Strategy and Systems Thinking Through Dynamic Storytelling

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Abstract

This paper describes a way of using systems thinking concepts and a system dynamics model to help clients design a strategic approach. The client, a large information services corporation, knows the market it is serving now and the market it wants to serve in the future. It also knows the core competencies necessary to meet the benefits needed in each market. A can-do attitude and limited time for reflection limit the client's ability to design the policies necessary to achieve this strategic transition. Systems thinking concepts help the client understand the urgency of the situation and the difficulties faced in achieving a strategic transition.

The model is designed around the client's perception of the corporation's present and desired market, and around Gary Hamel's strategy concepts. It is not designed to answer a specific question, but rather to allow the client to address strategic issues. The model incorporates every implied causal link that the developer could collect from diverse constituencies within the company to increase the chances that users will find topics from which to build a discussion. Reports are made to look like corporate reports to ground the model in the client's mind. The model runs on MicroWorlds. It is used like other existing management flight simulators.

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"Genuine learning is a peculiar taking, a taking where one who takes only takes what one basically already has. Teaching corresponds to this learning. Teaching is a giving, an offering; but what is offered in teaching is not the learnable, for the student is merely instructed to take for himself what he already has."

<div align="right">Heidegger</div>

Introduction

Continuous pressure to act and to fight fires often prevents people from developing new mental models and creates unintended consequences which require more fire fighting. The practice of systems thinking in the context of organizational learning is an approach to balance action and thinking. Practice, however, requires the very conditions which we are trying to develop. System dynamicists know that chicken and egg paradoxes are not such [1]. Instead, two conditions should be sufficient to develop awareness and practice of systems thinking: a vision in the mind of the learner and transitional objects for her to progress toward the vision. A path to create a vision can be found in [2]. This paper illustrates two transitional objects used to improve strategic thinking using systems thinking: re-telling shared stories using both systemic frameworks and system dynamics models. The stories rely on Gary Hamel and C.K. Prahalad's framework of strategy as stretch and leverage [3] used as a bridge between strategy and systems thinking. The motivation for this effort is EDS' ongoing effort to reinvent itself.

Background

In 1992, part of EDS' top leadership attended a seminar taught by Gary Hamel at the London Business School. During the seminar, it became painfully evident that very few corporations have succeeded to sustain market leadership or to remain in existence for more than four decades. This realization created a sense of urgency comparable to Jay Forrester's [4], in spite of thirty years of outstanding success.

EDS has run through four stages of growth. In the sixties, the company leveraged customer mainframes by selling idle time to other customers. In the seventies, Title 19 allowed EDS to support health organizations nationally. In the eighties, EDS led the market with systems integration. In the nineties, EDS has led the information technology outsourcing market - a success highlighted last March by a $4 billion contract with Xerox.

Hamel's ideas provided a framework for EDS to create its next source of growth. We brought together hundreds of employees from diverse locations, functions, industries, demographics, tenure, and hierarchical levels, as well as outside intellectual leaders. Successive teams organized in "waves" crafted a view of the world in the form of "industry drivers", of EDS' core competencies, of EDS' opportunities, and of the enablers and the barriers involved in realizing them. The new strategic direction coming from this effort is now spreading through the organization.

Strategic Stretch as an Organizational Learning Concept

Systems thinking concepts and Hamel's concept of strategy show interesting similarities which help transfer systems thinking concepts in strategy sessions. I will highlight the similarities between Hamel's concept of stretch and leverage [3], and Peter Senge's organizational learning framework [5].

Peter Senge defines organizational learning as the increased capacity of an organization to design its own future [6]. Aspiration, conversation, and conceptualization, are the three cornerstones of that capability, as shown in figure 1. Aspiration focuses on the development and evolution of a shared view within the organization. Conversation focuses on the ability of organization

members to explore other people's views, and to test one's own views and mental models with other people. Conceptualization focuses on systems thinking and system dynamics.

Aspiration

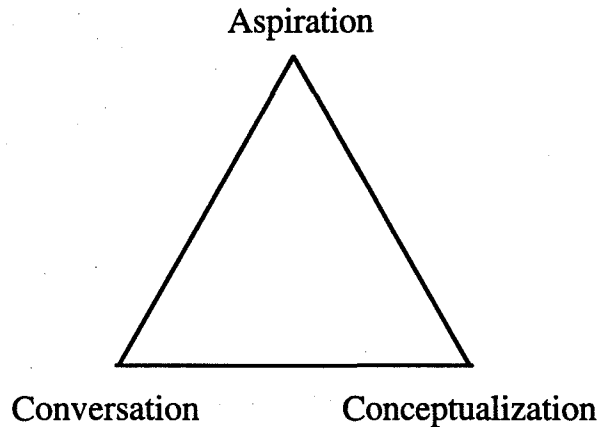Conversation   Conceptualization

Figure 1 - Three Cornerstones of Organizational Learning

Aspiration sets a creative tension which allows members of an organization to give meaning to their endeavor. Conversation enables the organization to modify its structures as the changes it makes to the world require it. Systems thinking and system dynamics supply the principles and tools which allow disciplined structural change.

Good design in system dynamics prescribes models where all phenomena of interest are explained by endogenous variables and their relationships. Within the explanatory and generative capabilities of the model, endogenous variables maximize our ability to design effective action. While recognizing the importance of monetary, fiscal, trade, and industrial policies, education, and social norms, Hamel asserts [3] that these factors get too much attention. From his point of view, attention to the environment serves a temptation to explain competitive decline with external, out-of-our-control causes. From the systems thinking perspective, managers see themselves as the victims of overwhelming forces. Since Gary Hamel links effective action (competitive advantage) to how we perceive the world, he traces the ultimate source of competitive advantage to managerial frames of reference: "the assumptions, premises, and accepted wisdom that bound or 'frame' a company's understanding of itself and its industry."

The system dynamics methodology, as well as soft systems methodologies help managers surface their mental models and articulate their implications. This process, with system dynamics models, and management flight simulators in learning laboratories, are good opportunities to collectively explore and experiment with our understanding of the world, to unlearn ineffective models, and to build and share new ones.

The gap between aspirations and resources is the first managerial frame Gary Hamel offers as a fundamental strategic differentiator. The bigger the gap or stretch, the greater the company's ability to get the most for the least. A company articulates an ambitious gap by sharing a strategic intent: a short, clear, inspiring statement of purpose such as "put a man on the moon by the end of the decade". In its simplest causal interpretation, Hamel's proposal can be represented as a negative feedback loop (see figure 2). How realistic is this representation?
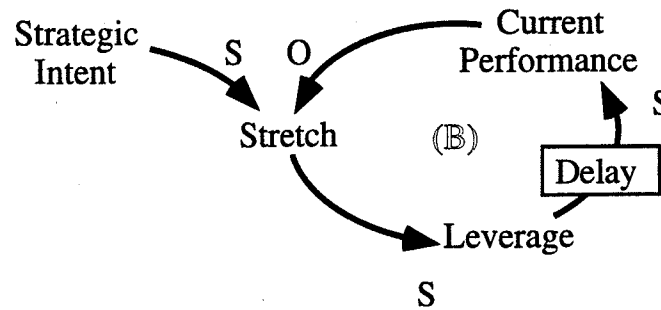
Figure 2 - Elementary Interpretation of "Stretch"

ARMCO Worldwide Grinding Systems [7] provides a feedback view of its business which reinforces this interpretation. ARMCO models itself as a positive feedback loop in which a gap is maintained constantly open in spite of enterprise systems modeled as negative feedback loops which strive to close it as shown on the left side of figure 3.
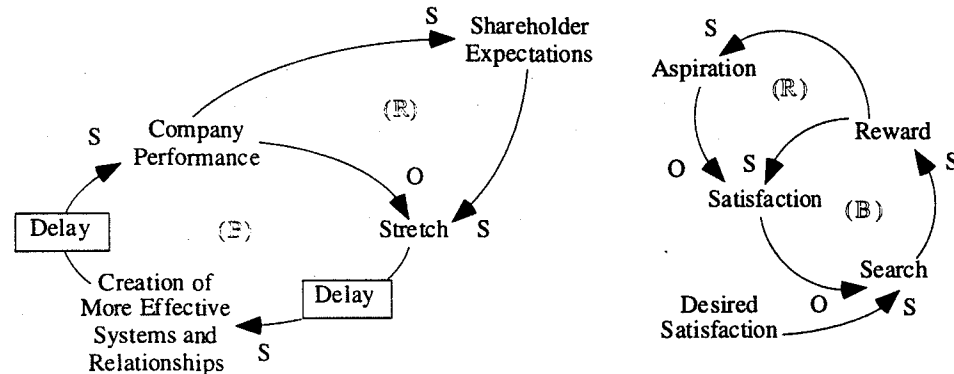

Figure 3 - ARMCO's View of Business and Simon's Adaptive Aspiration

Can we refine the representation? Compare ARMCO's model with Simon's adaptive aspiration model (see right side of figure 3). If we consider satisfaction as the opposite of stretch, the models are very similar. Simon speaks of "search" in the problem-solving sense [8]; ARMCO talks about creation of new systems perhaps more in line with Donald Schön's art of design in professional practice [9]. ARMCO's aspiration loop is embodied by an external agent: the shareholder. The key difference is that Simon's model considers an additional gap between satisfaction and desired satisfaction: the possibility that stretch may be larger than desired by the organization. When aspiration is shared, it is likely that both satisfaction and aspiration would "belong" to the same actor. ARMCO's inclusion of the shareholder in its representation may weaken the effect of stretch.

Gary Hamel's second managerial frame to achieve competitive advantage is the concept of leverage. The parallels between general system dynamics concepts and Hamel's specific definitions of leverage are few, aside from the obvious similarity of purpose: to find the points and policies in the system which will most effectively influence its behavior.

The third and last managerial frame Hamel proposes is consistency of purpose and effort. Perhaps the simplest way of tying this view with system dynamics models is to compare it with Jay Forrester's words in Urban Dynamics [10]: "The greatest uncertainty for the city is whether or not education and urban leadership can succeed in shifting stress to the long-term actions necessary for internal revitalization [...]." or with John Sterman's illustration of the executive, legislative, and judicial (Supreme Court in particular) branches of Government as control systems

with increasing lag times designed to guarantee increasing consistency of purpose and action through time and with the US Constitution [11].

Systems Thinking for Strategic Thinking

Based on these similarities, the Strategic Planning group at EDS is developing tools and methods to spread strategic concepts using systems thinking and system dynamics. The tools include presentation materials, learning labs, system dynamics models, and management flight simulators.

A "limits to growth" archetype articulates the concept of a spent economic engine and illustrates the importance of structure, feedback, and delay (see figure 4). Causal loop diagrams emphasize personal responsibility in the creation of a new environment and its consequent requirement for change. They also highlight the existence of strong personal convictions which prevent us from reacting to the changes we create. From an external point of view, large margins attract competition which eventually attack the margins. From an internal point of view, large margins reassure us that our current view of the world is correct; our confidence reduces our ability to learn. Margins are likely to suffer from either pathology.

The causal loop diagram captures existing stories within the organization; it requires no polarity signs or loop labels. Meeting participants grasp the story right away because it is only another reenactment of a story that they have already heard or with which they already deal every day. The new element in the story is the structure which binds success to a future problematic situation. The archetype refocuses responsibility on the architects of success; "EDS" can no longer blame competitors or higher levels of management. The realization of personal responsibility opens an avenue for recovery through personal action.

It is not enough to realize that an understanding of the world can be changed to increase our capacity for action. People who discover a new way to see the world need to be able to share it and to test it with others. Communicating this vision requires considerable skill. A climate of openness and trust needs to be created. Our education instills a fear of making mistakes in front of others [12].
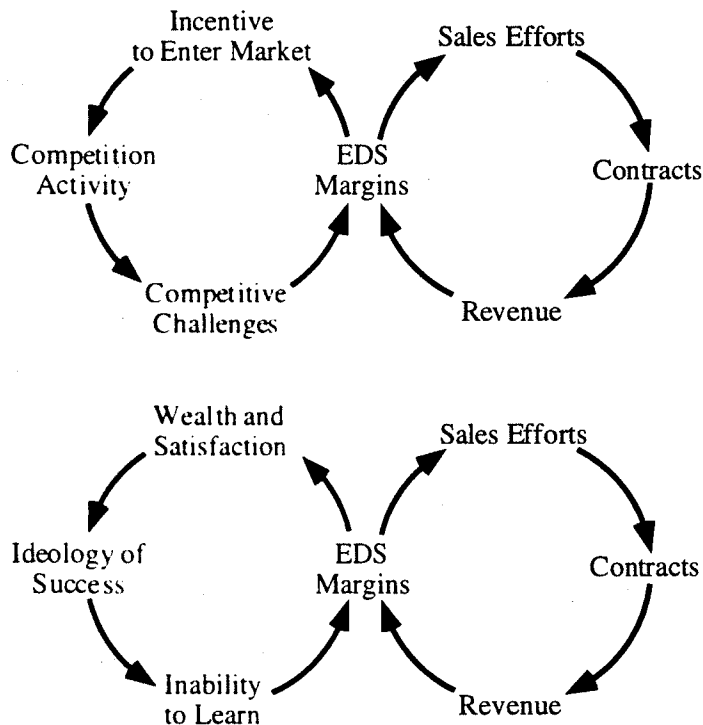

Figure 4 - External and Internal Limits to Growth

Therefore, we become skilled at covering up our and others' mistakes. These skills prevent us from testing our mental models, our new ways of looking at the world. In the offering of a new perspective we can always find a threat to the established perspective. This perceived threat will trigger defensive reactions and further cover-ups [13]. Argyris defines a model (Model I) which abstracts the essence of defensive behavior [14]. He also proposes a model of interaction (Model II) which, if practiced, would yield new skills of openness [14]. A simplified set of his rules of behavior (see figures 5 and 6) can help participants understand very quickly the nature of this obstacle. Before reading through the rules, I ask them to think of a problematic conversation they have had recently. After reading through Model I rules (which always elicit giggles and smiles), I illustrate them with a personal example. After reading through Model II rules, I illustrate them with a successful and an unsuccessful personal examples. The rules are a first step to enhancing participants' capacity for conversation. A much broader EDS program, Leading Learning Communities, led by Fred Kofman, trains a limited number of participants in these skills over eight months of intense practice [15].

- I know how I want you to behave and I am not going to tell you directly.
- I will ask you questions which, if you answer as I anticipate, will lead you to understand my position.
- If you have questions or doubts about my intentions, I will expect that you will not raise them and will act as if you do not have any doubts.
- If you do not behave as I expect, I will give you more time to think "constructively", eventually attempt to argue you out of your views, conclude that your defenses are too high to permit you to learn, or compromise/withdraw and act as if I am doing neither.

Figure 5 - Model I of Individual Interaction - Simplified Version

- I know how I believe that you should behave given the facts identified, and I will communicate that to you.
- I will act in ways to encourage you to inquire into and to confront my position.
- I will check periodically to see that you "walk as you talk."
- If I think that you don't "walk as you talk", I will test it with you openly.
- If I learn that the discrepancy is unintentional, then I will act to help you.
- If I learn that the discrepancy is intentional and you are hiding this fact, then I will feel that I cannot trust you.

Figure 6 - Model II of Individual Interaction - Simplified Version

During presentations or workshops, participants are involved only at an espoused or intellectual level. Participants are still mired in a mess - in the Ackoff sense. Left to their own devices, they will take no long-term benefit from the presentation. A further step toward the reinforcement of systems thinking concepts is to link them to their daily experience of the business through simulation. In particular, the company still needs to design transition strategies to change its structure and operations to fit the characteristics of new sources of growth as they are developed. The strategic transition model was built specifically to allow managers to discuss transition strategies in the sales force.

System Dynamics Models for Strategic Thinking
Most management flight simulators have been built to illustrate a particular way of looking at the world. The Service Quality Management flight simulator [16], for instance, shows how spending more time with every customer can translate into good performance and how close attention to "hard" numbers can throw the player into an eroding goals situation. In this case, I captured and included every story or hypothesis I heard at EDS for the last six months on how the corporation works. I built the model to behave neutrally: it is possible to extract the same bottom-line performance out of the model with drastically different strategies. The way in which

performance materializes is of course also dramatically different in each case. The objective of the model is to provide a transitional object to stimulate discussion and testing of hypotheses about where to take the corporation next.

Time was of the essence in building this model. A balance was necessary between the amount of detail (the number of stories included) and the effort spent developing the model. Based on EDS' current efforts to develop the selling function into a consultative, service-oriented force, I chose the Service Quality Management model as a conceptual base for this model. In particular, considerations about quality are identical to that model.
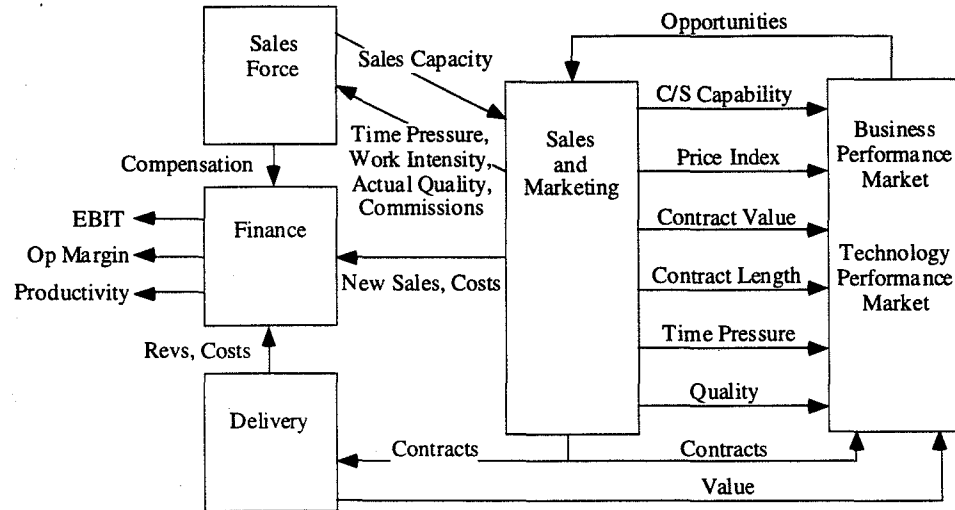

Figure 7 - Subsystem Diagram

The model contains three main subsystems: sales capacity, contract flow, quality, financial results, and markets (represented only in terms of relative attractiveness.) The model assumes that product and services can be delivered flawlessly. Improperly negotiated contracts are the exception to the last point; in this case, an improperly negotiated contract will cause problems some time in the future.
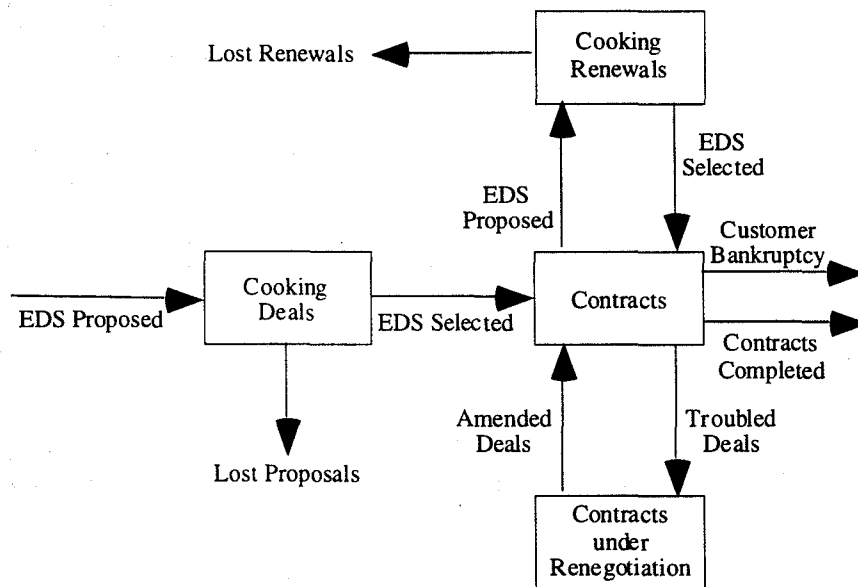

Figure 8 - Sales Sector

The sales structure (see figure 8) highlights the elements which are particularly relevant to EDS' current intellectual discourse: proposals, new contracts, renewals and add-on business, and customer financial health. The sales organization is considered in the aggregate, over industry and geography divisions.

Participants have the opportunity to study the consequences over time on revenue as contract profiles change. Many of EDS' largest contracts are ten-years long. Changes in sales philosophy take a long time to show up as changes in the revenue stream. This realization creates a sense of urgency in spite of currently splendid bottom line performance.
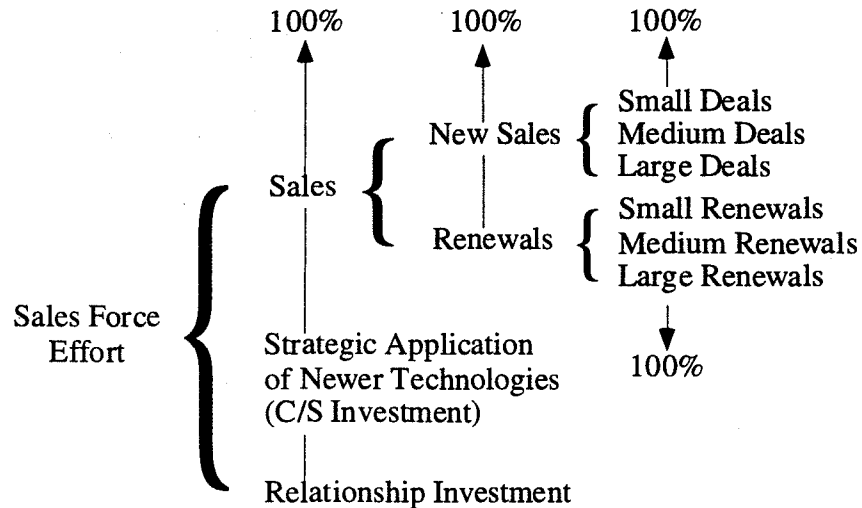

Figure 9 - Sales Force Allocation - Decision Variables

Key decision variables include sales force allocation (as shown in figure 9), sales targets, capital assistance (a capital infusion to the customer when taking over computer operations in an outsourcing deal), hiring, customer satisfaction levels, and pricing. Allocation of sales force to small, medium, and large deals has not been articulated into a dynamic story. Nobody was able to explain why a size distinction was important, and yet corporate sales reports differentiate them. I kept these variables in the model to help participants bridge model lessons to real life.

- Larger contracts have a higher potential of turning up problems.
- A high customer satisfaction index (CSI) can only be obtained by spending more time with the customer. If that time yields more contracts, however, productivity (revenue over compensation) is likely to increase in the long-term.
- Longer contracts reduce the required number of contracts to sell per unit time.
- While sales reps are out developing these bonds, they are not developing other opportunities.

Figure 10 - A Few of the Stories Used to Build the Model

A few of the stories used as model relationships are shown in figure 10. The laundry list format was more successful than a matrix or causal loop diagram formats in communicating with other people. The matrix, although concise, requires the use of terse labels. Causal loop diagrams, which are very well understood at the archetype level, create confusion when more than three or four loops are involved, especially if polarities are included.

All of the numbers used in the model were close to EDS' numbers in 1989. The use of old information helps participants reenact the present and de-emphasizes present issues.

Aside from the service quality model adopted for the general structure, all relations in the model are interpretations of the stories collected by talking informally with EDS colleagues at corporate levels for a period of four months. When the stories are contradictory, the interpretation which favors EDS' current views on strategy is selected.

Playing the model with corporate managers and individual contributors elicits additional stories, hypotheses, and ideas about further refinement of the model. In at least one case, people wanted to see the model to make sure the numbers it produced were consistent with their own.

As it turns out, participants rapidly zeroed in the model's usefulness at the strategic business unit level. Interest from one strategic unit is leading us to modify the model for its industry. Others who saw the model are interested in studying specific dynamic issues.

On the other hand, the sessions are triggering a considerable number of opportunities for further work. Although this effort is by no means the only systems thinking-related project at EDS, a few of these opportunities can be directly traced to this specific work. Causal loop diagramming is being used in a specific instance to support a member of the Leadership Council (the highest decision-making entity within EDS.) A business unit is building a model to guide a Fortune 10 client through strategic choices in reengineering. Key individuals have been able to express dynamic hypotheses using causal loop diagrams (see figure 11 [17]). Master-apprenticeship transfer of system dynamics has just begun. The tools of systems thinking are being used in most corporate strategic initiatives.
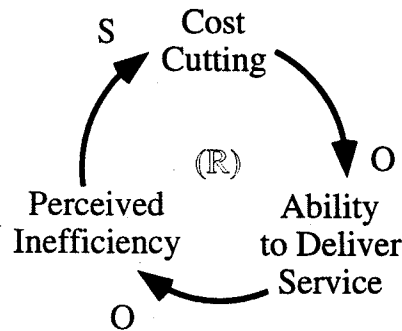

Figure 11 - Self-fulfilling Prophecy of Cost Cutting

Conclusion

The tools presented in this paper have played a positive role in transferring systems thinking and system dynamics to EDS for strategy applications. Similarities between the philosophies of these disciplines and Gary Hamel's conceptualization of strategy simplified the transfer. Systemic approaches to telling familiar stories provided both an introduction to this new thinking and shed a new light on participants' understanding of their situation. We will continue helping other think strategically using systems thinking and system dynamics; we believe they will play an important role in enhancing the ability of the corporation to reinvent itself and to create its own vision of the future.

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