must be able to manage the paradox of chaos and order as they juggle creativity and experimentation along with control and efficiency. In the evolving electronic workplaces, leaders must "push the envelope to survive, we live in a constant stream of tensions: balancing work with play, creativity with competition, complacency with outrageousness" (Tetenbaum, 1998). This means honing the decision-making skills at all levels of management. Decision-making is the most important job of any executive. It is also the toughest and riskiest because of the ways in which human psychology can sabotage decisions. Decision makers display a strong bias toward alternatives that perpetuate the status quo as we know from our own experiences! Such psychological and group phenomena, are called "decision making traps" by Hammond, *et al* (1998). In the electronic environment, especially when investing in information technology, many leaders and their management teams are treading new ground. Understanding and awareness of such traps are more necessary than ever.

- Leaders integrate and synergize

Leaders must have the ability to integrate opposites. The challenge for managers and their teams is to create coexisting, highly differentiated as well as highly integrated organizations. Differentiating units is easy; achieving integration is not. Tushman & O'Reilly (1999) stress that innovation (either incremental or discontinuous) stems from two component processes: those structures, people, incentives and cultures that promote creativity and those that facilitate implementation. The need for creativity must be balanced with the need for execution; they state that:

"Organizations can sustain their competitive advantage by operating in multiple modes simultaneously - managing for short-term efficiency by emphasizing stability and control, and for long-term innovation by taking risks and learning by doing. Organizations that operate this way may be thought of as ambidextrous - hosting multiple, internally inconsistent architectures, competencies and cultures, with built-in capabilities for efficiency, consistency and reliability on the one hand, and experimentation, improvisation and luck on the other."

- Leaders encourage the sharing of solutions

Units, teams, and people should be required to function in alternate roles of teacher or coach and student, sharing what they have learned and learning from others. As an example, General Electric's Medical Systems business is a leader in remote diagnostics. CT scanners installed by them in hospitals can be monitored remotely by service people while they are in operation. They can detect and repair an impending malfunction, sometimes online, and sometimes before the customer observes the problem. The Medical Systems division shared this technology with GE's other business units. This enabled the Aircraft Engines, Locomotives, Motors and Industrial Systems, and Power Systems businesses to monitor the performance of jet engines in flight, locomotives pulling freight, running paper mills, and turbines in operation in customer power plants (Abernathy 1999).

- Leaders encourage creativity and innovation

Today's leaders are challenged to create an environment that encourages unexpected advances and unleashes creativity in traditional organizations such as our universities and research establishments. The rest of our discussion focuses on this aspect of the new leader. There is a shortage of technically skilled workers and even more so of innovators. Retention and recruitment is one of the greatest obstacles to developing digital services and information products.

Strategies for creating the digital workplace and worker

Telework or telecommuting

Telework is driven by computers, email, voicemail and the Internet and marks the transition from working in the industrial age to working in the information age. The potential strategic and competitive advantages of the mobility and flexibility provided by virtual work environments are beginning to impact all types of enterprises. More and more all work places are managing alternative work arrangements usually mixing virtual and non-virtual offices and activities. The debate to define telecommuting continues but experts generally use the term "telework" as it describes any work, formal or not, that is done away from the office, whether at home, at shared locations, or at satellite offices, by all kinds of workers, including employees, independent contractors and home-based business owners.

Is telecommuting or telework a robust feature of future workplaces? The number of telecommuters in the USA rose to 15.7 million in 1998, and then to an estimated 18 million in 1999 (Alexander 1999). Telework statistics is difficult to confirm because of the differing definitions used to identify such workers. The US Bureau of Labor Statistics (BLS) counts 5.4 million workers under its broadest measures, including those who work from home at least part-time, making up 4 percent of total employment. IDC, a technology consulting company in Framingham, Mass., estimates that the number of telecommuters in the USA reached 9 million in 2002. The company defines

telecommuters as those who do any work at home during off hours or during at least part of a typical workweek. A study by the US General Accounting Office (GAO) report that an estimated 16.5 million employees telecommute at least once a month, and 9.3 million employees telecommute at least once a week. The GAO defines telecommuters as employees who have formal arrangements to work at least one day a week off-site away from the office, either at home or at another location, like a telecenter. A 2000 study by the International Telework Association & Council (ITAC at <http://www.telecommute.org/>) in Washington, D.C., estimated there were 23.6 million telecommuters in the United States. For this study, ITAC defined telecommuters as those whose full-time job permits telecommuting (Wells 2001, see Sidebar).

Terrorism in the USA has highlighted the necessity of telecommuting as an effective strategy against natural disasters or other calamities - a way to keep workers working. Companies impacted by the World Trade Center disaster who had some previous telecommuting experience were faster at finding ways to get employees working again - whether at home or some shared space - in the weeks following the terrorist attacks. The ITAC found that workers are anxious and more now prefer to work at home whenever possible.

"A lot of people are going to want to telecommute more, and this is going to be a permanent change." (Armour 2001).

Wireless technology is a co-trend of telework and will be a significant "attractor" factor as the technology develops. The Cahners In-Stat Group (at <http://www.instat.com/>) estimates that roughly 47 per cent of the US workforce had access to wireless voice, pagers and/or Palm Pilots and other mobile computing devices, by the end of 2001. They expect wireless adoption in the business market to rise steadily, reaching more than 60 per cent of the US workforce by 2004 (Davies 2001). Wireless technology is also a growing trend in developing countries where wired services are limited. Similarly, the smallest companies (firms with fewer than 100 employees) are expected to account for the largest group of business users ' working wireless' in the future. In Europe, a new report from Analysys (at www.analysys.com/vlib/), a telecommunications research company, claims that the mobile communications data market could grow from 7 billion Euro in 2000 to almost 130 billion per annum by 2011.

All in all, distributed electronic work could become a major global trend. Conceivably an organization's workforce may work from numerous countries in virtual teams with team members who have never met face-to-face. At this point it will be useful to look at a case study. I have used a description of employee preparation at Merrill Lynch as described in Wells (2001). Merrill Lynch spent four years studying how best to implement the virtual workplace option before instituting a formal telecommuting plan in early 1996. This careful planning resulted in a guide for managers of virtual work arrangements and a four-step preparation process.

“Much like a family counseling session, it includes a workshop in which the employee and the manager hash out issues that could potentially poison the telecommuting relationship. For example, both employees and managers consider, devise and agree on ways of measuring productivity, workflow and time management; map out how the telecommuter will communicate with co-workers; and discuss how to quell fears of career sabotage from being out of the office. The final step is up to two weeks of practice in a telecommuting “simulation lab,” a kind of telecommuting school, where soon-to-be telecommuters work alone. Although they may be in the same building as their managers, they communicate only by phone and e-mail—just as they would from home. They also learn how to troubleshoot problems with their PCs, software and other equipment they will use at home.” (Wells 2001)

The result of this careful planning: Telecommuters increased from about 100 in 1996 to 3,500 people in 2001 who work from home between one and four days a week. An increase in productivity of between 15 percent and 20 percent has been reported among their telecommuters, as well as 3.5 fewer sick days a year and a 6 percent decrease in turnover during the first year of the program (Wells 2001).

Group Support Systems and Collaborative Technologies

Whatever the advantages and challenges of virtual work and workers, this trend is here to stay and will impact leadership and the management of information workers. Computer-supported cooperative work (CSCW) holds great importance and promise for this new workplace and for society at large as any form of electronic work require the correct tools. For the types of workers we discussed above that means having an array of reliable, portable tools that facilitate communication, organization, and performance. The good news is that such technology is not only essential for telecommuters, but is also used by those working in conventional workplaces.

People who work together in cross-functional or even cross-organizational teams must quickly establish a work plan, divide up tasks, and determine means of coordination and self-regulation. Often team members work asynchronously, but their work must still be coordinated effectively. Problem resolution, idea generation and innovation are enhanced when using group support systems. Electronic communication can provide three components that may significantly change information exchange (Mills 1999): parallelism, anonymity, and group memory. Parallelism is the ability of all members to exchange information simultaneously. This allows a group member to participate when he/she has an idea without having to wait their turn. Anonymity allows even the most timid worker to participate on a level electronic playing field. It also encourages more risk taking and more outrageous but potentially useful ideas. Group memory is the electronic capture of the group’s work. This is then available for review by the group and others in future to stimulate new ideas and add to the value of organizational intellectual capital. All the members of a group thus have a common, shared memory that can be used during or after the meeting. One of the underlying assumptions of the impact of

group memory on idea generation is that this feedback improves individual problem solving as well as electronic brainstorming in general (Satzinger *et al* 1999).

There is a large body of literature on available collaborative technologies. Benford, et al. (2001), for instance, provides a good description of how Collaborative Virtual Environments (CVE) aims to transform computer networks into three-dimensional spaces that support collaborative work and social play. More information on virtual collaboration can be found by visiting the web site of the *Collaboratory for Research on Electronic Work* at <http://www.crew.umich.edu/>.

Virtual cross-functional teams and skunk works

Our earlier discussions of complexity theories and the resultant lessons for leaders, managers and organizations clearly point to work arrangements that simulates complex adaptive systems and stimulate creativity, innovation and fast turnaround of ideas, services and products. How can leaders bring the “startup mentality” inside large existing organizations? How can these concepts work across national borders to create an international virtual workforce? Virtual cross-functional teams are the proofing ground for such a future world of work by creating entrepreneurial units within the traditional organization from which the rest can learn.

Stepanek (1999) calls such virtual cross-functional teams “rebel bands” and Tushman & O’Reilly (1999) calls them “skunk works”. Such groups are relatively small, have loose decentralized product structures, experimental cultures, loose work processes, strong entrepreneurial and technical competencies and are relatively young and heterogeneous employees. Entrepreneurial units build new experience bases and knowledge systems; they generate the experiments, failures, and they create the variation from which possible dominant designs or technological discontinuities can emerge. The ambidextrous organizations referred to earlier, build in contradictions as they operate both for immediate payoff and for future new directions. Tushman & O’Reilly(1999) believes that management must protect and legitimize entrepreneurial units and keep them physically, culturally and structurally separate from the rest of the organization. There is good evidence that this “rebel culture” pushes decision-making deep into the organization and cut through layers of bureaucracy, resulting in the creation of even more innovative teams and a greater tolerance of diversity (Stepanek 1999).

Collaborative behaviors rarely emerge in teams unless senior management and team leaders take specific steps to create an environment of trust, creativity, and collaboration. The study by Jassawalla & Sashittal (2001) of new product development processes in ten high-technology industrial organizations shows, however, an enormous disparity between expectations and reality. Despite good intents, many high-technology firms find that cross-functional teams do not deliver as highly as expected. What causes these

disappointing outcomes? A lack of leadership understanding and new management practices that is appropriate for these virtual cross-functional teams.

“Effective senior management and effective team leaders build collaboration and accelerate new product development processes principally because they understand the complex developmental process by which collaborative behaviors are learned by participants. They understand that transforming linear new product development processes - where each functional group makes its part of the new product decision and hands its output over the wall to the next group - into organic processes is essential for harvesting the innate talents and creativity of people. Hence, they focus their energies on developing an organizational and team culture in which people can discard their old ways and adopt new ways of thinking and doing.” Jassawalla & Sashittal (2001)

The acquisition, growing, and keeping of creative people

Learning organizations are challenged to grow and keep creative people and to encourage virtual cross-functional teams. It is not advisable to manage creative people in traditional ways. Below are some strategies for doing so from the works of Gibbs (2001), Cook (1999), and Butler & Waldroop (1999).

1. Risk hiring unusual people and create a culturally diverse workforce.

Most organizations tend to err on the side of conservatism in their hiring practices. They choose people who are like them, people who give the answers they expect and thus end up with “clones” that rob the organization of the needed dynamism and creativity. “Group-think” and “group-speak” thus is increased and adds to existing tradition rather than opening up the organization (Gibbs 2001).

2. Structure without control.

It is better not to try to manage creative employees at all. It is more effective to motivate them through new leadership behaviors. They require more freedom, with the only structure provided through deadlines and guidance, rather than management techniques.

“High-tech and artistic people don’t accomplish anything without structure, but the structure needs to be primarily unknown to them and unconscious.” (Cook 1999).

3. Forget the 9-to-5 work day.

Creative people work on their own flexible schedule. They need the abovementioned structure and systems to check in with managers, but rarely care about working a 40-hour work week.

4. Right brain and left brainworkers.

Teams usually consist of right brain (creative), left brain (technical), and strategic (synapse) members (Cook 1999). Although there are some inherent difficulties in getting

creative and noncreative types to work together effectively, allowing employees' unique personalities to become apparent through management development exercises help them to see the value of others.

5. *Feedback needs to be adjusted for these new types of workers*

Knowing how to give feedback is a crucial aspect to improve relationships between creative and more traditional workers. Because the creative process is such an intensely personal pursuit, improperly presented feedback can be extremely damaging. Therefore, it's necessary to help creative workers articulate how they feel about the feedback they've been given. By setting clear expectations in the beginning, a manager can tie criticism back to the initial expectations and explain why certain aspects of the project don't work. Integrating peer reviews into the evaluation process generally provides greater credibility as most creative work is highly subjective.

6. *Creative career track options*

Creative types generally do not make good managers and other career paths needs to be developed for them. They must have assurances that they can rise high in the organization without being forced to manage people.

7. *Learn to manage people who are smarter than you*

Non-technical people may have to manage technical people and may be perceived as less smart than their employees. However, leaders and managers need not be as technically proficient as those who work for them because their role is quite different. This should not be a stumbling block in hiring and keeping creative workers.

8. *Job sculpting*

Another strategy to keep new types of workers is to "sculpt" jobs specifically for them. Job sculpting is used as a competitive strategy by many electronic-based organizations but is more difficult in traditional organizations. It is the art of matching people to jobs that resonate with the activities that make them happy. Butler & Waldroop (1999) says that managers need to listen more carefully when employees describe what they like and dislike about their jobs and talk about their deeply embedded life interests. They then work together to customize future work assignments. Employees stay at jobs only if the job matches their deeply embedded life interests

Methods for stimulating and encouraging creativity

"Crazy people who are productive are geniuses. Crazy people who are rich are eccentric. Crazy people who are neither productive nor rich are just plain crazy. Geniuses and crazy people are both out in the middle of a deep ocean; geniuses swim,

crazy people drown. Most of us are sitting safely on the shore. Take a chance and get your feet wet.”

(Michael J. Gelb, quoted in Gibbs 2001)

There is a need to systematically enhance and support creativity and innovation in the digital workplace and to produce novel but appropriate ideas to solve technological and human challenges. Organizations that deliver the same products and services in the same way as we have seen earlier, will not survive in the long run. This is especially true for organizations functioning at the edge of chaos in the growing global economy. Innovations in products, services, advertising, promotion, and compensation are the lifeblood of all businesses but especially e-business. Larson (2001) warns that tolerance of creative people can and must be taught even though innovation and creativity cannot be taught.

Creativity and complexity

The Internet has become a hive of creativity as exemplified by the explosion of ideas from the dot.com revolution. The Internet is also tolerant of creativity. A new international workforce can be created around this creative wellspring if we keep the principles of complexity theory in mind: Emergent complexity is driven by a few simple patterns that combine to generate infinite variety. Kao (1997) shows clearly how one simple creative breakthrough can “evoke a cascade of increasing complexity. ‘Simple’ inventions such as the wheel, printing press, or transistor lead to ‘complex’ offshoots such as automobiles, cellular phones, electronic publishing, and computing.”

Sullivan (2000) defines creativity and innovation thus:

“Creativity is the process of bringing a novel idea into existence. Innovation is the practical application of creative ideas.”

He describes three key elements for a creative workplace:

- individuals who are willing to tap their creativity and express ideas
- an environment which supports creativity and innovation, i.e. risk taking, trust, openness, play, and humor
- allowing time for idea generation
- having the necessary resources (time, money, energy, technology & learning)

We have already seen from discussions in earlier sections of this chapter that we can identify a number of resources needed by creative organizations: knowledge, intellectual abilities, thinking styles, motivation, personality, and the environment. There is a body of scientific literature that explores the ability of organizational processes to enhance creative thinking and innovation. A comparison of a number of these can be found in Andriopoulos and Lowe (2000). Their study was conducted on subjects working in organizations whose main business is creativity, thus some points may be overstated for

organizations with large traditional process-based components. However, I believe their ideas are so important for an Internet-based workforce that they need to be discussed here in some detail and that they apply to creative work in all types of organizations.

This section is written with the naturally creative person in mind and for teams whose main purpose is to solve problems through innovation, whether in a temporary or permanent capacity, whether working onsite or virtually. Thus, when I refer to ‘employees’, I mean those people identified for or assigned particularly to creative functions. There is clearly a need for employees in other parts of the organization who can maintain and continually improve existing processes and functions.

First, however, a story of two creative people speculating about creativity: Paydarfar & Schwartz (2001) describe the process for discovering new knowledge in an editorial for *Science Magazine*®. In "An Algorithm for Discovery" they summarize their discussions on this topic while carpooling. Their five simple principles for creating new knowledge are:

- Slow down to explore. Resisting quick closure and instead actively search for deviations and inconsistencies
- Read, but not too much, as it is important to master others' ideas and one's own fledgling ideas need nurturing from other sources
- Pursue quality for its own sake. They believe that rigorous attention to refining methods and design helps to avert premature rejection or acceptance of hypotheses
- Look at raw data. Doing so first hand provides a check on automated averaging
- Cultivate smart friends to sharpen critical thinking and spark new insights

Putting creativity concepts into practice through ‘Perpetual Challenging’

Andriopoulos and Lowe (2000) provide one of the best theoretical frameworks for examining the formal and informal elements of creativity. They established that the grounded theory of ‘Perpetual Challenging’ is a reliable and practically useful process for enhancing organization creativity. I am therefore providing a more detailed summary of this concept.

Perpetual Challenging (PC) refers to ways of encouraging creative and intelligent workers to achieve their full potential, to enhance ‘employees’ internal drive to perceive every project as a new creative challenge so that their individual contribution is maximized and an innovative solution can arise.”

PC consist of four processes for enhancing creativity: *adventuring, overt confronting, portfolioing, and opportunizing*. The authors’ definitions follow below.

Adventuring is the process through which individuals are encouraged to explore uncertainty. This is achieved through experimentation, introspection and the making of scenarios.

Overt confronting refers to “the deliberate [setting] of work-related debates among employees ... so that their creative thinking is fully utilized”. They identify two types of confronting, conceptual and contextual. *Conceptual confronting* uses the constant

questioning of external, internal, and each other's ideas. This creates healthy conflict and a better understanding of the underlying issues. *Contextual confronting* occurs when there is organizational pressure placed on employees by requiring them to work at ever-higher levels of difficulty and against deadlines. They constantly confront new obstacles and learn continually from the projects and each other (see also related work by Senge, 1990 and 1999, in this field).

Portfolioing require that employees get involved in a diverse range of projects and with different project teams. It is an important creativity-building skill to work on multiple projects simultaneously. It also allows a group or individual to switch from project to project when they are temporarily at a loss for new ideas and to renew their creativity by working on something different.

Opportunizing refers to a process that allows employees to work on projects not only because it is required but because there are significant tangible benefits in it for them. There should be opportunities for financial rewards as well as recognition; "the ideal project is the one that has creative as well as financial opportunities".

All of these techniques lend themselves exceptionally well to the virtual worker, especially for virtual cross-functional teams. There are many other processes that have been used to stimulate the generation of creative ideas. Below I list more of these. It behooves organizations in the rapidly changing electronic environment to explore as many of these as possible.

- Exploiting uncertainty. Ensuring that each rational process has its irrational side can exploit uncertainty. For instance, meetings should have an orderly part as well as a chaotic portion. Leaders should ensure that employees understand the value of the discussions and concepts from the previous sections, in particular ideas contained in the works of Stacey between 1991-1999. According to Sternberg et al (1997) managers should allow "messiness" to exist and stresses that the uncertainty associated with creative projects must not be controlled just because of a need for orderliness in traditional settings.

- Electronic meeting and brainstorming systems are useful in generating ideas. Everyone in the meeting can "talk at once" by typing into his or her computer. The system then instantly distributes the contributions throughout the group. This means that participants do not lose track of their ideas while listening to other contributions, nor do they lose track of what others are saying while they are contributing-because all ideas become part of a real-time and permanent written record. Strong personalities can no longer dominate or sidetrack a meeting. Weaker personalities have equal access to the "floor." And because individuals provide input anonymously, participants evaluate each idea's merit independently from the personality of the person delivering it. Participants can float unconventional or unpopular ideas without evaluation apprehension.

- "Scenario planning" is a process that enables work groups to visualize a range of opportunities through analyzing trends and competitive intelligence. The process facilitates a break with traditional thinking and encourages creative "what if" thinking.

Arranging trends in some form of a logical “story” can facilitate comprehension and relevancy. This brings to the surface unspoken assumptions about the future, challenges mental models, and frequently unblocks creativity and resourcefulness. (Tucker 1999)

- Thinking exercises can be employed when work groups are stuck for new ideas. The Six Hats method is a well known thinking tool kit developed by Edward de Bono, the man many regard as the authority in teaching thinking as a skill.

- Collaboration. The previously mentioned study by Jassawalla & Sashittal (2001) also looked at the nature of inter-functional and interpersonal linkages occurring in the organizations with teams that collaboration at a high level. They found that such team members had learned and developed distinctively new ways of thinking and acting, which meaningfully differentiated them from others. They could identify four foundations for new learning and actions:

“First, for instance, collaborative teams had achieved high levels of at-stakeness (Liedtka, 1996). They were equally and highly committed to the collective intents of the team. They took ownership and personal responsibility for accomplishing team objectives, and they committed to changing their ways of thinking and doing in order to achieve new results. At-stake teams had either converted or eliminated skeptics. They also had no uninterested participants.

Second, collaborative teams had achieved high levels of transparency. Transparency refers to the high levels of awareness they professed about each other's agendas, orientations, interests, and objectives. Transparency signaled the development of a shared vision and the emergence of trust among participants. In transparent teams, there were no hidden or covert agendas, and few misunderstandings.

Third, high-collaboration teams had achieved high levels of mindfulness, i.e., they had begun to reflect in their actions the high levels of shared understanding they had reached. In mindful teams, members behaved as if they understood the breadth of concerns and orientations that existed. In mindful teams, every member could explain why other members (whether acting alone or as part of the team) did what they did and found it easy to support their actions.

Finally, we found that collaborative teams had achieved high levels of synergy. They had developed a team environment in which they trusted each other to the extent that they could engage in constructive conflict and push each other into developing solutions that stretched every participant's notion of what was doable and achievable.

Synergistic teams produced, as a result of their intense interactions, results that far surpassed the simple sum of their capabilities.”

Summary

Leaders in the information economy and managers of a potential global virtual workforce need to understand the concepts and management philosophies that drive innovation and success in this environment. It is critical to allow less control and more creativity and risk

taking in everyday business. The demands to build effective organizational learning processes in distributed environments are likely to accelerate especially when combined with the rapid developments in information technology. The role of leaders in this kind of world are not to direct others in what to do but to establish the conditions in which workers can realize their own creativity on a much larger scale than is currently the case. Leaders are challenged to create an environment that encourages unexpected advances (“emergent structures”) and unleashes creativity in traditional organizations such as our universities and research establishments. We must shift our focus (Sanders 1998):

- *“from microscopic, local views with a focus on the marketplace to global views, with focus on the environment*
- *from a model wherein structure creates process to a model wherein the interactions within a system create self-organizing structures*
- *from a focus on organizational pathology to a focus on organizational potential*
- *from paying attention to policies and procedures that are fixed and inflexible to paying attention to perking information and emerging events*
- *from planning steered by strategic-planning committee or consultants to whole-system input into planning process*
- *from a focus on quantitative data to visual thinking in the big-picture context*
- *from seeing change as a threat to seeing change as an opportunity*
- *from leadership being responsible for success to everyone being responsible for success.”*

The modern leader has four roles - direction-setter, change agent, communicator, and mentor. Nanus (1997) believes that “these [four] provide the answer to all the turbulence, exploding uncertainty, change, and complexity” that face leaders in the global economy and the rapidly changing electronic environment.

@-Home and @-Large cultures; a speculative discussion.

“One consequence of emerging complexity is that you cannot see the end from the beginning. While many can readily acknowledge nature's propensity to self-organize and generate more complex levels, it is less comforting to put oneself at the mercy of this process with the foreknowledge that we cannot predict the shape that the future will take. Emerging complexity creates not one future but many.” (Pascale 1999)

There seems to be great opportunities opening up for working digitally on a global scale. This chapter attempted to make the case for leadership in developing an internationally distributed workforce. Why should this be a priority for a digital culture? Below is a speculative and, admittedly futuristic and idealistic, extrapolation based on the information provided.

My original premise was that nationalism could co-exist with “globalism”. The latter refers to participating in a global digital culture without reference to one’s local culture, nationality, color or creed. In fact, being unshackled from local economic, cultural and religious bonds when functioning in the global digital workplace. For convenience, we can call these two realities the *@-Home-culture* and the *@-Large-culture*. Knowledge workers of the future will be able to create a healthy balance between these two realities by working digitally. The benefits of such a dual cultural existence could be:

Keeping people @ home

Knowledge workers in less-advantaged and developed countries generally move to developed areas to work at their full potential. The trends discussed in this chapter will allow them to live and participate fully in their local culture but also participate globally and benefit financially.

Keeping Taxes @ home:

Bringing money into the local economy also add to the tax base necessary for local development and infrastructure.

Keeping expertise @ home:

There is a global shortage of information technologists and knowledge workers. Working from one’s own country keeps expertise in the region while not restricting work opportunities to the region.

Bringing money home and spreading the benefits around:

The large IT workforce in India that works on outsourced projects from other countries is a prime example of spreading the benefits of e-commerce around. This should become an economic strategy for all developing countries, supported by local policies and investments in IT infrastructure.

Combating parochialism and the worst aspects of nationalism:

Isolation can exist even in a connected world. A globally connected and available virtual workforce may be able to rise above national concerns and provide opportunities for further democratization of countries around the world. In such a world, if you hurt any part of it, you hurt the whole. This may lead to more sustainable peace efforts as the works of the late Buckminster Fuller has long advocated (see the *Humanity’s Option for Success* website at <http://www.bfi.org/>.) Networking an expanding @-Large-digital-culture should create a greater understanding of cultural differences overall and thus place greater value on diversity rather than on aggressive nationalism.

Increasing supply and demand for information workers:

If more IT and knowledge workers stay in local communities but work virtually the opportunities to expand this sector of the workforce will improve because of role modeling, availability of teachers, and more opportunities to study and receive continual training online.

Stimulating innovation and tapping creativity for global progress:

Cross-functional, cross-national teams or “skunk works”, as we have seen, increase the potential for innovation and break-through discoveries. Virtual work lends itself particularly well to creative processes discussed in the section on creativity.

Creating a cadre of leaders that understand how to manage and lead a distributed virtual workforce:

Such leaders would differ radically from today’s “international managers” found in multinational companies. They would be more aware of, and value different cultures. They would have a greater understanding of complex adaptive systems and the importance of less control and more support of creativity.

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Read more on virtual work in:

- *Collaboratory for Research on Electronic Work* at <http://www.crew.umich.edu/>.
- *International Telework Association and Council* at <http://www.telecommute.org/>
- The ITAC also provide training on telework
- Froggatt, Cynthia C. (2001). Work Naked: Eight Essential Principles for Peak Performance in the Virtual Workplace, San Francisco : Jossey-Bass, 2001
- Hoefling, Trina (2001). Working Virtually: Managing the Human Element for Successful Virtual Teams and Organizations, Sterling, Va: Stylus Publications
- Helgesen, Sally (2001). Thriving in 24/7: Six Strategies for Taming the New World of Work, London : Nicholas Brealey.