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# CATALYZING SYSTEMS THINKING WITHIN ORGANIZATIONS

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## ABSTRACT

This paper describes the work of an M.I.T. research project (the Systems Thinking and the New Management Style Project) to bring systems thinking to top management groups in several large, successful corporations. The principal research tool, the "strategic forum" is described and critiqued. The paper then presents a case study to illustrate the strategic forum. Concluding remarks and supporting figures are presented at the end.

## I. INTRODUCTION

Company X is at the top of its field. It is ranked in the fortune 500, it has grown at 30% over the last 10 years. It is known for its generous personnel policies, and its climate is one of innovation, excitement, and profitability. Its branches are highly decentralized, allowing for extensive local control by its branch managers and staff. The company has had employee stock options in place for its entire fifty year history. Company morale and loyalty are high.

But Bob Short, the CEO of the company, feels something is wrong. He greatly appreciates the good qualities of X, but feels that the highly decentralized structure is creating a problem that's only now becoming clear to him. He sees that the local branches are making decisions that do not act in favor of the entire company. The decentralization of the company has led to parochial decision making. Because profits are tied so directly into a branch's performance, its managers have little incentive to think of the repercussions of their actions as a whole. They can not see that any move that hurts the company will, over time, hurt the local branch as well.

Mr. Short feels the need for the employees to see the company as an interrelated system where every action taken by one sector has an impact on the other sectors. Because he is responsible for the whole, he is keenly aware of this, but he finds that his branch managers don't reflect this understanding. He has seen numerous examples of short sighted and parochial decision making in the divisions, and he has seen the price paid by the company as a whole.

His problem is one of education. He has to teach the managers to think differently, to approach their problems differently.

Mr. Short's problem is one of the foci of a research group at MIT called the Systems Thinking and the New Management Style Project (NMS). One of the project's objectives is to develop techniques that allow managers to think and act in ways conducive to long-term systematic health of their businesses. This paper reports on ongoing experiments designed to catalyze systems thinking within management teams in several major corporations (those which are a part of the NMS project).

## II. WHY ENHANCING SYSTEMS THINKING MIGHT BE AN IMPORTANT ORGANIZATIONAL OBJECTIVE

The above story of company X illustrates the dilemmas of many organizations as they grow and drift toward an increasingly short-term, "atomistic" orientation in decision-making. While everyone continually pays lip service to the long-term health of the organization as a whole, pressures to trade short-term for long-term gain and for parochial decision making become deeply rooted in the culture and traditions of many organizations. Many management experts regard the capability in Japanese organizations to focus consistently on long-term business objectives as one of their primary competitive edges in dealing with their American counterparts.

Moreover, a systems perspective becomes more critical to a business the more complex the business becomes. In complex systems, cause and effect are generally not closely related in time and space. Managerial actions taken to correct problem symptoms in one part of the system are often ineffective, sometimes even counter-productive, because the origins of the problems lie in the interactions of diverse parts of the system. When local actions are taken to correct problems that are caused systemically, "better before worse" behavior often results. The managerial intervention relieves the problem symptom in the short-term, only to see the underlying systemic forces which originally produced the problem intensify difficulties in the long-term. As problem symptoms return, pressures to reapply the short-term symptomatic "solution" also return. Managers can find themselves dragged into a reinforcing spiral of increasing reliance on short-term palliatives.

But, the very difficulties illuminated by the systems perspective also point to unique opportunities. The basic insight of the systems perspective, that most organizational difficulties are created by the very managerial policies intended to generate success, implies that there is untapped potential for organizations to more effectively influence their future. If the organization's policies and structure are the root cause of most of its problems, then they are also the key to resolving those problems.

The perspective that within the organization lies the potential to determine its destiny runs counter to many prevailing managerial

attitudes and much thinking within the social sciences. When organizations get into difficulty, there is an almost inevitable tendency to blame forces outside of management's control. These external forces are often seen as increased competition, poor overall economic conditions, overpriced and underproductive workers, and so on. The "external cause" perspective is reinforced by the preponderant static and non-systemic theories of change in the social sciences. In their formal education, managers are taught to analyze the organization as reacting to a set of external forces. There is little, if any, formal training in understanding how the interaction of different organizational policies can produce unanticipated difficulties. Much of conventional corporate finance and strategy theory is either non-dynamic (ignores the processes of change) or non-systemic (focuses on isolated decisions, ignoring interactions between different types of decisions) or both.

Developing systems thinking within an organization is probably best thought of as part of a broader process of developing a new management philosophy and tools for implementing that philosophy. The essence of this philosophy should be the shift from a reactive to a creative orientation. A creative orientation involves developing a shared sense of purpose and shared visions of what the organization seeks to accomplish. It involves developing an organizational culture of personal commitment and openness to challenge established policies and strategies. Ultimately, the creative orientation resides in a personal perspective that an individual's choices are the predominant influence in shaping their lives and, by extension, that an organization's choices of objectives and policies are the predominant force influencing the organization's success. Within such a philosophical orientation, the systems perspective provides a conceptual basis for understanding the likely consequences of alternative organizational choices. Without analytic tools for linking policy and behavior, a managerial philosophy stating that "we can determine our destiny" may engender frustration and ultimately cynicism rather than fundamentally new ways of thinking and acting.

Lastly, new tools for implementing the systems perspective are becoming available. Senior managers, like Mr. Short, have for years advocated a longer-term, more wholistic view to their management. But, they had little means to implement such a view beyond the clarity of their own intuitive understandings and force of their own arguments.

The particular tools upon which our research draws is the "system dynamics" methodology developed at MIT and elsewhere.[1] The system dynamics approach involves developing feedback models to show how current policies and structure influence behavior in complex human and social systems. The new STELLA software makes it possible for managers to build and analyze their own models using a personal computer with graphics capabilities.[2]

The only problem is that there is very little experience with how to actually help managers become the "model-builders". In conventional consulting, experts build the system models, then attempt to explain to their clients the rationale for adopting new policies. The consulting mode can lead to improved decisions, but it rarely alters the way managers think. Bringing systems thinking tools into the hands of managers involves an understanding of how managers construct and continually update their "mental realities", and how formal systems modeling tools can become part of the ongoing construction of mental models. The research reported below is, to our knowledge, the first effort to study how system modeling tools can become part of constructing improved mental models in management teams.

## III. THE SYSTEMS THINKING STRATEGIC FORUM

Over the past year, we have been experimenting with alternative processes to catalyze systems thinking within management teams. The teams have typically been composed of the senior managers responsible for overall business management. The intent of these experiments has been to create a genuine learning process that deepens management understanding and leads to lasting improvement in organizational policies and strategy. The following steps summarize the basic stages in these experiments.

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[1] Forrester, J.W. Industrial Dynamics, 1961: Cambridge(MIT Press); Roberts, E.B., Managerial Applications of System Dynamics, Cambridge (MIT Press).

[2] High-Performance Systems, Inc., Lyme, New Hampshire.

Step 1: Current Vision and Strategy

The first step in working with the management teams is for the participants to articulate their present set of guiding ideas in managing the business. This includes the current vision, strategic objectives, and strategies for achieving the objectives. The vision is the overall definition of desired results. Strategic objectives are the key measurable outcomes by which success can be gauged at future points in time. Strategies are the set of desired processes assumed to be most effective for accomplishing the strategic objectives.

At this first step comes the initial revelation of the prevailing mental models guiding management of the business. Strategic objectives reflect what people currently believe are possible achievements. Strategies reveal what they think is necessary to accomplish the objectives. At this stage, there is no intent to expose shortcomings or incompletenesses regarding prevailing mental models, but rather to simply get an initial statement of prevailing assumptions. Problems with current mental models become evident as the strategic forum process continues.

Step 2: Simple "Reality Check" Models

At this stage, the participants are introduced to the discipline of the modelling through constructing and exercising simple models that begin to examine the feasibility of the current strategy. The basic question at this stage is "can we get there from here?" In other words, are the strategic objectives attainable given current strategies? Sometimes, inconsistencies and new insights become apparent with quite simple dynamic models.

It is the intent of the "reality check" models that they be quite close to the prevailing mental models. Technically, this means that the models are predominantly "open loop". Open loop models contain few feedback relations. Such feedback effects, which often account for the surprising behavior of complex systems, are generally unrecognized in prevailing mental models. Consequently, when managers are suddenly exposed to a complex feedback loop structure, as they might be in a conventional consulting situation, they tend to discount surprising model outcomes because they

neither understand how they arise nor believe that they reflect reality.

Step 3: "Closing The Loops"

In this stage, the predominantly open loop character of the simple reality check models is corrected. The group is drawn into a conceptualizing process to expand the simple reality check models and identify potential important feedback dynamics.

This stage is inherently open-ended and can continue for a considerable period of time. The key to its success lies in identifying what the system dynamicists call "dynamic hypotheses." A dynamic hypothesis explains a particular problematic pattern of bahavior in terms of specific feedback interactions. At this stage, the group begins to develop and test their own theories to explain the problems in which they are interested.

Step 4: "What if" Policy Testing

Stage 4 is a natural extension of Stage 3 into considering alternative policies to improve system behavior. To be effective, this stage must allow the testing of the changes in policy and structure that the management team currently has under consideration. Moreover, if the preceeding stage has been effective, new courses of action will probably also have been identified, which can be tested further in this stage.

Step 5: Action Steps

In this stage, the implications of insights from Stages 2, 3, and 4 are translated into specific actionable initiatives. Action steps may include ways of implementing new policies, such as new reward systems, changes in organization structure, or changes in information systems. Action steps may also include the design of new learning experiences for other groups within the organization. For example, strategic forums often lead to the design of management games intended to develop shared understanding of particular business dynamics among a large number of people within an organization.

In considering action steps, it is important to keep in mind that the primary impact of the strategic forum is in reshaping mental models of managers. Consequently, the full benefit of a strategic

forum may occur over a considerable period of time as managers gradually assimilate new ways of thinking about a business. New conceptual perspectives give way to new perceptions. New actions emerge gradually as a learning process unfolds. As will be illustrated below, this can occur in a way that makes it difficult to trace the exact evolution of new ideas and new policies.

## IV. A CASE STUDY

Over the past year systems thinking strategic forums have been conducted in several companies. Some forums have taken the form of intensive 1-1/2 to 2 day sessions with management teams. Some have been spread out over a series of 2 hour meetings every 1- to 2 weeks. The following case study, based on a strategic forum that has been ongoing for the past several months, illustrates the potential of the process to accelerate learning in a management team. Not all of the strategic forums we have conducted have been as successful, as will be discussed when we summarize our learnings in Section V.

### Background

The Marriot Insurance Company is a leader in its industry. Nonetheless, it is the wide-spread feeling of many of its managers that settlements on claims, in keeping with conditions throughout the property and liability industry, are significantly in excess of fair and just settlements.

There is ample reason to believe that the causes for this condition lie outside of Marriot's control. Competitors are having the same or worse difficulties. There is a wide spread attitude that there has been erosion in ethical standards throughout society, and a concomitant increased willingness to litigate. Nonetheless, many among Marriot's leadership believe that the organization may have untapped leverage in influencing its claim settlements.

Beginning in the summer of 1986, the top management in the claims function undertook an ongoing strategic forum to examine the causes and possibilities for influencing the gap between average settlement size and fair and just settlement size. Over a period of several months, the management team has developed a series of dynamic models focused on adjuster capacity, quality standards in

claims management, and litigation management. The process has enabled senior claims managers to clarify and communicate more effectively a shared understanding of the business, led to ongoing efforts to reorganize claims offices and other parts of the claims organization, and is now focusing on an education program to enhance understanding throughout the claims organization of the systemic causes of eroding investigation quality and claims service.

## Getting Started: What is the Strategy?
## The Current Mental Models

At the first meeting of the claims management team, the team provided an initial statement of strategic objectives, strategies, and perceived barriers facing the organization. It should be said in starting that Marriot is an organization that emphasizes mission, vision, and a set of core values that are shared widely throughout the organization. Thus, it was not surprising that the claims management team began with a very clear idea of its vision and how it wanted to see the basic values of the larger organization operate within the claims organization. Moreover, the group possessed a high level of openness and mutual trust reflective of several years of working together in an overall organizational environment that places a premium on these characteristics.

In their vision statement, the management team stated their intent to be preeminent among claims organizations in the insurance industry. Their vision was summarized in the phrase "fair, fast, and friendly". This represented their intent to provide fair settlements of customers' claims, prompt attention to new claims, and to treat customers well. They discussed a good deal their image of the ideal claims adjuster, who is capable of conducting thorough professional investigations, has excellent communication skills, keeps neat and complete file records, and is able to educate claimants regarding the fair value of their claims, while at the same time being able to detect those with the slightest fraudulent inclinations. We joked a little about the claims adjuster who "walks on water", but it was clear that the group held very high expectations for the types of adjusters they sought to attract and develop within Marriot.

Thie initial statement of strategic objectives identified 10 different measures of performance, including productivity measures such as the "production ratio" (claims settled relative to new

incoming claims), as well as subtler objectives like quality investigation and "vigorous oversight of litigation." The team recognized that it is difficult to keep one's sights on so many different objectives. In fact, Ken, the Vice President for claims, talked about what they call the "balls in the air" problem. Whenever the management team attempts to increase emphasis on a particular objective, progress on that objective is accomplished at the expense of backsliding on some other objectives.

The team then elaborated 12 different strategies to accomplish their strategic objectives. Three quarters of the strategies were concerned with developing adjuster capacity and litigation management. As it turned out, this reflected the assumption in the group that building a corps of outstanding adjusters and improving litigation management were major problems or barriers to achieving their objectives. They saw their primary barriers to success being that investigations needed to be more thorough, that adjusters were too concerned with not looking bad, adjuster turnover was too high (although it was falling), service needed to be improved, and that the prestige of adjusters within Marriot, and within the entire industry, was too low. They were also concerned about the fact that attorneys were not taking enough cases to trial and that responsibility for litigation management was too diffuse.

The discussion of strategies and barriers illustrated the way that strategic objectives and strategies typically are formulated at the same level of abstraction. In fact, often "strategies" are simply sub-objectives, which it is assumed are necessary to accomplish the strategic objectives. For example, the strategies "hire better people" and "increase field experience and exposure of adjusters" are themselves objectives assumed important for accomplishing overall strategic objectives concerning capacity development. As they are commonly expressed, strategies lack operational depth. They fail to provide a clear picture of what will actually have to happen in order for strategic objectives to be achieved. In the current disaffection with strategic planning among managers and consultants, the failure to couple strategies and operations is often criticized.

The other problem with common formulations of strategic objectives and strategies is that they are non-systemic. The "laundry list" of 12 strategies developed by the Marriot team ignores the interdependence between different strategies. In fact, one of the reasons for beginning the strategic forum with a statement of the

current strategy is to create a record of the *form* as well as the substance of the current mental models guuiding the business. The "strategy laundry list" suggests an image of a business as a set of separate processes and problems to be resolved by separate and distinct initiatives. In fact, our experience is that managers are keenly aware of the interdependencies. But, they lack a *language* for expressing and examining how different problems are interrelated and how different initiatives will interact. Surely, this was true for the claims team at Marriot, and was reflected in their desire to undertake the strategic forum.

Initial Reality Check Models

Several simple reality check models were developed with the Marriot claims management team. The first dealt with the physical stocks and flows involved in building adjustor capacity. As noted above, building capacity was a prime concern in the team. Moreover, discussion had revealed that the number of adjusters had been expanding at about a 30% annual rate for several years, to keep pace with rapid growth in claims. Such high personnel growth rates invariably stress alignment and productivity. The first strategic objective stated was "maintain 100% production ratio (claims settled relative to incoming claims)." So, continued high growth in incoming claims suggested continued high growth in new hires.

The model used for this first reality check involved distinguishing new adjusters from experienced adjusters (see Figure 1). Initially, the team made a simple assumption that new adjusters were 30% as effective as experienced adjusters. We also asked the team to estimate how long it took to develop an experienced adjuster, and the average time an experienced adjuster stays in that position. Once these numerical assumptions were established by the team, it became possible to examine how overall effective adjuster capacity would be affected by different rates of hiring new adjusters.

The simple adjuster capacity model quickly showed the difference between overall growth in numbers of adjusters and capacity growth. In particular, the more rapidly new adjusters are hired, the greater the difference between numbers of total adjusters and effective adjuster capacity. The reason lies in the different skill levels and effectiveness of new adjusters and experienced adjusters. The more rapidly new adjusters are hired, the larger the proportion

of new adjusters relative to experienced adjusters, and consequently, the slower the growth in adjuster capacity.

The initial tests with the simple adjuster capacity model began to raise questions regarding the feasibility of achieving desired growth in adjuster capacity through merely hiring new adjusters. This immediately led to a discussion of subtler aspects of developing experienced adjusters, a subject that was a deep concern to all members of the team. The need for improved training was discussed. The possibility that internal organization within claims offices might impede the development of new adjusters was also discussed.

Clearly, the problems illuminated by the simple adjuster capacity model made explicit fundamental difficulties in building capacity. It became clear that developing adjuster capacity was a major issue in everyone's mind.

But the most important insight from the simple reality check model emerged when one of the team members criticized the way the initial model had lumped new adjusters and experienced adjusters into "effective adjuster capacity". He pointed out that there is no one single adjuster capacity, but different types of capacity for dealing with different types of claims. After discussing Joe's criticisms, we decided to distinguish "simple claims capacity" from "complex claims capacity." While this distinction clearly oversimplified the many types of claims, it helped to differentiate the type of work assigned typically to new adusters from that of experienced adjusters. The team agreed that almost all complex claims were handled by experienced adjusters. Conversely, new adjusters dealt with simple claims primarily. This led to a revised model that linked "simple claims capacity" and "complex claims capacity" to the respective types of adjusters (see Figure 2). Comparing simple- and complex claim capacity to the respective volumes of simple and complex claims would indicate whether capacity was "adequate" to the work that needed to be done (see Figure 2).

We then simulated the revised adjuster capacity model with historical rates of adjuster hiring and incoming claims. The team estimated the number of new adjusters hired per year over the past several years and the number of incoming claims, broken down into simple claims and complex claims. The resulting simulation showed

consistently inadequate complex claims capacity, for a variety of assumptions regarding hires, claims, and time to develop experienced adjusters. At this point, Joe, the team member who had originally suggested the model revision proclaimed, "This is exactly what we have experienced; we are losing money because of inadequate capacity to deal with complex claims. The settlements that are killing us are a small number of very large losses in complex claims."

The ensuing discussion led to a more refined statement of the original problem of overpayment on settlements. Reflecting on the dynamics of the revised capacity model, the team felt strongly that most of the overpayment that had been experienced was because of inability to deal with complex claims. In light of the fact that adjusters had been expanded at approximately 30% per year over the past 3-5 years, it now became clear that the rapid personnel growth led inevitably to a disproportionate influx of new adjusters and lower than desired growth in complex claims capacity. In this discussion, the team discovered a new set of connections between its policies (in this case, its hiring and capacity development policies) and its strategic issues (overly high settlements on claim).

The claims capacity models illustrate the benefits of simple reality check models. First, these simple models allow the managers themselves to quickly become part of the modelling process. This was illustrated by the fact that a change in the initial model that led to important new insight was proposed by a team member, not by the technical facilitators. Secondly, the simple reality check models provide new perspective on the group's strategic objectives. As a result of working with the adjuster capacity models, the group came to appreciate the subtleties and challenges in building adjuster capacity, especially when overall rates of growth are high. There came to be a shared appreciation that inadequate capacity, especially inadqeuate capacity to deal with complex claims was perhaps one of the organization's chief problems. From this point onward, whenever capacity problems were discussed, there was a shared awareness that growing capacity and hiring new adjusters were not synonomous. Eventually, this awareness merged into a new vision for how the management team would like to see claims offices designed and managed, as will be shown below.

Beginning to Close the Loops

The simple reality check models (of which there were others in addition to the adjuster capacity models) began to familiarize the team with the modeling discipline applied to examine pieces of the claims organization. This naturally led to the desire to begin putting the pieces together to examine policy alternatives within the entire adjuster capacity-claims management- litigation system. We decided to set aside litigation issues initially in order to focus on capacity-claims management interactions.

One path toward examining the larger system was to explore the causes of adjuster hiring and the consequences of having too little adjuster capacity. One line of questioning that emerged was, " Why is there inadequate adjuster capacity?" "What are the signals that indicate that capacity is adequate when in fact it might not be?" "Are there ways in which the system compensates for inadequate capacity so as to mask the need for developing additional capacity?"

Interactions between adjuster capacity, claims management, and performance standards by which claims operations are measured were discussed through several meetings with the team, during which several preliminary models were developed. Finally, a hypothesis began to emerge. The key to the hypothesis lies in distinguishing two classes of performance measures: "production standards" and "fuzzy standards." Production standards were measures like "production ratio" and "pending ratio" which indicate whether the current backlog of claims pending is being processed at a rate commensurate with the inflow of new incoming claims. The production standards are relatively easy to measure, are understood by everyone in the business, and send out clear immediate warning signals when they become out of balance. The fuzzy standards include quality of investigation, file quality, effective oversight of litigation and subrogation (when Marriot attempts to recover settlements from another insurer), and service quality. The fuzzy standards are difficult to measure. Though there is wide-spread appreciation that the fuzzy standards are important, the team felt that, at any point in time, there is usually considerable uncertainty as to how well a claims office is doing on the "fuzzies." Because they are easier to measure, the team felt that there were natural pressures to manage by the production measures. As Ken, the vice president put it, "In this business there are lots of way to look good without being good."

Building a formal model helped the team to develop a more explicit and complete description of their hypothesis. The model was constructed through a series of group discussions, then put into an exercise that allowed each of the team members to work with it individually. The model is easiest to explain in three stages: pending claims and the production measures, pressures to add adjuster capacity, and pressures to adjust fuzzy standards.

Figure 3 shows the way the production measures are related to the backlog of pending claims and the flows of new incoming claims (called Acord because of the form on which new claims are submitted) and settlements. There are three basic production measures: production ratio (settlements relative to incoming claims), pending ratio (number of pending claims relative to incoming claims), and the average settlement time (ratio of pending claims to settlements). All measure the extent to which the current rate of settlements is in balance with the volume of new incoming claims. For example, if settlements are less than new claims, production ratio is less than 100%, the stock of pending claims and thus the pending ratio is rising, and the average settlement time will be rising.

Figure 4 shows how pressure from the production measures are related to adjuster capacity. If the number of incoming claims increased, pressure on existing claims capacity would build. The increased volume of incoming claims and the possible build up in pending claims would make the need for increased adjuster capacity apparent. In the terms of the model in Figure 4, staffing needs would increase, sending a signal to boost the hiring of new adjusters. If new adjusters were hired commensurate with the increased need for claims capacity, settlements would rise to match the increase in new claims and to restore the pending ratio (typically, Marriot seeks to keep pending ratio at about two months worth of claims). Production ratio would return to 100% and settlement time would be restored.

But, the above scenario presumes that adjuster capacity adjusts fully to match the increased volume of incoming claims. There are many reasons to question whether this happens. First is the natural caution in bringing on new adjuster capacity which represents a significant cost commitment. Second are the delays in locating, hiring, and training new adjusters. Third is the intrinsic difficulty in building experienced adjuster capacity to match growth in complex claims, as discussed above. For all of these reasons, it is likely that

increased incoming claims are met by alternative responses within a claims organization.

The alternative to building capacity to match growth in incoming claims is to increase the productivity of existing claims adjusters. How do adjusters manage to settle a larger volume of claims per adjuster per month? Primarily, through spending less time on each individual claim. Herein lies the connection to the fuzzy standards. The team felt that there is strong pressure to maintain the production standards in Marriot. But, if this cannot be done through rapid adjustments in adjuster capacity, it must be accomplished by letting fuzzy standards slide, so that individual claims can be settled more quickly. As one of the members pointed out, "The quickest way to eliminate a growing pending pool is to simply call each claimant, ask them what they think their claim is worth, and put the check in the mail."

This response is shown in Figure 5, by the feedback loop that links capacity pressure (staffing need relative to actual adjuster capacity) to pressure to adjust fuzzy standards. If capacity pressure leads to erosion in fuzzy standards like quality of investigation, individual claims can be settled more quickly, adjuster productivity increases, the rate of settlements increases and production measures are restored.

Interactions between production standards, fuzzy standards, and adjuster capacity can produce several patterns of behavior, summarized in Figure 6. In all three cases shown, there is an increase in incoming claims beyond the initial capability of existing adjusters. In the first case, there is no change in the fuzzy standards. Increased new claims and pending claims leads to hiring adjusters, who eventually increase the rate of settlements and restore the production measures. Note that in this first case, production ratio is below 100% for about one year, during which time the pending ratio and average settlement time are rising. (Production ratio is subsequently greater than 100% for several months in order to reduce the high pending ratio.) The time lag in adjusting production ratio is due to the delay in bringing new adjusters on line. This delay could be longer or shorter depending on the type of additional capacity needed. The significant point is that, if increased adjuster capacity bears the full burden for boosting the rate of settlements, there will be significant periods of time where production standards are not being met.

In the second case shown in Figure 6, there is no increase in adjuster capacity in response to the increase in incoming claims. Consequently, capacity pressure is relieved by lowering fuzzy standards and boosting adjuster productivity until the production standards are reestablished. Once the production standards are reestablished, there is no further indication that additional adjuster capacity is needed. How long it takes before the indicators of capacity pressure disappear depends on how quickly the fuzzy standards can be lowered.

In the third case shown in Figure 6, there is a combination of increased hiring and lowered fuzzy standards. Again, production standards are reestablished after a lag. In the third case, there is a combination of increased adjuster capacity and increased adjuster productivity. This is probably the most realistic case. The team felt that simultaneuos increases in capacity (which are measurable) and erosion of fuzzy standards (which are not measurable) probably occured often. If the organization is under near continual capacity pressure during rapid growth, which seems to be true, these two adjustment processes are probably occuring continually. The organization can "look good," that is maintain reasonably acceptable production measures, while the underlying quality of investigation and claims settlement is steadily eroding. The consequence would be a steadily rising average settlement size and increasing losses in litigation -- exactly what had been experienced.

The claims management team spent several hours in a series of meetings developing and working with models of the sort shown in Figure 5. Some were less complex. Some were more complex. All dealt with the basic trade-offs between maintaining fuzzy standards and building capacity. All showed the forces that can systematically bias the organization toward undercapacity, even while adjusters are being added rapidly. The capacity-claims management models, along with the earlier capacity models, resulted in the growing awareness that (1) the existing claims management system produces performance indices that can lead managers to consistently underestimate the capacity needed and (2) even when hiring is aggressive, achieving high rates of growth in claims capacity may be difficult.

In a followup discussion after the team members had worked individually with the above-mentioned capacity-claims management

exercise, several interesting observations were made. There was some discussion of how claims managers can know whether or not they have inadequate capacity. It had become clear why the standard production measures can be misleading, and how counterproductive it can be to manage by these measures. In fact, the usefulness of the production measures is itself linked to the fuzzy standards. As one of the members said, "The production measures are valid indicators of how well we are doing if the fuzzy standards are not allowed to erode. Only when the 'fuzzies' are being met does the production ratio correctly indicate if we have enough adjuster capacity."

Ken made an observation that was especially striking. He said, "As I think about the implications of this exercise, it becomes obvious to me that we may have half the number of adjusters that we should have. You must realize that that is a crazy thing to say. We already have a lower case load per adjuster than almost all of our competitors. What the model gives us is a different basis against which to evaluate our business. Normally, you can only compare yourself to your competitors. Without these models, people here would think I had lost my mind if I proposed that we should double our number of adjusters."

By the same token the group was concerned that no "model" become the authority. They felt that it was extremely important for others in the claims organization to build up their own model from scratch. What had made the process useful for the team was conceptualizing and analyzing the models themselves and, in the process, coming to their own understanding. We would need to find ways to facilitate similar experiences for others within the organization.

## "What If" Policy Testing and Action Steps

At the time of this writing the policy testing process is just getting started. Considerable time has gone in to examining the litigation process and Marriot's potential influence over its losses in litigation. A simple reality check model quickly called into question the original strategy of taking more litigated cases through to court settlements. It is now obvious to everyone that taking more cases to trial will actually result in larger losses unless high fuzzy standards, notably quality investigation, can be maintained. The team has

developed a clearer way to explain how the litigation process is interconnected with the claims management and investigation process.

But, it is interesting to see how the policy initiatives now being considered by the claims management team have been influenced by the strategic forum process. To illustrate, one involves the reorganization of the claims offices discussed briefly above. Periodically during our series of meetings, we break off from the modeling to step back and reexamine the visions of the team members. One idea that emerged in a recent discussion was to break down the traditional hierarchical structure that operates within claims offices, wherein all complex claims are assigned to senior adjusters, and move to an adjuster team concept, wherein adjusters share responsibility for claims. The adjuster team concept is intrinsically attractive to the management team because it is aligned with Marriot's values of openness and nonauthoritarian managerial style. Moreover, effective adjuster teams might be more capable of monitoring fuzzy standards like quality of investigation, just as production teams have been essential in enhancing quality in manufacturing organizations. Lastly, an effective team environment might accelerate growth of complex claims capacity by providing a superior learning environment for young adjusters.

One action step that will almost surely come out of the strategic forum will be a "claims game." The intent of this game will be to have claims managers discover for themselves the fundamental pitfalls and leverage points in managing capacity growth, settlements, and litigation. The game will be designed so that claims managers can reflect on their own day-by-day practices in allocating their time and responding to problems. After they have played the game, the managers will be assisted in conceptualizing the forces at play and analyzing their own tendencies. Groups of claims managers will first play the game, then analyze the policies they employed, and play again. They will then discuss the implications for their own management practices and how the systems perspective of claims operations can be brought into their offices.

## V. WHAT HAVE WE LEARNED

Our initial experiments with the Systems Thinking Strategic Forum have been humbling. The more we do, the more apparent is our ignorance. In particular, those of us involved with the experiments have become painfully aware of the difficulties in creating an effective group learning environment, especially when the tools that can make that environment unique are foreign (and potentially threatening) to the participants.

Nonetheless, several important learnings are emerging. Hopefully, these learnings will be the basis for eventually making processes like the strategic forum more replicable and widely available.

### A Middle Ground between Consulting and Training

The intent of these experiments has been to break sharply with traditional consulting practice, wherein managers provide information which consultants organize and structure into formal systems models. In traditional consulting, the consultants then recommend courses of action based upon their analysis of the systemic implications of the information provided to them. We believe that this process isolates managers from the prime benefit of the systems perspective, namely, the construction and analysis of the systems models themselves. Effective consulting can lead to improved decisions, but, it rarely alters the thinking which lay behind the previously ineffective policies. Consequently, in the traditional consulting mode no learning process is established that leads managers to a series of insights about their own business.

By the same token, the systems thinking strategic forum also departs from previous attempts at general management education in systems principles and methods. The educational strategy clearly emphasizes developing managers' abilities to think more systemically. However, past experience has indicated to us that the efforts required to apply systems thinking skills to pressing operational and strategic issues often exceeds what can be accomplished in realistic systems thinking training sessions for managers. We remain convinced that broad-based managerial education in systems principles and methods is extremely important for developing a systems perspective within organizations. But, this

ongoing education effort must be complemented by working sessions which aid managers in applying the systems perspective to their own problems. Such "task oriented education" is essential for discovering the benefits of systems thinking. Eventually, an organization must develop the internal resources for sustaining its own learning process. The strategic forum is merely intended to initiate this learning process.

## Implications of Working with Mental Models

Approaching the modelling process from the standpoint of how to effectively evolve the mental models of managers fundamentally differs from the more traditional task of building good models. Many insightful models have little or no impact because the insights are too far beyond the prevailing mental models of managers. While the models may have some intuitive appeal (often resonating with deep felt feelings for how a business ought to be run), there are too few conceptual bridges to the concepts and assumptions by which the business is being run at present.

For example, one learning that has been repeated many times in our experiments is the benefit that can derive from extremely simple formal models. The simple adjuster capacity models developed at Marriot were one example. An even simpler reality check model developed at Marriot concerned the desirability of taking cases in litigation through to in-court settlements. The claims Vice President had been advocating a tougher stand and taking more cases through to settlement. A simple model of cases in litigation and those settled in court and out of court showed that, for any range of assumptions concerning likely fraction of cases won versus lost, and respective costs, the higher the fraction of litigated cases taken to court settlement, the greater the total financial cost to Marriot. In a manufacturing firm, an extremely simple reality check model allowed marketing managers to conclude that the utilization rate for certain key products was much lower than widely believed. In another manufacturing setting, an extremely simple model pointed out to a top management team the intrinsic evolution towards increasing service revenues versus new equipment revenues -- a profit opportunity that the company was unprepared to exploit.

From a technical system dynamics perspective, the models utilized in all of the above examples were exceedingly simple, involving only one stock (or state) variable, and virtually no

significant feedback loops. The models were almost "back of the envelope" calculations. Why, then, did they prove so useful?

There appear to be two reasons why the simple reality check models appear to be so useful. First, they are close enough to the prevailing mental models that they can be readily understood by managers. The managers unfamiliar with the formal dynamic policy models can be easily discouraged by models with multiple feedback loops and large numbers of variables. Time and again we have seen managers with no technical training immediatly become involved with a simple reality check model, provided it is focused on an issue that is important to them.

The second reason that simple models appear to be useful is that even simple system dynamics models begin to provide a new language for describing business dynamics. Normal verbal communication is inadequate for describing subtle short- and long-term dynamics and the multiple effects of different policies over different time horizons. System dynamics provides an elegant framework for describing business dynamics, which begins to become apparent even in the simple reality check models.

## Insights Into the Nature of Mental Models

One of the reasons that clarifying managers' mental models is challenging is that the assumptions contained within these models are of fundamentally different kinds. The systems perspective helps to clarify the different strata of the mental models (see Figure 7). First, there are assumptions about "behavior," what has happened and what is happening within the system. Second, there are assumptions about structure, the basic interdependencies that connect different parts of a system. Third, there are assumptions about the expected effects of changes in policy. This third class of assumptions links structure and behavior.

Assumptions about behavior are generally the least controversial. Nonetheless, we never cease to be surprised about the fact that managers often simply do not know basic data regarding their business. An essential step preliminary to an effective strategic forum is often to survey what is and is not known about current and historical business conditions. Sometimes, the construction of simple reality check models brings to the surface inadequacies in basic

business data and forces managers to make explicit their operating assumptions regarding business conditions.

Assumptions about structure reflect managers' understanding of the basic interconnections in a business. We find that managers typically have a rich store of information regarding the structure of their business. They know the pieces intimately from many years of experience, anad can often describe operating policies with a fairly high level of consistency.

In many ways, the most important and least well understood set of assumptions concern how alternative policies will influence future behavior. In dealing with a complex system, people may have an excellent understanding of the individual pieces of the system and how they are interrelated, yet consistently misjudge the dynamic behavior as the pieces interact and how that behavior would be altered by new policies. Yet, it is exactly this set of assumptions which underlies the design of new managerial policies. Consequently, it is in the area of clarifying the linkages from structure to behavior and the likely effects of alternative policies that tools like System Dynamics have their greatest leverage.

Prerequisites for a Successful Strategic Strategic Forum

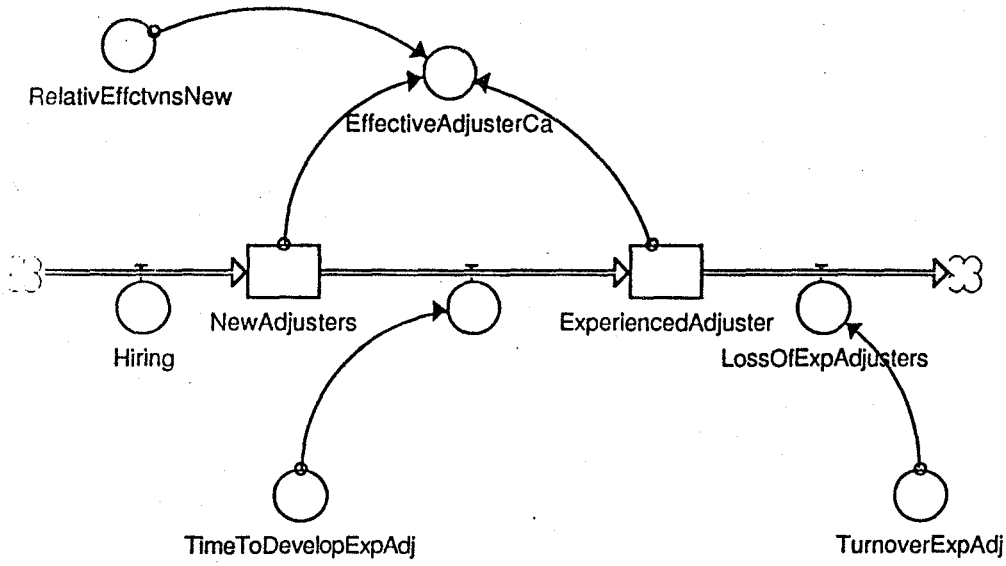
There are a number of pre-conditions that must be met for a strategic forum to be successful. First, the assembled team needs to be a group of people who have the power to act and who need one another to act. The strategic forum is designed for a management team, not a "study group". While a study group may benefit from the systems thinking process, the needs of a management team to take action can be a great benefit to the learning process. Actions are always based on assumptions, i.e., implicit or explicit mental models. In a context requiring action, the fundamental learning questions are "what are the assumptions underlying our current actions?" and "can we improve these assumptions so as to act more effectively?" In such a context, managers can evaluate for themselves whether or not the systems thinking process clarifies and improves the assumptions underlying their actions. They can assess the "value added" of the strategic forum. By contrast, "study groups" can get bogged down quite easily in pursuing unattainable theories of "how the system really works."

Second, the management team must be truly motivated to learn. Nothing impedes learning so much as the belief that one already has all the answers. While the need to improve understanding may seem like a given in virtually all managerial settings, there is always a cost - perceived benefit calculation that must be made. Unless the participating managers believe that the possible benefits of new understandings justify the time and effort that will be required, the likelihood that the strategic forum will be successful is low.

Third, the management team needs to have developed the degree of maturity that allows people to speak openly and honestly. People must feel free to talk about what is important to them, their own assumptions, and their own perceptions of others' assumptions. Such discussions invariably become personal and highly subjective. people must feel free to "question the party line." They must feel free to challenge one another's assumptions, in a spirit of genuine inquiry and mutual learning. While the above conditions of maturity for a management team might seem to be essential for any form of effective cooperation, it has been our experience that these conditions are often absent. Many management teams are dominated by internal politics and games playing. People are reticent to expose their own ignorance. They are often equally reticent to possibly expose the ignorance of one another, for fear of future retribution.

Fourth, the participants in the management team need to share a strong sense of personal ownership for the vision of the group. As will be seen below, the first step in the strategic forum process is to state the overall vision and objectives for the group. If people feel a strong personal commitment to attain these objectives, they will be highly motivated to undertake the effort to learn how best to proceed. They will be willing to put themselves at risk, in the sense of exposing their misunderstandings. They will be willing to change and adopt new policies if they become convinced that such new policies have a higher likelihood of achieving their objectives. In the absence of ownership of the vision and objectives of the group, there is much evidence to believe that people often prefer the status quo to change in actions and policies. Change is always threatening. It always involves a degree of risk. Many mangement teams would prefer to achieve moderate levels of success following established policies and procedures than to undertake significant changes. In

such settings, everyone will wait for someone else to stick their neck out and, consequently, no change results.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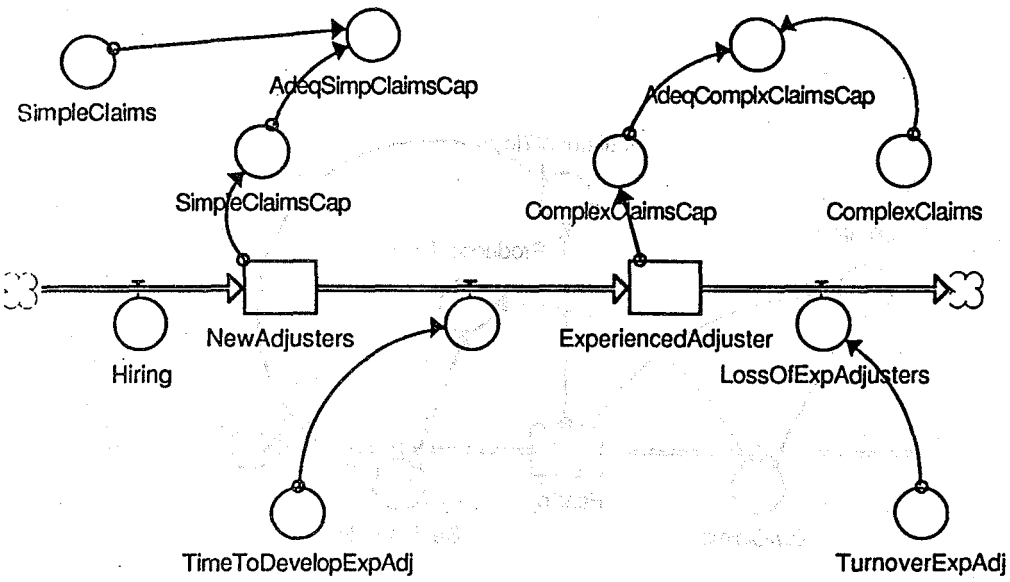
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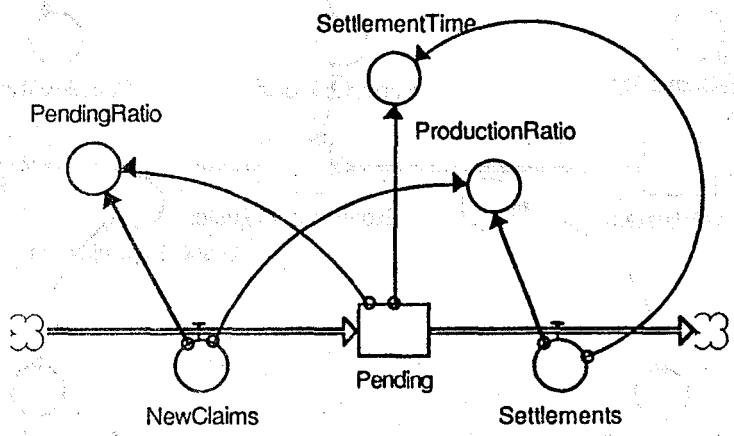
FIGURE 2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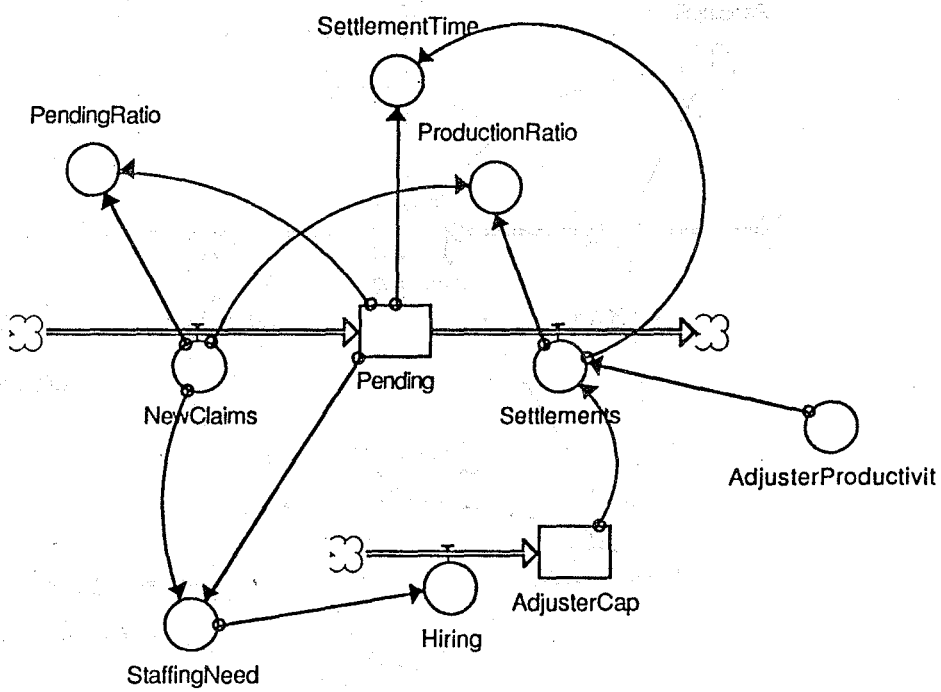
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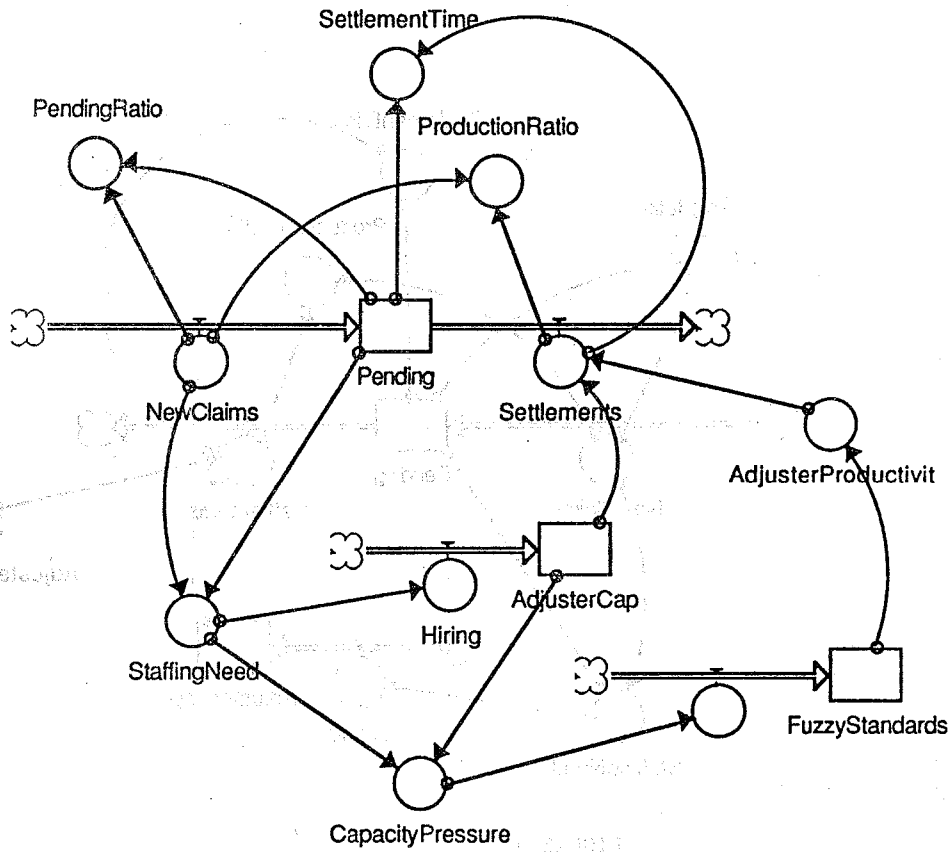
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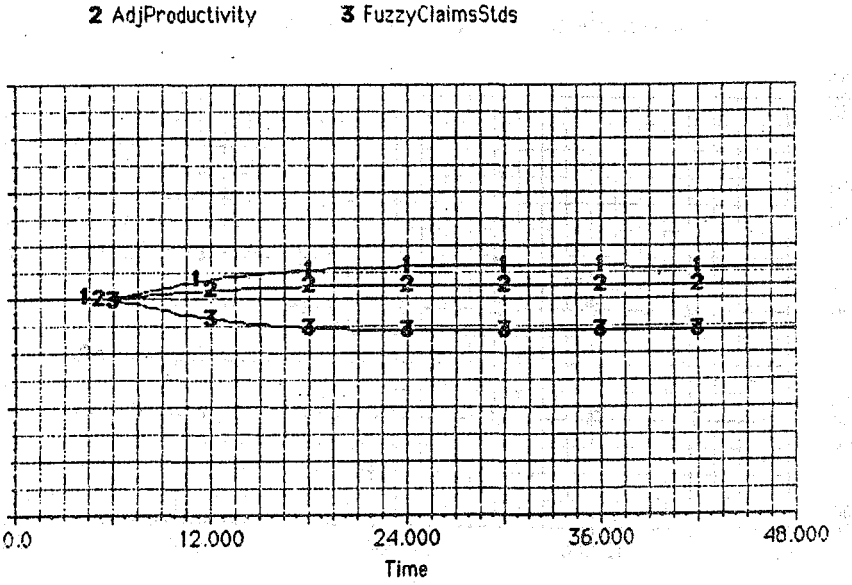
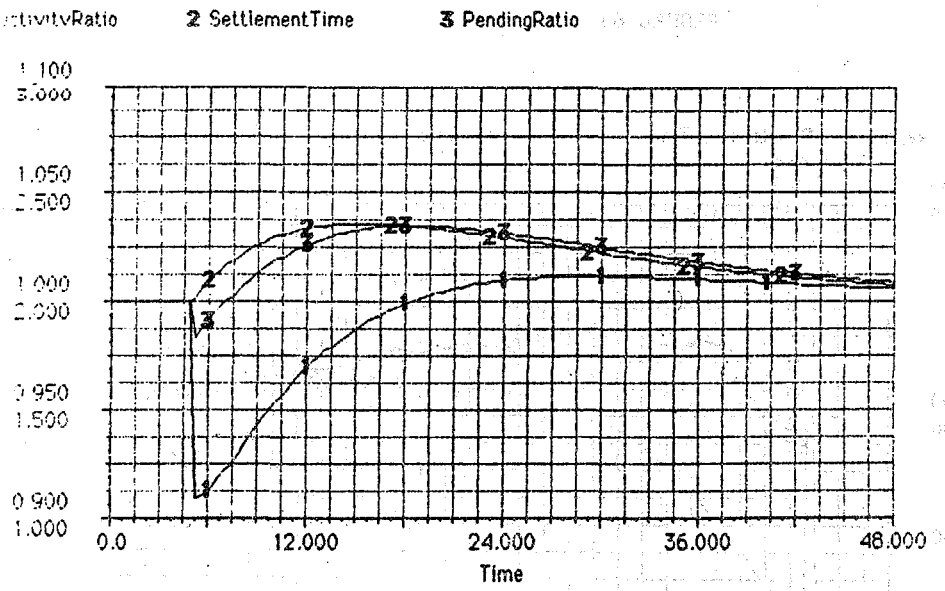



FIGURE 6c

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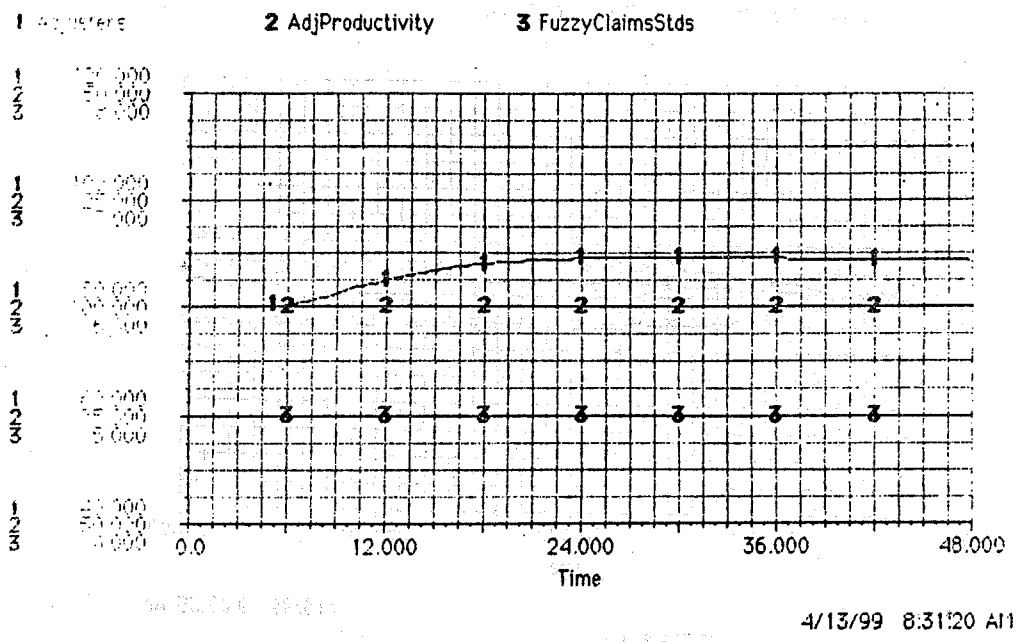
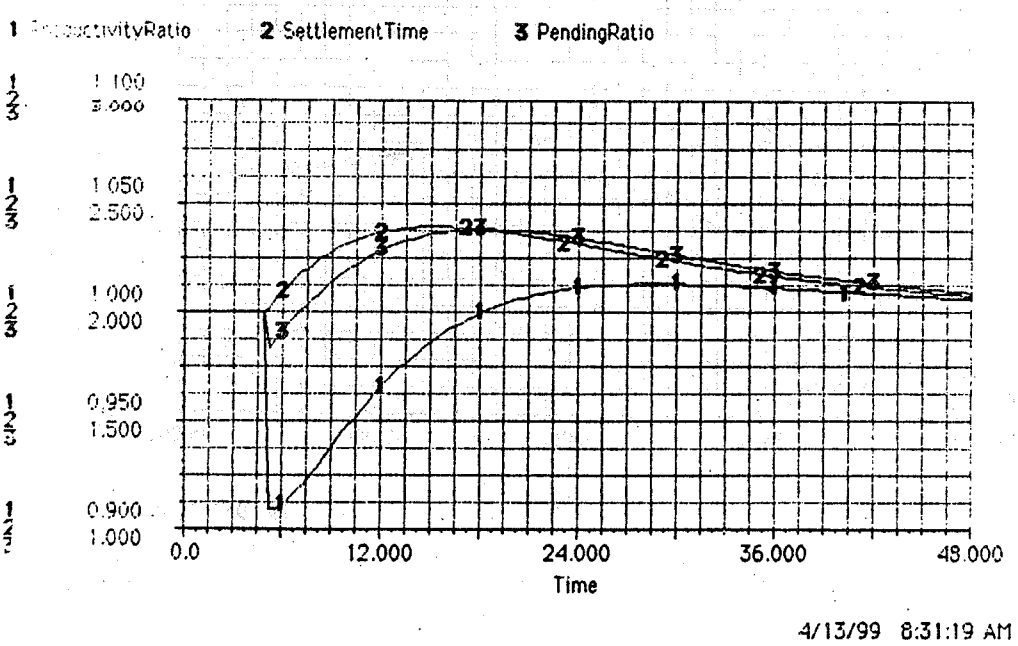



FIGURE 6a

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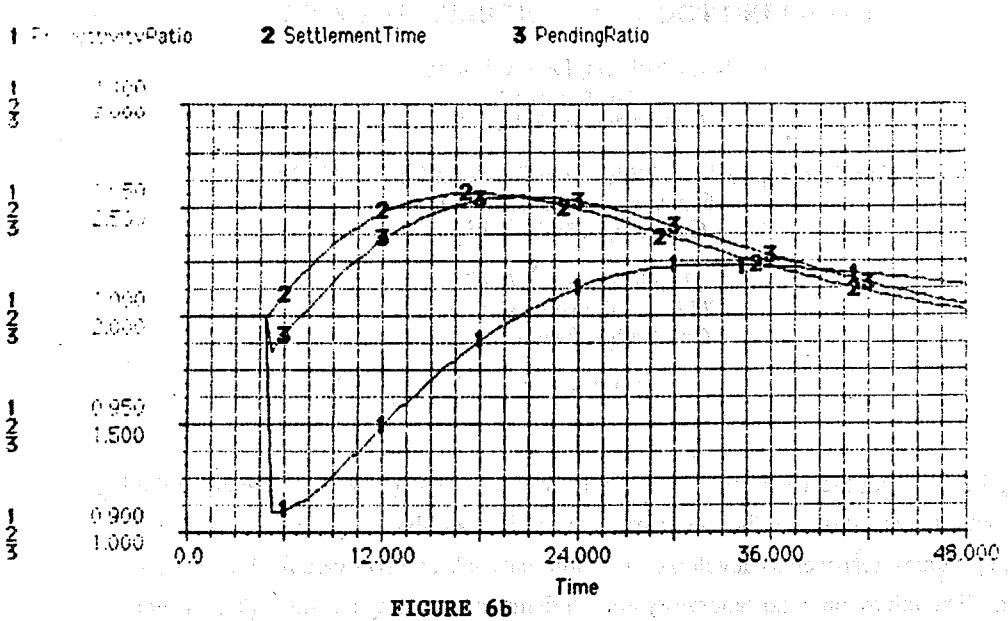


FIGURE 6b

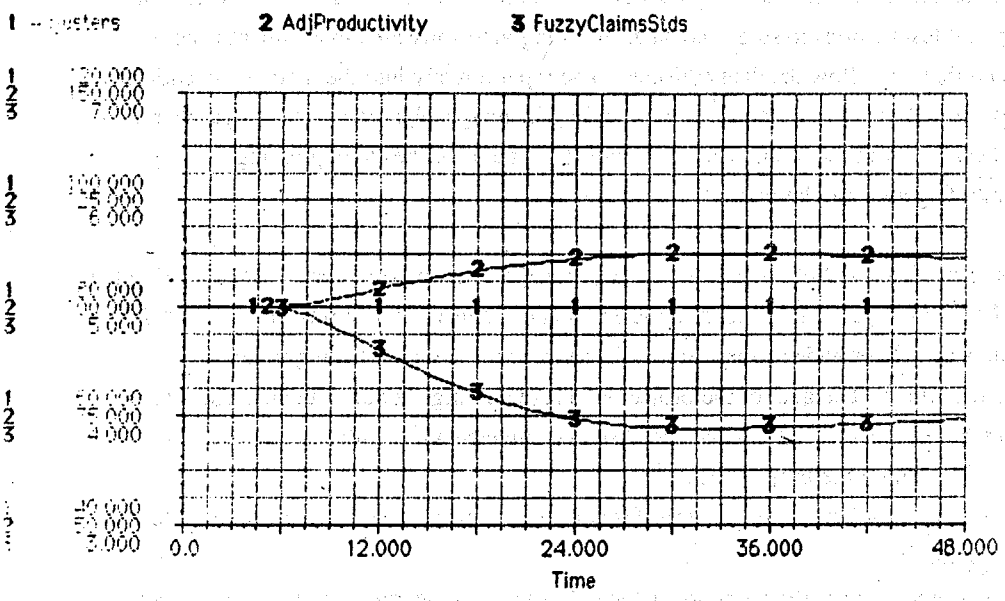


FIGURE 6b

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