VIEWPOINT

THE SYSTEMS THINKER®
BUILDING SHARED UNDERSTANDING

VOL. 14 NO. 10 DEC. '03 / JAN. '04

TAKING A SYSTEMS VIEW: A REFLECTION

BY DAVID W. PACKER

Over many years of working with systems thinking as a student, manager, and consultant, I have developed an increasing respect for and fascination with the diversity of ways that people and organizations benefit from its application. Likewise, I have come to appreciate the power these concepts and tools can bring to issues that range from personal dilemmas to the biggest challenges confronting our world. Taking a systems view involves looking at how dysfunctional behaviors result from interactions among the parts of a system over time. It provides a way of examining the potential unintended consequences of proposed interventions and of recognizing the impact of time delays and feedback. As such, it can lead to better assessments and more effective actions than traditional linear thinking.

This long and broad view is in direct opposition to the "quick-fix" mentality that increasingly dominates our complex world. Perhaps the reliance on "band aids" results from our economic system, in which managers focus on short-term results to keep stock prices and option values high, and shareholders care more about quarterly returns than long-term corporate health (accentuated by technology that provides instant access to massive amounts of data). Perhaps it comes from our political system, in which politicians invest in symptomatic rather than fundamental solutions—which take longer to show results than the person's term in office—in order to ensure reelection. Or perhaps it is an outcome of our educational system, which fails to expose people to the basic ways in which feedback processes work in the world.

Whatever the reason, despite the promise of systems thinking, its impact has been surprisingly limited. But I fear that, unless a critical mass of people and organizations adopt a systems view, our organizations will continue to fall short of their potential. Even worse, the dire consequences of non-systemic approaches to issues such as global terrorism, the environment, and poverty will threaten the world for us, our children, and future generations. By offering the perspectives that follow, I hope to widen the circle of systems thinkers by attracting newcomers and convincing experts to stay the course.

The Systems Thinking Difference

Let me start with a personal story. As a student, I attended a lecture by Norbert Weiner, the famed mathematician. He discussed a key project in which scientists of the day were working—unsuccessfully—to get computers to translate text from one language to another. Weiner identified a possible breakthrough in the project: The goal should be to create a *system* for excellent translation by including a computer component to perform routine elements and a human component to handle the non-routine tasks. Together, they could elegantly and affordably achieve the overall goal. The fundamental idea of a *system* as an entity that was different from its components—and not merely the sum of the components—was, to me, original, new, and powerful.

Over the years, I have heard many people say that the simple act of thinking systems rather than components, the whole rather than the pieces, enables them to better understand why things behave as they do and take more effective actions. I have seen, for example, executives who are dealing with a critical product issue come to the realization that the answer is not in making marketing *or* manufacturing work better, but in improving the quality of interaction and influence *between* the two functions. The notion of recognizing the interactions among component parts as critical to the system's performance leads people to accept the system as the major determinant of the behaviors and events that occur.

Once we can see the whole (the system) as something different from its parts (the components), it isn't too far a leap to accept Deming's observation that optimizing a system *requires* suboptimizing its components. This idea is profoundly paradoxical. It says that functional excellence will not guarantee overall success and that working "across the stovepipes" provides the greatest possibility for superior performance. Bridging the gap between functions requires compromises from each department for the benefit of the firm as a whole. My observation is that once people "get" the concept of systems, they become sensitive to the harm the stovepipe mentality can bring, and they open themselves to seeing linkages among the pieces that may be important, even in areas beyond their control.

Because talking across stovepipes is not easy, the mastery of dialogue, skillful conversation, and concepts such as the ladder of inference—all part of today's organizational learning focus—are essential to fundamental and sustainable performance improvement. A dozen years ago, I scoffed at such things as too soft and fuzzy. Now I am convinced that these tools play a critical role in improving systems. (Of course, Peter Senge already understood this point in 1990 when he popularized systems thinking and integrated it with team learning and other skills in his surprise best-selling management book, *The Fifth Discipline: The Art and*

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Practice of the Learning Organization!)

The ability to visually represent the interrelationships among the components of a system through different kinds of diagrams represents another benefit of systems thinking. These "maps" reveal the cause and effect linkages thought to underlie behaviors by depicting the "system behind the story." Causal loop diagrams are especially effective in displaying the feedback processes at play. By recognizing the behaviors associated with each of the two kinds of loops (balancing and reinforcing) and through the process of collaborating on creating the diagrams, people are able to reach important and sometimes profound insights. Stock and flow diagrams are especially effective in displaying the dynamics among accumulations or stocks (such as backlog, inventory, or morale) and the flows (such as orders, shipments, and successes) that increase or decrease them. By identifying stocks and flows, we gain knowledge about a system's behavior and take a step toward building simulation models. We know that the "map is not the terrain," but maps of structure predictably add insight to our ability to better know the real terrain by giving us a shared view of its complexity.

System archetypes also provide a strong basis for learning about systems. Archetypes are a set of relatively simple structures that have been observed to occur again and again in social systems. These structures typically consist of two or three causal loops and have names like "Fixes That Fail" (the story of unintended consequences), "Shifting the Burden" (the story of addiction), "Limits to Growth" (the story of resource depletion), and "Escalation" (the story of violence and war).

It has been interesting to see the rapidity with which relative newcomers can relate to an archetype and apply it to their own experiences. In workshops, the energy and insights that emerge from archetype examples are often startling. More than once, I have heard someone say that the understanding of a single archetype changed his or her life!

Breadth and Depth

The most rigorous end of this spectrum is computer simulation, which stems from the breakthrough work of Jay W. Forrester at MIT in the 1950s. He brought the first application of engineering control theory to social systems, taking advantage of advances in computer technology for simulating non-linear systems. His 1963 book, *Industrial Dynamics*, provided the initial codification of the ideas, tools, and learnings of the nascent field and remains a classic today. (It was, by the way, my privilege to be a research assistant in Forrester's group during the early phase of the field. That was how I was hooked!) Simulation enables users to view the system's behavior in action and to experiment with various scenarios. These are very powerful capabilities.

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Efforts involving simulation models around specific organizational issues have had a positive impact on corporate decisions and strategy assessment in a number of cases. However, building such simulations takes enormous time, money, and expertise. In addition, decision-makers who don't fully understand the model may be uncomfortable changing policies based on its outcomes.

A broader or at least more visible source of impact, I think, has come from "models for learning" developed in academic and other non-corporate environments around major social issues and generic problem behaviors. *Limits to Growth* (by Donella Meadows et al.) and *World Dynamics* (by Jay Forrester) were based on simulations that explore the extent to which our planet's resources can support the rapid growth of human population and industrial activity. Forrester's *Urban Dynamics* deals with the system structure underlying the growth and decay of cities. These bodies of work have created a widespread awareness—with significant controversy—of the critical environmental and social issues facing humankind by demonstrating the potentially catastrophic trends that can result from certain systemic structures.

As another example, my own work on the dynamics of corporate growth (a master's thesis also published as a monograph) outlines how balance among functional decisions in a growing company can be more important than specific functional expertise. The study used computer simulations to show how a company, by its own actions and with inadequate understanding of its systemic structure, could easily fail even though its market was virtually infinite. It demonstrated how an enormous range of behaviors, from wildly successful growth to stagnation to collapse, depended *solely on the firm's internal decisions!* As the cartoon character Pogo said, "We found the enemy and it is us." I contend, though it is impossible to prove, that this work had a positive impact on the company that sponsored it (which was highly successful for more than 20 years afterward).

The very breadth of the systems arena has created some barriers that I believe have slowed acceptance of the field. From a systems perspective, the obstacles I have seen relate to our own stovepipes, represented by different approaches such as simulation, causal loop analysis, stock and flow diagrams and the like. When practitioners in particular areas imply that their approach is the only valid one, the credibility of the whole spectrum of activities suffers. Here, I have tried to convey that all approaches that stem from a fundamental understanding of systems—whether broad or deep—can add value by offering insights far beyond traditional linear thinking. As in most systems, the right balance among the components is the path to a stronger whole.

Looking Ahead

In closing, my objective in this article has been to present my observations of the compelling potential for creat-

ing a better world through applying systems concepts and tools to our own circumstances and issues. Thinking systemically can change lives, improve businesses, help economies, and maybe even save the planet. Equally important, the broad range of approaches for application provides great accessibility. Opportunities for demonstrating the impact of systems thinking should be embraced, wherever they happen, and the diversity of approaches should be used to full advantage! I hope I have provided some incentive for doing just that.

David W. Packer is a founding member of the Systems Thinking Collaborative (www.stcollab.com), bringing extensive business experience and systems thinking capability to its membership. He holds a master's degree in management from MIT, where he was a member of the system dynamics group at the Sloan School, and is a graduate of the executive program of the Darden School at the University of Virginia. David participated for many years in the growth of Digital Equipment Corporation and now serves on the board of directors of several organizations, including Pegasus Communications, the Home for Little Wanderers, and the Policy Council of the System Dynamics Society.