A MODEL OF ORGANIZATIONAL CHANGE

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Abstract

This paper reports on the initial results of a research effort to improve the long run effectiveness of organizational changes. The literature suggests that organizations frequently experience periods of stability that are punctuated by bursts of large scale change. Our objective is to understand what causes this pattern, and what policies are likely to improve organizational performance through the change process. In this paper we present a causal loop diagram of the structure of our model, and discuss the reasons for this structure. This model does reproduce the behavior patterns to which the literature refers. In addition, we report the results of some sensitivity analyses and policy tests of the model. These results have implications for managers. Finally, we discuss the limitations of our model in its current form, and the next steps that we intend to take.

The Problem

The ability to manage change is an important part of organizational learning. Increasingly the role at which an organization responds to changes in its environment (learns) is becoming the most sustainable competitive advantage of an organization. Understanding and managing the change process for performance improvement will become a central task of the executive team. A system dynamics perspective may provide insight into both the most frequent and the most effective patterns of organizational change.

One of the most frequently cited patterns of organizational change over extended periods of time is an oscillatory one. The literature hypothesizes that this pattern occurs because there are powerful forces for stability in organizations, but that this same pressure for stability ultimately creates the need for change (Tushman, Newman and Nadler, 1989). In general, past business success reinforces the current strategy, systems and structures, and the longer the success continues, "the more dominate these internal forces for stability become" (Tushman et. al., p.113). On the other hand, "the very social and technical consistency that are the sources of success may also become the seeds of failure if the environment changes" (ibid). Since we can be assured that the environment of any business will change at some point, this structure will produce, for any company, an oscillating rate of change variously referred to as "punctuated equilibria" or the "boom–splat".

The objective of our current work is to model the key components of a change system, to describe the relationships between components, and to explore the policy options that may result in the most favorable performance outcomes. Specifically discussed in this paper is the basic structure of the organizational change model and the impact of changing policies on several key variables. The relationship of this system model to organizational learning is discussed.

The Model Structure

For our purposes, there are two major dimensions of organizational change that are important: scope of change, and timing of change. Scope of change can be either incremental or strategic. Incremental changes are small and occur within the current framework or systems of the organization. They are continuous in nature. The objective of incremental changes is to maintain or regain alignment between key components within the organization, such as the strategy, structure, systems and people.

Strategic changes tend to occur when the very survival of the organization is at stake. They require breaking out of the current context or frame of the organization, and attempting to move it to a completely new configuration or alignment. Strategic changes are addressed to the organization as a whole, are large scale, and are discontinuous. Both types of changes are considered in this simulation.

In terms of timing, changes can be either reactive or anticipatory. Reactive changes are initiated in response to an event (or series of events) that has occurred. Anticipatory changes are initiated in the expectation of events that are considered likely to occur. Systemically, choices between reactive and anticipatory change will affect the delays that are introduced into the system. In our model, only reactive changes are explicitly considered at this time.

The basic structure of our model is shown in the causal loop diagram in Exhibit 1. The top half (incremental change) and bottom half (strategic change) of the diagram have similar structures, but there are some significant differences. We will first describe the structure that is common to both types of change, and then discuss some of the differences.

Exhibit 1
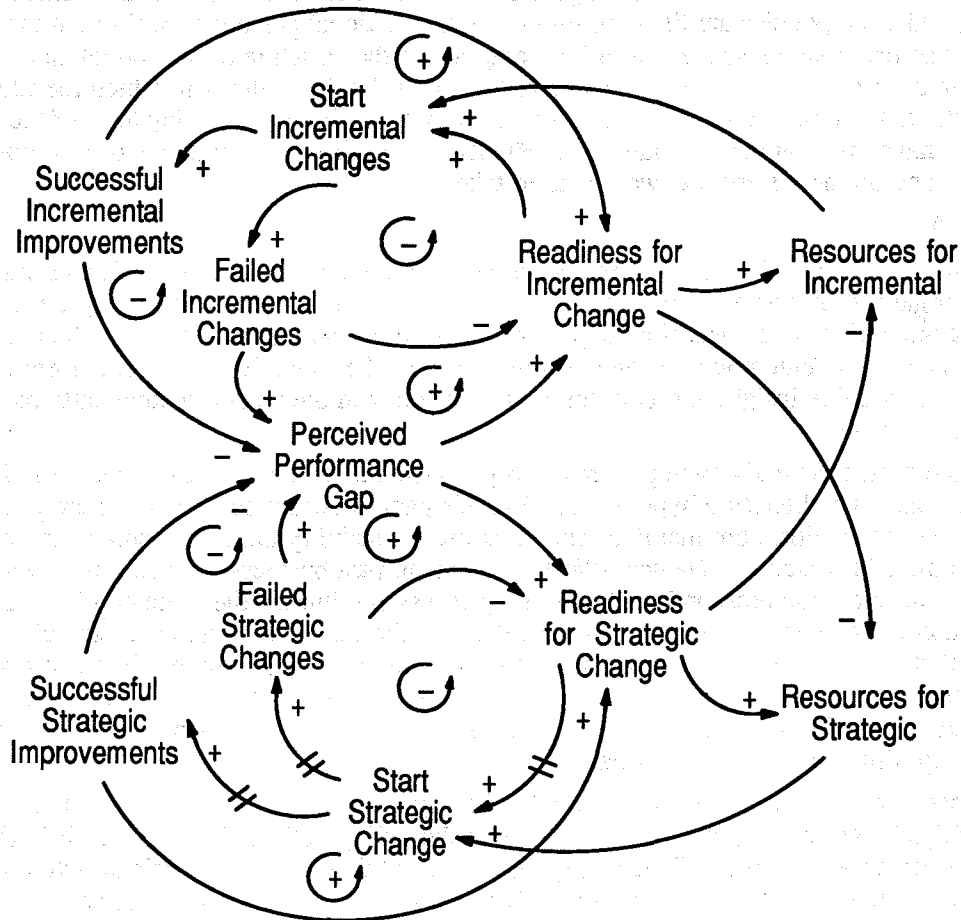
We assume that the organization's environment is changing such that some low level of continuous change is required to maintain the organization's performance. Therefore, in the absence of any organizational change, the gap between the organization's perceived performance and its goals (its perceived performance gap) increases. As the perceived performance gap increases, its readiness for change also increases, and it initiates change experiments intended to increase its performance. To the extent that these experiments are successful they close the perceived performance gap and the cycle begins again. These simple negative feedback loops have a few other loops attached to them.

One loop concerns the impact of a failed experiment. Not all the change experiments succeed, and to the extent that they fail they would increase the perceived performance gap. When there is failure, the performance gap continues to grow. This creates a positive feedback loop.

Second, readiness for change is affected by the organization's experience with prior change efforts. Successful change experiments increase the readiness for change, creating another positive feedback

loop. Failed change experiments decrease the readiness for change (Hess, Ferris, Chelte & Fanelli, 1988). The link between experiments, successful or not, and readiness is an important one. We believe that this simulates the organization's ability to learn from its experience and to make connections between policies, actions and results. Without this ability, an organization can only be reactive to business performance outcomes.

Finally for both incremental and strategic changes, there is a limit to the number of experiments that can be implemented during any time period. This limit is imposed by resource availability, which must be allocated between getting the current job done and experimenting with changes which alter the job in the future. As an organization improves its ability to learn, we would expect these two roles to merge.

The major differences between the two change strategies are longer delays and increased inertia in the strategic change loop. Because strategic changes are large scale, discontinuous, and directed to the organization as a whole, they have longer delays while they are being initiated and planned, and longer delays while they are being implemented.

Building readiness for strategic change requires a larger perceived performance gap than for incremental change (Nadler, 1989)), and usually does not occur unless the organization is in severe crisis. Also, because they are large changes requiring large amounts of resources, the same level of readiness leads to the initiation of fewer strategic changes than incremental ones.

Even though incremental changes are easier and faster to implement than strategic changes, they are not a solution that can be relied upon to provide long term advantage. Kilman (1988) and Nadler (1988) argue that incremental changes to a system can provide improvement in productivity for only three or four years. As time goes on, the returns of working within the system diminish. The fundamental strategic system becomes the constraint to performance improvement. At this point the system itself should be changed. Once a new strategic system has been put in place, incremental improvements to this new strategic system can again be effective. There is much literature which supports the idea that over the long term, both types of change need to be operating (Imai, 1986; Miller & Friesen, 1984 Nadler, et. al., 1989). It is also clear that there is a limit to how much change an organization can absorb (Nadler 1989).

Model Performance

A model has been built in *ithink* to begin testing the relationships described by the causal loops. The model was initialized in steady state, and then subjected to a pulse in perceived performance gap (the amount by which the organization is missing its goals), in order to simulate an organization that fails to meet its goals. The model output, shown in Exhibit 1a, replicates the referent behavior that Tushman et. al., 1989 have described; long periods during which there is no organizational change, interspersed with bursts of organizational experimentation and change. Given the values that we used to initialize the model, the duration of the "convergent" period (Tushman et.al., 1989), during which there is no change, is approximately 30 years. The bursts of change occur over 7–10 years. Note that as the perceived performance gap decreases, the actual performance of the business increases. In the exhibit we have platted the performance gap measure, therefore lower values indicate better business performance.

The model also produces other behaviors that are consistent with the literature. When the convergent period comes to an end, the organization first tries to close its performance gap by making incremental changes to the current strategic system. These can provide performance improvement for only a few years, after which they fail and detract from performance. Only after these incremental changes have failed to close the performance gap does the organization embark upon strategic changes. These strategic changes are assumed to have a success to failure ratio greater than unity so they install a new strategic system. The new strategic system acts both to close the perceived performance gap and to enable incremental experiments to be successful again, and so we see both types of experiments proceeding in harmony (Miller & Friesen, 1984).
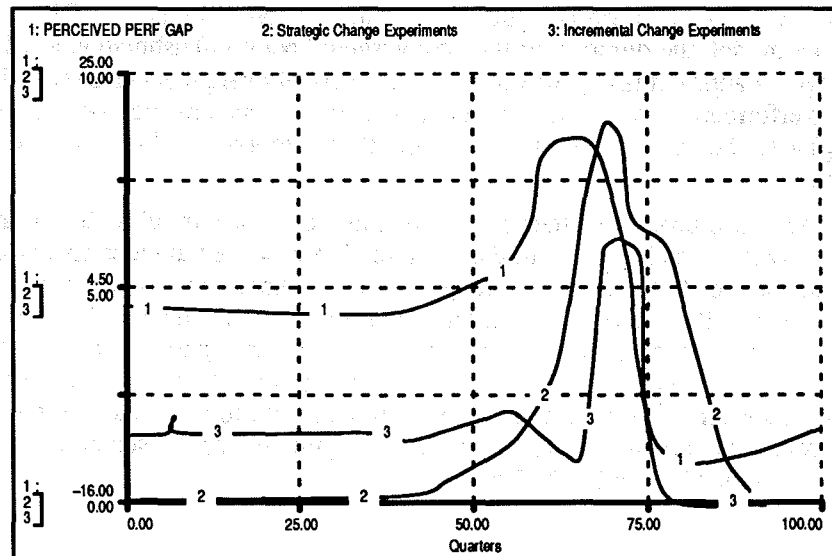
**1a.
Pulse to Perceived
Performance Gap**
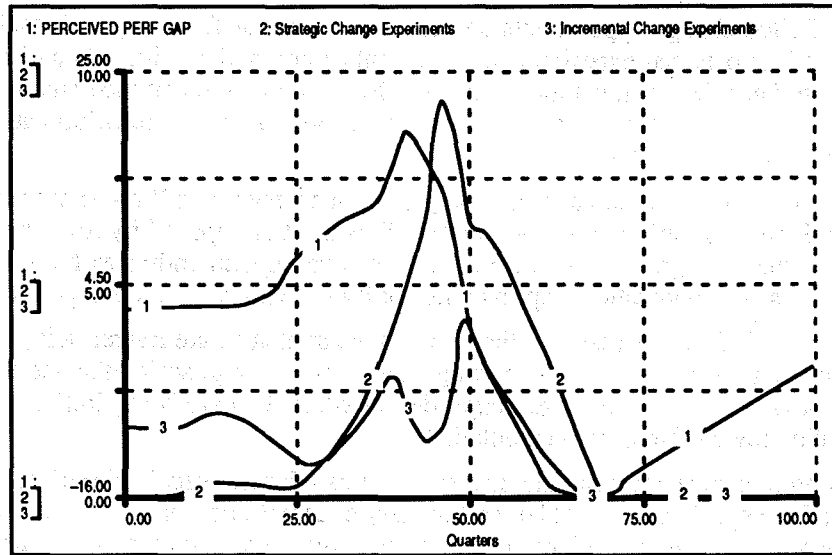
**1b.
Pulse to Readiness for
Incremental Change**
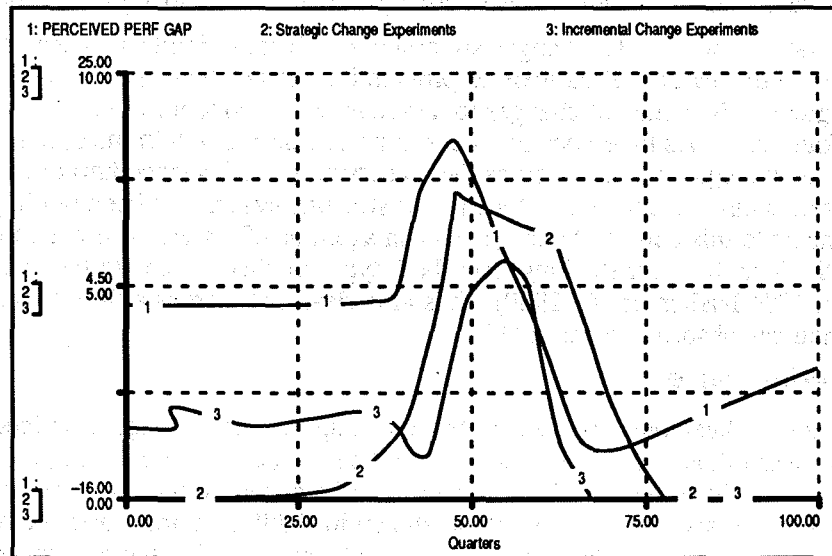
**1c.
Pulse to Start
Incremental Change
Experiments**

A third referent behavior can be seen by comparing Exhibits 1a–1c. Here the model demonstrates that the sensitivity of the model's response is substantially decreased as an equal sized initiating pulse is applied first to the perceived performance gap stock, then to the readiness for change stock, and then to starting experiments stock. In short, we are systematically moving the reason for change away from the performance issue. This result is consistent with the change literature which indicates that the likelihood of achieving change is increased when the pressure for change occurs closest to the business issue (Beer, Spector and Eisenstat, 1990; Tushman et. al., 1989; Nadler, 1989). As the driver for change moves away from the business issue, the impact is diminished, the feel of the initiative begins to be perceived as change for the sake of change. An example of an initiative that is not based upon solving a business problem is the executive who comes back from a seminar, or reads a book, and thinks that creating a vision would be great for his company. The company may get a new vision, but it will probably have little to do with how the organization does its work.

Policy Test

The causal loop diagram shows that readiness for change is affected by both the perceived performance gap and by the organization's memory with success or failure of experimentation. In the model, we can change the relative magnitude of these flows simply, by dividing or multiplying the appropriate coefficients. This allows us to test different policies that differentially emphasize these drivers. One policy, for example, would emphasize the perceived performance gap as a driver of readiness; we can think of this as the "If it ain't broke, don't fix it" policy. Under this policy, if the organization is meeting its goals there is low readiness for change; and this would still hold even if the experience with prior changes had been very successful. On the other hand, a large perceived performance gap would increase readiness for change and lead to initiation of change experiments, even if the experience with prior experiments had been unsuccessful. The attention of the organization is directed primarily on how well it is doing and paying little attention to how it is getting there.

Using the causal loop diagram and the model output shown in Exhibit 2a we can understand the effects of this policy. A pulse in the performance gap increases readiness for incremental change and this, in turn, leads to incremental change experiments being initiated. For the first two or three years, these experiments are normally successful. After three or four years, however, incremental improvements to the current strategic system are no longer effective and instead lead to decreased performance, and therefore, a larger perceived performance gap. Since this gap is the primary driver of readiness, the organization continues to do incremental changes that continue to fail and therefore drive the performance gap larger.

2a.

1: PERCEIVED PERF GAP   2: Strategic Change Experiments   3: Incremental Change Experiments

2b.

1: PERCEIVED PERF GAP   2: Strategic Change Experiments   3: Incremental Change Experiments

2c.

1: PERCEIVED PERF GAP   2: Strategic Change Experiments   3: Incremental Change Experiments
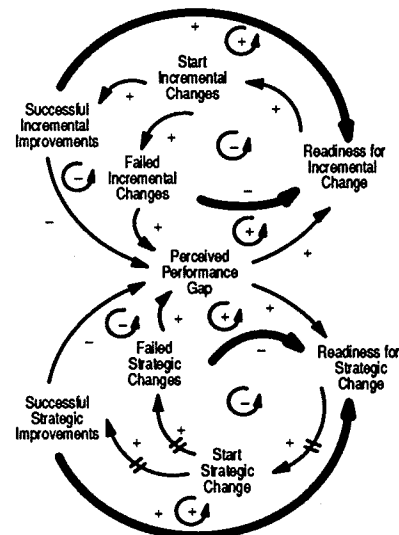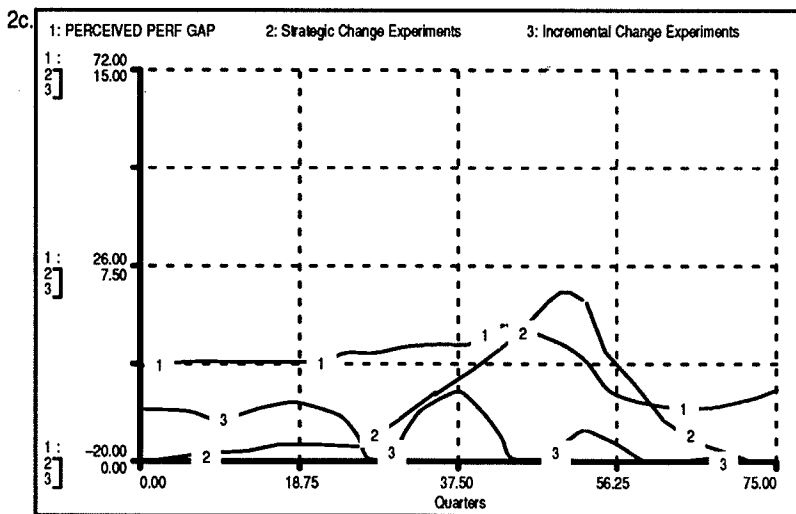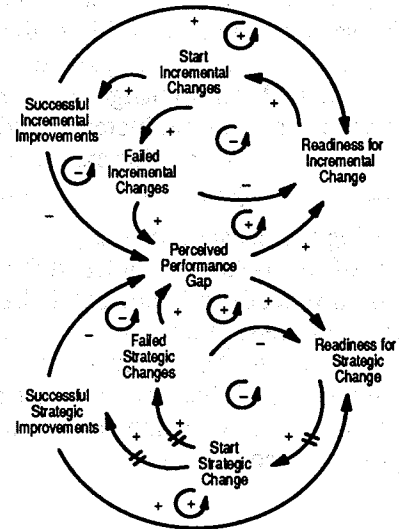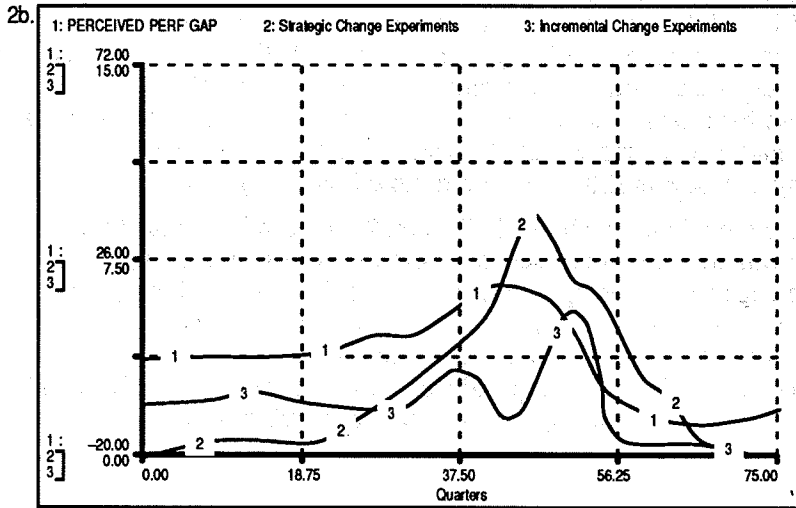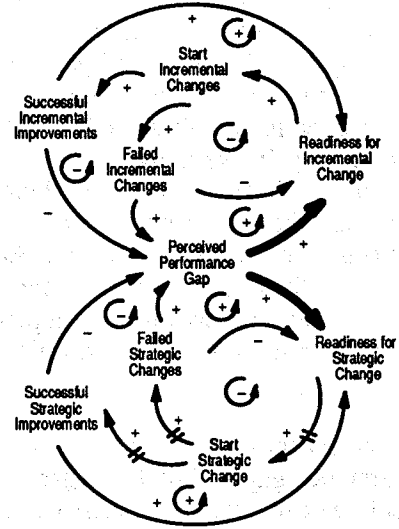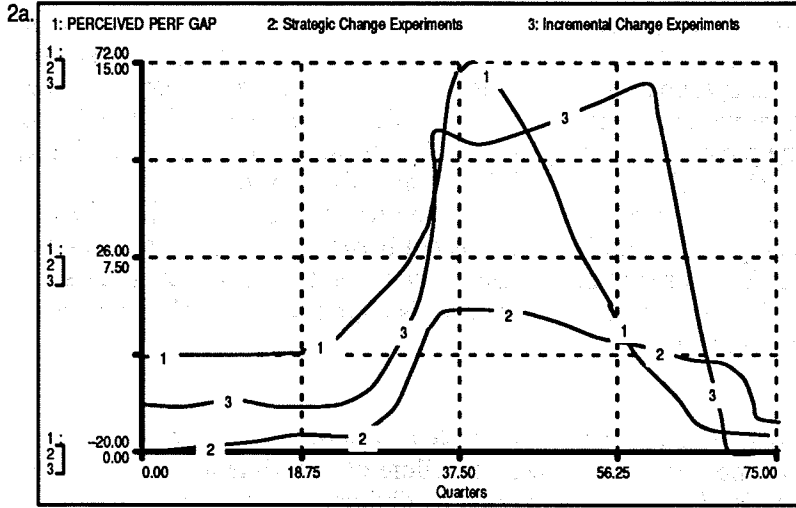
This positive feedback loop would lead to complete corporate collapse. It is saved from doing this because, at some point, the perceived performance gap gets so large that it drives an increase in readiness for strategic change, which in turn initiates strategic changes.

Since we have assumed that the strategic changes are generally successful, they start to close the perceived performance gap and create a new strategic system within which incremental changes can again make a positive contribution. This burst of strategic and incremental change drives the performance of the business to high levels, eliminating the perceived performance gap and therefore driving all readiness for change to zero. The result is a period of stability during which there are no more changes. In the popular literature this is referred to as organizational complacency. Since we assumed that the organization's environment is changing enough to require some level of organizational change, this period of stability ends when the unchanging organization no longer "fits" its environment and the perceived performance gap opens up again. An unanswered problem is understanding how to recognize the need for change early since anticipating and reacting to this need have been cited as advantageous for the organization (Nadler, 1989).

A second policy would be to increase the organization's memory of success and failure with change experiments. Under this policy, if prior experiments had made a positive contribution, the organization would be ready to initiate more change experiments, and this would be true even if there was no immediate perceived performance gap. The focus here is on the processes or experiments as well as the results or performance.

Exhibit 2b shows us that under this policy the system behavior is different. We see the same initial behavior of starting incremental changes but, when these incremental changes start to fail, the readiness for incremental change is reduced. Therefore the organization does not continue to initiate more failing incremental changes, and the performance gap is not driven so large. However, the perceived performance gap is still large enough to increase readiness for strategic change and therefore initiate strategic changes. As these strategic changes succeed, they close the perceived performance gap and create a new system within which incremental changes are again positive contributors to performance. Overall, cumulative performance under this policy is much better than in the "If it ain't broke, don't fix it" case, because the organization does not inflict so much damage on itself by continuing to initiate incremental changes that fail before it initiates strategic changes. There are fewer delays in responding to errors.

We might assume that since overall model performance was improved by emphasizing the organization's memory of success and failure with prior experience, then we would further increasing this emphasis even more would achieve even better performance.

Surprisingly, it is possible in our model to over–emphasize experience with change experiments. Exhibit 2c shows what happens when experience with change is much more powerful than the perceived performance gap as a driver of readiness to change, i.e., "If it works, do it again". After the initial incremental changes start to fail, the organization stops doing them so quickly that it keeps the perceived performance gap relatively small. This is beneficial in the short term, but we noted above that perceived performance gap is a powerful driver for change, so that the likelihood of achieving change is increased in response to a real business issue. The longer term effect of the small perceived performance gap that occurs under this policy is that it is insufficient to drive the big burst of strategic change that would create very high business performance in subsequent periods. Overall, the cumulative performance under this extreme policy is lower than under the more balanced policy that we described above. Exhibit 3 displays the cumulative performance gaps across these three conditions.

Exhibit 3: Cumulative Performance Gap

1: "If it ain't broke, don't fix it."   2: Balance   3: "If it works, do it again."
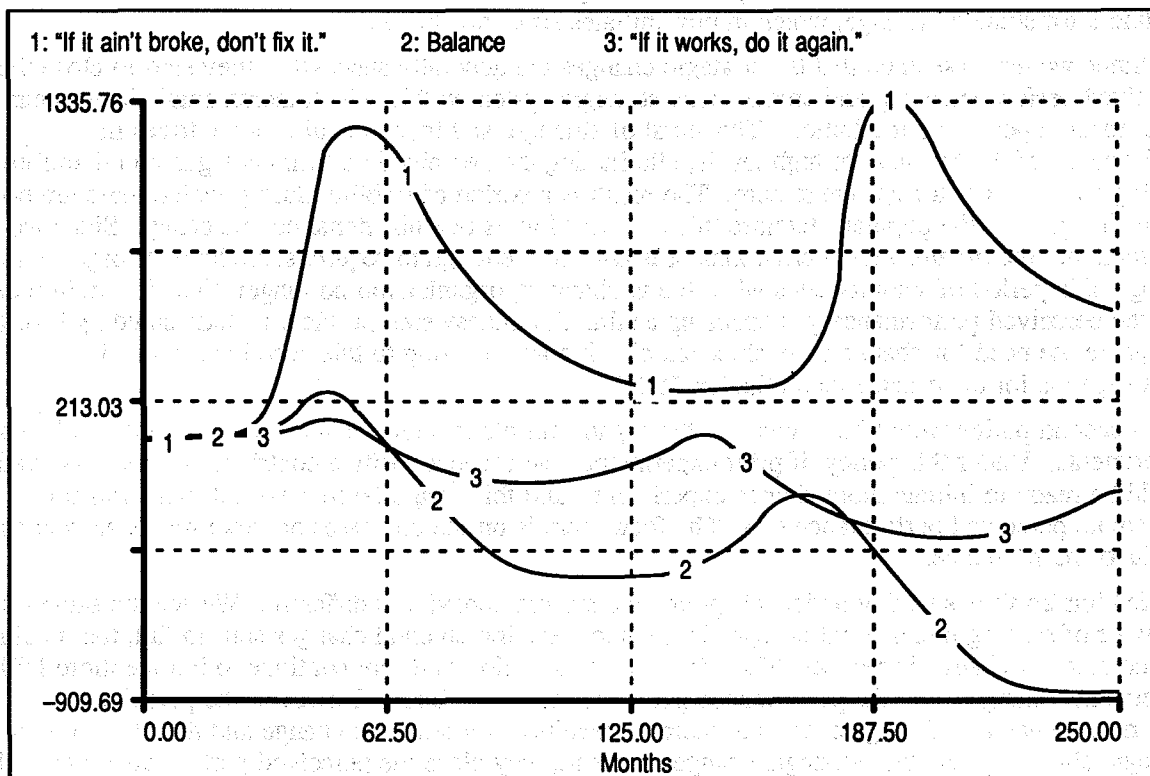
This suggests the intriguing hypothesis that outstanding business performance over the longer term may be less likely to be achieved as a smooth progression than as a series of cycles. The declining part of each performance cycle provides the readiness for strategic change that drives performance into the growth phase of the next cycle. By contrast, a smooth increase in performance is unlikely to create sufficient readiness for change to establish the conditions for superb performance.

Another interesting aspect of the model is its sensitivity to changes in the success to failure ratio for experiments. We conducted a series of sensitivity tests. Model output is most dramatically affected by independent changes in the success ratios of either incremental changes or strategic change experiments. Perceived performance gap, for example, takes a range of values twice as large when each of the success ratios are changed by 20% than it does when any other system element is changed by 20%. It seems somewhat obvious to say that if you increase your success ratio then your performance will improve, but the sensitivity of the model to small changes in the success ratios is impressive. The lessons for companies about learning what creates successful experiments in their own environments are potentially powerful. Since there is evidence that organizations generally are not able to learn from failures (Hess et. al., 1989; Mirvis and Berg, 1977), and since learning what creates successful change requires examination of both successes and failures, there is clearly much work to be done here.

Since the output of the base model matches the expected reference behavior pattern, we are comfortable with the hypothesis that we have identified key components of the system that produces organizational change. We also want to test some policies that may lead to more effective change over time.

Discussion

The model has shown behavior that is consistent with the literature in the field. It has also demonstrated behavior that suggests interesting hypotheses about company policies. For example, taking the three policies described above suggests that paying attention to only organizational performance is an insufficient strategy for sustaining performance. An interpretation of the observed

behavior would suggest that only knowing how you are doing without knowing how you got there will cause waste and ultimately reduce competitiveness. Financially driven companies may fall into this category. These are organizations which manage the budget rather than manage the business; i.e. they make decisions which make the financial performance of the organization look good for short term results, but ignore the longer term impact of these decisions for carrying out the business of the organization.

It is just as clear that putting too much focus on the process rather than the results is also an insufficient strategy for long term success. This observed behavior in the model might explain how an organization can successfully go through a change process, incremental or even strategic, but get the unintended result of no performance improvement. This condition, which is reported quite frequently in the quality and customer focus literature, describes organizations making changes in areas which are not important to the business or to the customer. The changes are being made out of context with no links between the process or system changes and the changes in organizational performance. At its worst, organizations are changing for the sake of change.

Performance improvement seems to be sustained in the long run only when there is a balanced perspective between how the organization is performing and how the changes or experiments impact that performance. In other words, from the data observed in this model, an organization will improve faster and longer when they know how they are getting better. This seems to be the basic definition of organizational learning.

The intention of the model has been to explore the relationships between key variables known or at least suspected to be critical in the process of organizational adaptability or learning. The development of the model to its current state has been successful in this, highlighting the impact of several policy decisions, as well as identifying key sensitivity areas which could help organizations be more successful during the change process. It is also clear that the model is not complete.

At this point we recognize several limitations to the model which we will be addressing over time. These include the following:

1. Our experience and the literature (Kilman 1988; Schneider, 1990) suggest the importance of the culture of an organization, the degree of alignment within the organization for the changes, and the desirability of the new direction. We need to model these explicitly.

2. The second issue of concern is the organization's capacity for change while carrying on the business. While we have a simple resource constraint in the current structure of the model, we believe it to be inadequate for modeling and understanding an on–going change process.

3. Finally, the model in its current configuration, seems to capture adequately the phenomena described in the organizational change and quality literature. This gives us confidence regarding our selection of formulae for the various variables. However, we have not yet tested the model with specific case data. This will be done several times in the near future.

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