

Competitive Simulations: Introducing Corporations to Organizational Learning

Gregory Hennessy
Monitor Company
25 First Street
Cambridge, MA 02141, USA
E-mail: gregory_hennessy @ notes.monitor.com

Abstract

System dynamicists usually view simulation as a means to help them understand the counter-intuitive behaviors commonly exhibited by complex systems and to facilitate others' learning about these behaviors. However, a second and closely-related application is typically overlooked: the elicitation of barriers to organizational learning in a non-threatening environment. In our experience, when clients are placed on teams and presented with a simulated future, the organizational defensive routines which prevent effective decision-making in the real world soon arise in the simulation setting. A skilled facilitator can then begin to address these behavior patterns in the (relatively) safe context of the simulation.

Thus, we see tremendous power in the integration of the applications of simulation technology. First, the dynamic model used to build a simulation helps both the modeler and the client understand systemic behavior -- which leads to better strategic choices. Second, the addressing of organizational defensive routines promotes learning and the conversion of such choices into timely action.

Competitive Simulations: Introducing Corporations to Organisational Learning

Four years having passed since Senge's *The Fifth Discipline* hit the bookstores, it should come as no surprise that word of system dynamics has spread as far as the executive suites of many Fortune 500 firms (and their privately held equivalents). Of course, since the field still lacks a comprehensive and authoritative text describing the state of the science, it should also come as no surprise that a fair amount of confusion remains regarding what exactly is meant by the term system dynamics.

Although it is becoming increasingly common to find managers with a strong interest and reasonable background in system dynamics, such managers are typically, for now anyway, in the planning or economic analysis groups -- not in the executive suites. Often, those senior managers and executives who have heard about system dynamics misunderstand it. Systems dynamics is thought to be some new-agey-kind-of-oneness-thing, more closely associated with the Gaia hypothesis (for example, see Myers) than with control theory¹. They often think the advantage of simulation has more to do with seeing "the numbers" in a new, more interesting way than with changing the way they think about the numbers. That is, they see simulation as a way to achieve single-loop learning, rather than as an opportunity to experience double-loop learning. But clearly, one of the chief benefits of the simulation experience is the opportunity to learn about the systemic structure and processes which give rise to the numbers.

Is there a way to make the insights we have to offer real for senior managers and executives? Traditional methods (education-based, group-model-building, from-the-ground-up efforts) are labor- and time-intensive, and are an excellent approach, but only for managers with the insight to see the value of such an approach and with the commitment to see such projects through. But what about more reticent managers? Can we find a way to help them? After all, those most in need of help are often the ones most ingrained in their old ways. At Monitor, we believe we have found a way. Through Competitive Simulation, we introduce senior managers and executives to system dynamics and organizational learning.

The Task: Not Only Better Decision Making - But Also Creating Action

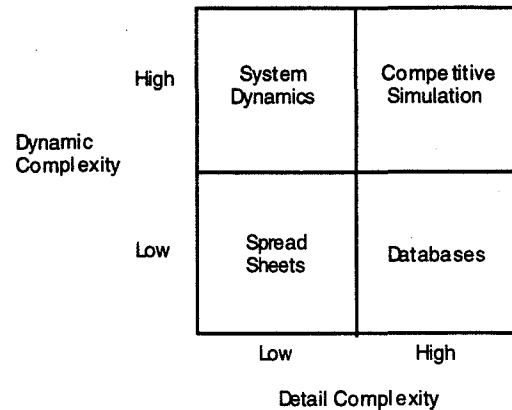
It is our mission as consultants to convert informed choice into timely action. The first objective is to help executives to **make informed choices** based on an understanding of the dynamic situation they face. Monitor established itself as the firm most capable of putting into practice Porter's strategic analysis (Porter 1980, 1985). These frameworks have helped managers understand their competitive position and make better business decisions. Today they are standard practice, and we are looking for ways to provide superior insight; system dynamics is one of the areas in which we are most interested.

The second objective is to help executives to **act in a timely manner** and in a way consistent with their new thinking. As Argyris has pointed out for years (see Argyris 1992) and as will be briefly described later, defensive routines and organizational barriers often dictate a dysfunctional pattern of managerial behavior, even in light of new, more informed decision-making power. Before we can help them act in a timely manner, we must help them learn to act appropriately in the first place.

¹Not that either is right or wrong, just that perception is often at the "mystical" end of the spectrum.

Our Competitive Simulation product helps us to integrate the two tasks by presenting managers with a simulation that is rich both in detail and dynamic complexity (refer to Figure 1). First of all, because the simulation is very closely modeled after the executives' business, they can attach themselves to it intellectually and emotionally. In the process of playing the simulation they learn to *make better choices* because they experience the time-compressed feedback processes which are central to learning about the long run consequences of decisions made today.

Figure 1: Taxonomy of Complexity



A second, and we believe critical, dimension to Competitive Simulations is that managers interact with people, not boxes. Thus, as they wrestle with real choices they also experience the organizational defensive routines which act as barriers to action. A trained facilitator, working with the team, can point out their ineffective interactions and can help them understand how they can change their behavior to *act with greater effectiveness*.

Ineffective Interactions

Ineffective interactions between managers prevent ideas from being discussed openly, lead to false consensus, and ensure a management environment where new courses of action are impossible. Exhibit 1 presents a framework which has helped me to understand the dynamics of ineffective interactions and points to how system dynamics can be integrated with action science to convert informed choice into timely action².

How We Think

The *Data I Select* is drawn from the total *Data* that is available. *My Beliefs and Assumptions* act as a filter to determine which data points I choose to acknowledge. Having selected some data points and not others, the *Data I Select* has an important influence on *How I Interpret It*. My interpretation, then, influences the *Conclusions I Reach*. My conclusions then become a part of *My Beliefs and Assumptions*, which then affects the *Data I Select* next time around.

If I assume you are irresponsible, then I focus on evidence which supports my underlying belief. Because I have a biased set of data, my interpretation and conclusion confirm that you can't be trusted with responsibility.

How We Act

We act based upon our implicit conclusions about our environment.

If I have concluded you are irresponsible, I withhold responsibility from you; that is, my choice of action is dependent upon my conclusions about your ability to perform.

How We Interact

We each go through our thinking process: beliefs filtering the data we select, influence the conclusions we reach, which in turn affects our beliefs. And we each act based upon our individual conclusions about the environment we share. Our interaction, then, adds to the pool of data available for us to select specific observations.

I, having for some time believed you to be irresponsible, withhold responsibility from you. You, having believed for some time that I don't trust you with important issues, focus your efforts on other projects and give me only a partial

²This framework is based upon Argyris & Schön (1974) and materials developed by Actor

effort. The result is that I am more convinced than ever that you are irresponsible, and you are convinced more than ever that I am a micromanager.

The Result: Organizational Defense Pattern (ODP)

The way we interact usually results in a pattern of defensive behavior (Argyris 1990). We bypass discussing sensitive issues because we don't want to start a fight, and we cover up the fact that we bypassed the issue. For example, if we reach very different conclusions about a certain issue -- conclusions which differ because we have selected different data and have interpreted it differently -- we avoid trying to have a meaningful reconciliation of our conclusions because we each "know" the other is too closed-minded to listen to reason. Having bypassed the issue, we then cover-up the bypass by having a perfunctory discussion of the issue, using broad statements and generalities. Framed with sufficient generality, we reach agreement on completely unactionable directives.

Most strategic failures result not from insufficient decision-making tools and skills, but from the inability to discuss important issues and from the resulting inability to achieve meaningful change in the organization. A consultant who enters an organization blind to the implications of ODP is destined to see the organization stifle any changes he or she recommends.

The Need for Integrated Interventions

The structure of ineffective interactions requires that, if informed choice is to be converted into timely action, all three components of the structure be addressed simultaneously. We must help managers change the way they think, the way they act (based upon their thinking), and (as a result of changing the first two) the way they interact.

For an economic organization to succeed in today's marketplace, it is not sufficient for them to have a great strategic plan -- they might be unable to act in a manner consistent with the plan. Nor is it sufficient for them to be able to act on just any old plan -- such a plan might move them in the wrong strategic direction. Fuller states (1993, p. 44),

"The key objective in competition ... is to improve your organization's performance along these dimensions:

- to generate better information than your rivals do
- to analyze that information and make sound choices
- to make those choices quickly
- to convert strategic choices into decisive action"

In order for an organization to be successful, it must do all of these things well. Piecemeal approaches associated with traditional strategic consulting, system dynamics, process consultation and action science just won't do the job.

Traditional Approaches

Traditional approaches fail to provide the integration of informed choice and timely action. Strategy consulting, system dynamics, and action science & process consultation approaches are considered in turn.

Traditional Strategy Consulting Intervention

Historically, strategy consultants have worked to affect the *How We Think* section of the system. Specifically, consultants have sold their ability to help managers: select better data, interpret it better, and reach better conclusions. The projects under analysis might involve which markets to serve, how to organize to face those markets, or any number of other common themes. But fundamentally, they focus on the "informed choice" part of the problem.

More recently, "implementation" has been the buzzword for consulting firms. All consultants want to see their recommendations actually come to life within the client organization. But standard approaches to implementation end up doing one of the following:

- consultants work side-by-side with existing middle- and line-management for an extended period of time to make sure the letter of the new strategic law is followed, or
- senior management replaces the existing middle- and line-management with a new set of managers "more suited" to working under the new strategy

While it is tempting to conclude that such consultants are addressing *How We Act* and *How We Interact*, they are bypassing the fundamental organizational issues which caused inaction in the first place (Argyris 1990). Once the consultants have left, the old, ineffective behaviors will resurface (though perhaps in a new form), and the organization, once again unprepared for the next strategic challenge, searches for strategic advisors.

Thus, strategy consulting as commonly practiced, cannot help managers learn to convert informed choice into timely action.

System Dynamics

System dynamics addresses some of the deficiencies of traditional strategy consulting and complements the value provided by traditional strategic advice. Like traditional strategy engagements, system dynamics helps managers select better data, interpret it better, and reach better conclusions. But the advantage of system dynamics is more than just better data, interpretations, and conclusions; it is that managers learn to question the implicit beliefs and assumptions which filter the data they select in the first place. The systems view completely changes the way they think about their problems. Thus, the strength of system dynamics lies in its ability to improve *How We Think*.

Many system dynamicists have migrated into Action Science in the pursuit of changing *How We Act*.³ Those that have are likely to present an integrated approach similar to the one discussed here. However, system dynamics purists are still hesitant to take that step and are, as a result, being less effective at achieving change than they might otherwise be.

Process Consultation and Action Science

Interventions based upon process consultation and action science (see Schein and Argyris) focus on *How We Think* (about each other), *How We Act* and *How We Interact*. They don't address *How We Think* with respect to the strategic challenges organizations face. They are sound methods for achieving change in the client, but rely upon the client's internal ability to know what to change into or where to move strategically. In some cases this reliance may be justified, but often, external strategic advisors can provide valuable perspective, expertise and guidance.

Thus, no single traditional approach offers a full solution. What is needed is a combination of strategy consulting, system dynamics and action science. Competitive Simulation is a technology which supports an intervention based upon the three schools of thought.

Converting Informed Choice Into Timely Action

How does an organization begin to do all of these things? Fuller (1993, p. 45) suggests that companies need to improve performance in three related areas:

- gather better information -- that is, information that is dynamic, that cuts across organizational boundaries, and that exists "in real time"
- establishing a framework for making decisions -- that is, creating a business version of military doctrine
- practicing the integration of the pieces -- that is, learning to use competitive simulation or business "war games"

³For example, see Rufat-Latre (1993), Rufat-Latre, et. al. (1993), and Senge (1990)

In other words, companies wishing to succeed need to understand: data (detail complexity), doctrine, and dynamic complexity (system dynamics, systems thinking).

Detail and dynamic complexity are familiar terms to most system dynamicists, but what about "doctrine"? Why is it essential to learning how to integrate informed choice with timely action?

Doctrine and Its Relation to Organizational Learning

Doctrine is an established framework for making decisions; it is not an operations manual or a detailed list of IF ... THEN ... ELSE statements. In the military, it is what allows a platoon leader to act without having to wait for orders in each new circumstance. In business, doctrine allows a manager to make decisions and then act in a timely fashion whenever new information arrives. It is not minutely prescriptive, but rather a mixture of philosophy and practice, and the connections between the two. Thus, an organization possessing an effective doctrine sees every employee contributing to the strategic advancement of the organization each time a decision is made and an action is taken.

Doctrine has an important role in the learning organization. Senge & Sterman (1992) warn that, "local decision making and individual autonomy lead to management anarchy unless managers account for the interconnections and long-term side-effects of their local decisions. Laudable goals such as 'empowering' and 'enabling' individuals often prove counterproductive unless managers can act locally and think globally." Substitute "platoon leader" for "manager" and you can see that this is fundamentally the same problem that the military addresses through its doctrine.

Specifically, doctrine is related to, but distinct from "Shared Vision" (Senge, 1990). Shared Vision is described as a "common aspiration" held by members of the organization; it is "a vision that many people are truly committed to, because it reflects their own personal vision." (p. 206). Once the organization possesses a Shared Vision, it needs a framework for turning the vision into action -- such a framework is its doctrine.

How Doctrine Contributes to Both Stagnation and Change

It is easy to worry that doctrine only entrenches an organization in a set decision-making framework which later serves to hamper change. Indeed, Martin (1993), while identifying four stages that troubled companies have typically experienced, discusses the role of "Steering Mechanisms" in such companies. A company's Steering Mechanisms -- its doctrine -- keep the company on track. While they are initially developed "to keep the organization aligned with the founder's vision and to keep the vision aligned with the economic environment," before long the economic times have changed and the mechanisms are interfering with the organization's ability to adapt to customer needs. The resulting *Disrupted Feedback* leads managers down the wrong path, asking the wrong questions. "Digital Equipment Corporation, for example, gathered extensive information on what customers wanted from its proprietary word-processing software without realizing that the age of proprietary minicomputers was over."

However, identifying a business's existing but dated and counter-productive doctrine and effectively updating it can be an important tool in overhauling a troubled organization. Toffler (1993) describes convincingly how the U.S. military establishment, following the Vietnam war, completely reinvented itself (to use the language of business) in a concerted effort to create a "Third-Wave" military doctrine. That the prototype of modern, hierarchical, American organizations could accomplish such a drastic overhaul says a lot about the power of recalibrating common frameworks of decision-making.

Of course, it would be inadvisable to institute a framework for local decision-making without first testing its robustness. Competitive Simulation aids in the development of doctrine by providing managers with a practice field to find out what works and what doesn't.

Together with the previously mentioned decision-making environment that is rich in detail and dynamic complexity, Competitive Simulation helps organizations understand its data, dynamics,

and doctrine. As a result, the organization becomes better at converting informed choice into timely action.

Competitive Simulation

“Strategy ... is an interactive dynamic ... [and] competitive simulation provides an opportunity to practice that interactive dynamic. It trains executives to anticipate the unexpected. It helps to build a management team that can roll with the punches, deal with unanticipated situations, and work together when things don't go according to plan.” (Fuller, 1993)

Competitive Simulations are an intervention which allows Monitor to integrate informed choice and timely action and to introduce the concept of doctrine. The intervention relies on two things. First, a dynamic strategy simulation to provide managers with a basis to improve their decision-making. Second, facilitators trained in action science who can help managers address organizational barriers as they arise during the simulation. The intervention is best described by example.

A Case Study⁴

Consider a key business unit in one large high-technology company that recently completed a Competitive Simulation. Fifteen people on three continents worked for four months simply to “map the battlefield.” Their preliminary work produced a rough-cut description of the competitive shape of the industry, the assets of the competitors, and their company's own assets. It took another two months to turn that rough map into a dynamic computer model in which the industry evolved in plausible ways and strategic choices produced credible results.

The parameters of the game and the structure of the exercise were straightforward. The simulation covered a seven-year time horizon during which two teams -- a blue team and a green team, both representing the company -- competed against seven rivals across 15 product lines. The game progressed in four strategic moves: the first move represented one year of competition, each of the next three moves represented two years. To make a move, each of the two teams made choices in four categories: business unit choices such as pricing and advertising; infrastructure choices such as deploying new technologies; strategic choices such as acquisitions and alliances; and corporate-level choices such as issuing debt or stock. In all, each team controlled roughly 300 mathematical inputs with as many as 3,000 independent variables that represented their choices in allocating company resources.

That was the part of the game the teams saw; behind the scenes, game referees and “control” converted their choices into financial results and market share consequences using software programmed with 40 pages of algorithms and more than 1 million data points -- and seven NeXT workstations crunching the data.

To add even more credibility to the simulation, during each move the teams received extensive factual information on their performance: accurate financial and market data broken out by product category, corporate income statements, balance sheets, cash flows, and key performance ratios.

The teams also received information on what their rivals were doing. But here, in keeping with the “fog of war,” the information was limited, intentionally sketchy, and available only after a time lag. The simulation included updates on new products, cost-reduction opportunities, acquisition candidates, and an industry newsletter that carried news, gossip, and rumors concerning major trends. Just like in real newsletters, the articles were a mixture of accurate reports and erroneous items. Just like in real business, the teams had to discern fact from fiction, information from misinformation.

⁴This section draws heavily upon Fuller (1993).

As the game neared its end, all the substantive and strategic issues were on the table. At this point, the teams were testing themselves -- and being tested -- on whether they had developed a consistent and coherent view of the world. Had they, in fact, fashioned a strategy that could fit rapidly changing circumstances? Had they consistently executed it? Could they convert informed choice into timely action?

Two different styles of teamwork emerged. The blue team worked as one group to develop its arena-by-arena decisions. The green team broke into smaller groups, each of which focused on different sets of choices. One team was reflective and contemplative in its work style; the other was boisterous and aggressive. One thing was common; both teams had driven themselves into the standard organizational defensive routines which afflicted them in their "real life" interactions. A trained facilitator pointed out their ineffective behavior and worked with them to improve their team interaction and effectiveness.

After the game, the two teams came together to learn the results and reflect on the experience. In fact, the outcome of the simulation confirmed the larger point of the exercise: the value of competitive simulation is not in the computer's output but in the players' input. There was no clear winner. The teams had settled on vastly different strategic directions. The green team had developed a shrewd strategy for working with competitors who were also valued customers. The blue team had focused on heavy investments in new technologies and future growth opportunities. The results: the green team won based on stock price, the blue team won based on other financial measurements. Neither strategy was ultimately "more right" than the other.

The investment in the simulation produced a fluid, dynamic, credible process backed by sophisticated, powerful technology. But the real lessons of the war game were only partly -- and least significantly -- quantitative. The real value was interpersonal and organizational: the simulation exposed the company politics and undiscussable human issues that exist in every large-scale organization. The players learned much about strategy; they learned even more about teamwork.

The Challenge - Entry Strategies for Reaching Executives

Our goal in using Competitive Simulations is a very aggressive one: help senior managers learn to convert informed choice into timely action. To do so requires an understanding of traditional strategic analysis, of system dynamics, and of action science. Each of these areas is important and each presents organizations with an opportunity to leverage the organizations' existing strengths.

However, companies are so far from integrating these pieces that an even greater opportunity exists in helping them to do all three simultaneously. The implication is that while the goal is aggressive, the objective associated with each particular skill area can be modest. We are not looking to turn clients into master strategists; rather, we help them to increase incrementally the strategic thinking skills which they have already acquired. We are not looking to turn clients into system dynamicists; rather, we demonstrate the importance of a few simple, first-order feedback processes. We are not looking to turn clients into Chris Argyris; rather, we start them thinking about the ineffective structures for teamwork which they themselves create.

Many senior managers and executives aren't interested in talking about or learning about system dynamics, action science, or for that matter "integration." They *are* interested in talking and learning about things that will help them run *their* business, *today*.

Competitive Simulation is geared toward managers with this "bottom-line" focus. If they won't listen to abstract lessons, customize the simulation to look like their world. If they have no interest in great leaps of insight, focus on providing small, manageable lessons. In this way Competitive Simulation performs the important function of introducing system dynamics and

organizational learning to managers who might not otherwise be receptive to these concepts. Maybe they will even learn more than they bargained for.

Note:

Mark Fuller, CEO of Monitor Company, inspired the selection of this paper's topic and outlined many of the themes presented here. John McClellan, also of Monitor Company, provided valuable suggestions and feedback during the writing of this paper.

While at Monitor Company, Greg Hennessy has researched the application of system dynamics and simulation technology in strategy consulting and has participated in projects within the financial services and telecommunications industries. Prior to joining Monitor, he received the Master's degree from MIT's Sloan School of Management and the M.S. degree in Social Science from the California Institute of Technology.

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Exhibit 1: A Framework for Integrating System Dynamics and Organizational Learning

