

THE NATURAL LOGIC OF MANAGEMENT POLICY MAKING:  
its implications for the survival of an organization

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Abstract:

A process-theoretic approach, seldom used but not without promise for organizational behavior research, is employed to postulate a process model of the natural logic evident in organizational policy making. The model is used to explain how the policies of a sample firm (for which twenty years of data are available) became adopted and how, together with critical events, this caused the firm to evolve in particular directions rather than others. Implications of the study are put forward in terms of identifying pathologies of the policy making process. Some prescriptions are put forward for the proper control of organizations by supervisory bodies, such as boards of directors. It is suggested that Management Science, in the form of systematic procedures for adaptive organizational design and updatable cause maps, may have an important future role to play in senior management affairs. Questions are raised for government and society concerning sustaining and regulating firms in both the public and private sectors in the light of the study.

Key Words: Process Model, Evolutionary Learning, Socio-political processes of organizing, Policy Making, Cause Maps, Survival.

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1. Introduction

To the outside observer, the decision making process in an organization that results in a series of policy changes made over a period of time seems unfathomable, shrouded in mystery and sometimes downright illogical; particularly when it leads to the failure of the organization. It is suggested that such failures may be twenty years in the making (Argenti, 1976). Hence, in researching organizational policy making, there is a basic problem of gathering data over a sufficient period of time that are also rich in detail about the internal organization, external events and other such qualitative aspects bearing on major policies taken. It presents the researcher with a formidable task (Miller and Friesen, 1982).

The lack of an integrated and coherent theory of organizational decision making poses an additional problem since, when longitudinal data are available with, hopefully, the requisite amount of richness, there is little or no structure for making sense of the data. So, for example, Miller and Friesen's (1980a) pioneering study categorizes the ways organizations pass through a transition without necessarily being able to explain how the management chose one set of transitional policies over another. Both these deficiencies will be addressed in this paper by: (1) postulating an integrated and, hopefully, coherent model of the natural processes of management policy making, and (2) using the model to structure both anecdotal and time series data about a company to explain its policies. Tentative conclusions (bearing in mind that we are dealing with a single company) will be drawn concerning pathologies of the policy making process and ways of avoiding them.

2. A Process Model of the Natural Logic of Policy Making<sup>1</sup>

The model to be developed may be classified as a process model of organizational policy making. According to Mohr (1982):

Process models are used little in organization theory and even less in many other social science subfields. When they are used, they are often underdeveloped. There is a tendency to present and conceptualize the stages in the process but to omit the forces that drive the movement from one stage to another. The latter, however, are essential (p. 14).

Such a conceptualization of the stages in the process of policy formation in an organizational setting (including the driving forces) will be attempted here.

Moreover, the model may also be classified under Mohr's (1982)

heading of descriptive quasi-theory:

A final and closely related consideration regarding the flow-of-events property of the process-theory style is its attractiveness as an object of descriptive quasi theory. Description as theory in the more mature sciences has targeted the form, matter, and motion of phenomena, but the kind of description that would seem to have the greatest potential in social science is description of processes - how things are done by people and groups. To the extent that the pursuit of description increases in prevalence as a research goal, social science will take on an increasingly process-theoretic flavor, at the expense of variance theory (p. 215).

The intention, therefore, is to build a description of the macro-phenomena of organizational policy making that may, hopefully, contribute to theory. The insights, so generated, will lead us later to draw some normative conclusions to improve the process or guard against pathologies of natural organizational policy making.

The model is built around system states that represent the collective memory and retained set of the organization, and organizing processes that are guided by the retained set. These states and processes are assembled within an evolutionary learning and organizing framework (Campbell, 1965; Weick, 1969; Aldrich, 1979) that links action to learning and back to action in a feedback sense. The model is outline in Figure 1 and a more detailed description follows.

Figure 1 goes here

#### An Evolutionary Framework

Weick (1969) and Aldrich (1979) conjecture that an organization evolves enactment, selection and retention processes that enables it to handle ambiguous information resulting from the organization's actions on its environments. The organization adapts to its complex enacted environments by trying to remove equivocality using standard procedures and recipes stored in its retained set or long-term memory; itself an accumulation of learning from past activities.

Enactment processes: An organization may start out its life by making random trials or, more likely, by choosing actions based on a very rudimentary map of causality. The choice of action will result from the enactment processes, that are guided by the planning and organizing procedures retained in the organization's memory. The enactment processes for policy making, it is proposed, comprise such activities as formulating budget plans, recognizing problems and choosing policies that are implemented through the organization's primary actions on its environments. Should these actions fail, equivocality reducing procedures are evoked from the organization's memory to make the budget plan work. This is effected through the organization's controlling actions, such as trying to manipulate the organization's environments or internal slack (Cyert and March, 1963) to make the plan self-fulfilling.<sup>2</sup>

Selection processes: Residual information, discernible from the organization's actions upon its environments, is registered by the selection processes. These processes are governed by the attention directing framework supplied by the retained set. Thus a new relationship, such as the price sensitivity of sales, may be selected for attention or simply ignored. It is now available for retention in the organization's memory and, hence, may influence future decisions.

Retention processes: The retention processes are used to admit the

relationship, thus selected, to the organization's storehouse of knowledge--its memory, so to speak. The processes are governed by the perceiving and interpreting framework supplied by the retained set that may reject or edit that which is selected to fit the existing set of retained knowledge, or modify the existing set in light of the new information, or even discredit the existing set and adopt its converse. These authorized adaptive changes are made to the retained set of the organization. The retained set is now available for influencing both the enactment process (e.g., relationships to be used in choosing action) and the selection and retention process (e.g., retained procedures for selecting relationships to be retained).

The driving forces: The forces that drive the enactment, selection and retention processes of the organization, it is argued, are: (i) the desire of subunits to increase (or defend against loss of) their status and power relative to other sub-units (after Pettigrew, 1973; Salancik & Pfeffer, 1977), and (ii) the desire by groups and individuals to reduce or control to acceptable levels the various forms of equivocality threatening confusion or chaos (after Weick, 1969 and Jung, 1965).

External uncertainty, such as the emergence of new technologies or ways of doing business, can cause the release of both these forces. The subunits with the requisite skills to reduce the uncertainty facing the organization will seek to use the opportunity to increase their status and influence, and other subunits will seek to defend against the threatened loss. Such uncertainty will spark political activity as groups challenge each other for command over resources to remove the uncertainty. The escalation of uncertainty created by these challenges can raise the collective feelings of equivocality to unacceptable levels. The challenges are usually settled by compromises, such as creating new domain boundaries for

apportioning the work of the organization and new standard procedures for handling interdepartmental disputes (after Pettigrew, 1973; Mumford and Pettigrew, 1975; Coser, 1964).

If the uncertainty takes on the nature of a full-blown survival crisis, the intergroup political activities become deadly serious as one group unseats the dominant group and usurps its power. The new dominant group provides the organization with a fresh orientation and strategy with which to engage its environment and confront its difficulties (after Turner, 1976).

Retained set: By such means, the past interactions among groups in response to a changing environment will have largely determined the present state of the retained set. For the purpose of policy making, the retained set, it is proposed, consists of: (1) the stock of standard procedures for reducing equivocality, (2) the current orientation or strategy with which the organization engages its environment, (3) the present architecture that provides the social setting through which future demands on resources are made, and (4) the current structure of the maps of causality. The importance of the latter to policy making calls for a more detailed description.

### 3. The Organization's Cause Maps

The maps are fragmented into a number of loosely coupled subunit maps describing the causal paths that lead from policy to achievement of subunit goals (after Cyert and March, 1963; Weick, 1976). Axelrod (1976) has argued that these maps will be simplified structurally to exclude feedback loops, and resolve indeterminacy (paths of cause-and-effect from policy variable to goals with opposing correlations). The maps of causality comprise three sorts of relations (see Figure 2): (1) simple logical or accounting relations, (2) relations that are a matter of observable fact from the feedback of the results of

controlled activities, and (3) relations subject to belief and environmental conditioning, where the necessary evidence of proof is not available or is confusing. The different types of relationships would seem to call for different treatments by the organization's selection and retention mechanism.

Figure 2 goes here

First, the simple logical and accounting relations map the flows of resources within the jurisdiction of each subunit. They do not usually come up for conscious consideration unless the architecture (e.g., a subunit boundary) changes. Second, the factual relations, whose values can be estimated with reasonable precision from unfounded results of the interaction of the subunit's actions with its environments, are selected to update the currently retained values of these parameters. For example, the cost of obtaining a sale by various promotion methods may be estimated precisely by monitoring selling activities. Third, relations of the belief kind become part of an interlocking set of beliefs that are a part of the subunit's internal culture and are not readily changed in spite of disconfirming evidence (after Steinbrunner, 1974). Key indeterminate or disputed cause-effect relations are supplied by the "belief set" of the dominant group.

Once a particular policy has been chosen, its success in ameliorating the problem, for which it was evoked, can be registered. If it is successful, it reinforces the dominant group's beliefs underpinning its choice. A precedent has been set, so that, when that particular problem arises again, the policy is a prime candidate for reconsideration. This reduces the uncertainty about the outcome, and the work of selecting a policy becomes a matter of organizational stimulus-response (after Cyert and March, 1963). The policy itself becomes a retained standard procedure for reducing equivocality.

If the policy is unsuccessful, but the problem does not reach crisis proportions, then the organization has two avenues of behavior. First, it may abandon the policy because it does not in any way conflict with the dominant group's central core of beliefs--it is merely struck from the list of successful policies. Secondly, if the dominant group feels the need to justify its retention of an unsuccessful policy because of its place in their interlocking "belief set" (admitting failure may bring into question their whole strategy), and if the evidence of failure is not overwhelming (as is often so), then it is explained away in such terms of poor implementation or bad luck. Furthermore the group may redouble its efforts to make it work (Staw et al., 1981). The retention system of the organization is protected from vacillations in policies due to pure chance effects by such a mechanism, but there is a risk that a bad policy will be retained.

Finally, if the policy failure engenders a crisis threatening the organization's survival, then the socio-political processes previously described selects a new orientation. A new dominant group with a new orientation and set of beliefs takes over. After an internal cultural readjustment, its beliefs supplant those of the discredited coalition in determining the organization's cause map.

The role of the retained set in determining policy making: Having described how the retained set adapts to experience, we return full circle to the crucial influence it has over the enactment process in general and policy making<sup>3</sup> (a major subset of the enactments of the organization) in particular. The enactment process, in similar fashion to the selection and retention processes, is driven by the forces of subunit desire for greater status (or to defend against loss) and a general desire to reduce equivocality to manageable proportions. The enactment process of (1) forming budget plans, (2) re-

cognizing problems, (3) choosing remedial policies and (4) making the plan work are laid out in summary form in Table 1. The hypothesized processes -- described in greater detail in Hall (1981) -- draw heavily on the seminal work of Cyert and March (1963), Lindblom (1968), Axelrod (1976) and other decision school theorists who have observed the way managers and groups of managers go about their decision making work.

Table 1 goes here

#### 4. Using the Model to Explain the Policies of the Sample Firm

An attempt will now be made to use the model to explain the policy decisions made by the management of the Curtis Publishing Company--the owners of the old Saturday Evening Post magazine. The macro-issues affecting policies (the firm's orientation, departmental structure and maps of causality) will be examined in this section. A more rigorous testing of the model to examine its ability to replicate the fine detail of the management's decisions (the micro issues) constitutes a major piece of research outside the scope of this present study.<sup>4</sup>

##### The Organization's Orientation

The time series data in Tables 2 and 3 depict four distinct periods of environmental conditioning of the old Saturday Evening Post. These have been identified as (Hall, 1976: 199-203): phase 1 the war years (1940-1944), phase 2 the post war boom (1945-47), phase 3 the years of stagnation (1948-1950), and phase 4, the circulation war (1951-1960).

Tables 2 & 3 go here

In phases 1 and 2, the critical problems facing the company were the lack of supplies of paper due to war time rationing, and lack of both

printing capacity and supplies when both the demand for the magazine and the size of its annual volume grew in the post war boom. It has been argued that the coalition in the firm best able to cope with this uncertainty will rise in status and power. The coalition can use this power to accord its goals top priority and divert resources into their attainment. One could posit, therefore, that the production operations coalition of the company would rise to power during this period and that the company would show a production orientation in its implemented policies.

This orientation can be seen from the firm's costs (Table 2). The production costs grew from \$46.7 million constant dollars (48 per cent of revenues) in 1940 to \$86.7 million constant dollars (53 per cent of revenues) in 1947. In contrast, the proportion of revenues spent on circulation promotion dropped from 30 per cent to 23 per cent over the same period. The production and circulation promotion operating ratios are compared in Table 4A.

Table 4A goes here

From this it appears that the production operations coalition effectively diverted a greater share of the firm's resources into its domain. This was achieved by allowing the magazine's pages to grow from a total of 5604 pages in 1940 to 7920 pages in 1947 (Table 3) and with it the volume of printing required. Although circulation promotion expenditure was held back relative to production costs, it was increased in absolute terms from \$29.4 million constant dollars in 1940 to a high of \$41.3 million constant dollars in 1946. This further stimulated the demand for the magazine and further increased the magazine printing requirements. It would appear that a coalition, once established, can secure its power base by pursuing policies that control the uncertainty facing the organization and, hence, the continued need for that coalition's services. As further evi-

dence of the firm's production orientation, it built a \$40 million printing plant, acquired three paper mills and 262,000 acres of timberland (Freidrich, 1970, p. 15). The production coalition in 1947 was at the zenith of its power.

In phases 3 and 4 of the company's developmental history, the uncertainty facing it changed from lack of supplies to lack of readers. In the period 1948-1950, due to the very high subscription rate charged, the readership ceased to increase (Table 3). This brought an abrupt halt to the company's growth.

In the subsequent period 1951-1960 the magazine became embroiled in a circulation war and aggressively acquired readers to maintain the circulation relative to its competitors. This suggests a shift in power to the coalition concerned with circulation promotion. Again we can posit that power will follow uncertainty and that resources will follow power. From the evidence (Table 4) the proportion of total revenue spent on promoting the magazine rose from 25 per cent in 1948 to 41 per cent in 1960. Over the same period, production costs fell from 55 per cent to 48 per cent of revenues. Resources were effectively diverted to the cause of the dominant coalition by the policy of increasing advertising rates to raise funds for the increased promotion expenditures. The increased advertising rates resulted in fewer advertising pages and hence, a slimmer magazine that reduced the printing requirements. As further evidence of its circulation promotion orientation, the company acquired a subsidiary company that handled subscription sales and circulation promotion for some 50 magazines (Friedrich, 1970, p. 15).

The transition from production to circulation orientation does not seem to have been particularly smooth. In 1950, in what seemed to be a panic measure, there was a substantial increase in promotion expenditure (19 per cent), but to no avail; the readership remained

at the same level. At this point the president of the company resigned and it was thereafter that the new orientation became evident. This substantiates the previous statement that a crisis or, at the very least, a series of critical problems is required to bring about a cultural readjustment in an organization and a change in orientation.

#### The Organization's Maps of Causality

An attempt will now be made to employ the process model to reconstruct the maps of causality used by the various subunits in the organization to structure their decisions. The major subunits providing the variety of skills and activities required for publishing a magazine can be identified as: (1) a circulation department handling the sales of subscriptions, (2) a publisher's department handling the sale of advertising space in the magazine, (3) an editorial department concerned with hiring writers, page layout and other matters affecting the content of the magazine, (4) a production operations department responsible for printing, binding and delivering the requisite number of magazines, and for securing the factors of production needed for this purpose, and (5) the office of the president of the company to coordinate these activities for the purpose of achieving the desires of the owners, as represented by the chairman and board of directors.

The goals assumed for the departments are those related to the scale of operations, such as the revenue, expense or quantity associated with the department's operations. The remuneration of the senior staff of the departments is usually determined, at least in part, by such measures (i.e., the larger the scale of operations, the greater the responsibility and remuneration). The president and board, on the other hand, are assumed to be more concerned with profit and growth to meet the objectives of the shareholders or owners.

Figure 3 depicts the causal maps, using the directed digraph scheme of Axelrod (1976), as the anecdotal evidence (Friedrich, 1970) suggests they must have existed.

Figure 3 goes here

Each departmental map represents the causal path from policy variables, that may or may not be under the direct control of the department, through intervening variables to the department's goals. The causal paths are derived mainly from straight forward accounting relations with a few additions concerning the behavior of readers and advertisers to price changes and promotional activities, as uncovered in a previous study (Hall, 1976). The directions of causality are shown by arrows and the sign of correlation between pairs of variables (links) is shown as +, 0 or - to represent the positive, zero or negative effect of the variable at the tail of the arrow on the variable at the head. The type of relation or link is notated in accordance with the previous discussion on maps of causality as accounting relation, factual relation, and believed relations. The interrelationships between the departmental maps are also shown.

The paths through the maps of Figure 3 from the prime policy variables that could be manipulated in a budget plan (i.e., subscription rate C1, advertising rate A1, and circulation promotional expenditure C2) to the ownership goals are detailed in Table 4.

Table 4 goes here

Each path is an argument from cause to effect and represents a policy, such as increase the advertising rate to increase the amount of profit (path #11). Some are simple (e.g., path # 6 has only two links), and some are tenuous (e.g., path # 10 has nine links). We have posited that where indeterminacy exists, the shorter path will

be the easiest to argue in committee and hence the most likely to be chosen (after Axelrod, 1976). Alternatively, paths representing arguments congruent with the organization's current beliefs also may be likely choices. The policy chosen will then be subject to environmental conditioning. That is, if the policy works it will be retained for future use.

Note that path # 14 represents a feedback loop of positive polarity. The firm's traditional editorial-advertising formula (Friedrich, 1970, p. 244) is the major element in the loop coupling editorial to advertising pages, so that any increase in readers will stimulate more advertising and hence more editorial pages that, in turn, attracts more readers. It is a standard procedure derived from past interdepartmental conflict. However, we have posited previously that the equivocality reducing processes will make the organization oblivious to this obfuscating recursive path of causality.<sup>5</sup> We can, therefore, strike it from the list of paths in any official map of causality used by the organization to structure its decisions.

The thirteen remaining paths in Table 4 have been reorganized in Table 5 to show the total effect on each departmental goal of increasing each policy variable. This has been accomplished by summing the correlations of each link in the path from cause to effect. So, for example, the path # 7, "increase promotion expenditure" would be seen as having a positive effect on the circulation department's goal for increasing "readers", a positive effect on the production department's goal for increasing the "amount of printing and production expenses", but a negative effect on the president and board's goal for "profits".

Table 5 goes here

Before 1948, as will be demonstrated, the organization had good reason to believe that the demand for its magazine was price inelas-



tic (i.e., the link between subscription rate C1 and readers C5 in Figure 3 was either zero or positively correlated). After the year 1948 it became obvious that this correlation was negative because the policy of increasing subscription rates had brought about a stagnation in total readers. Therefore, the signs of correlation for the arguments or paths affected by this reversal in sign of correlation have been grouped in columns headed "b" (before 1948) or "a" (after 1948).

Scanning down the columns, one can see the degree of coincidence in the signs of correlations from each policy change to each departmental goal for the various arguments. For example, the paths that link the policy "increase subscription rates" to the circulation departmental goal of "readers", before 1948, are all of zero correlation. At this time, one would expect the circulation departmental coalition to be indifferent to an increase in subscription rates. After 1948 these same correlations became negative, which one would expect to lead to a preference to lower subscription rates to increase the acquisition of readers. Similarly, the effect of increasing subscription rates, before 1948, on "circulation revenue" is seen to be of positive (path # 1) or zero correlation (path # 2)--a preference to increase subscription rates to boost circulation revenue would be expected. After 1948, the correlation of path # 2 became negative so that there is now one path of positive and one of negative correlation. It is not now clear what effect increasing subscription rates has on circulation revenues; an indeterminant situation. The policies for a particular departmental coalition to prefer in order to further their own aims can now be constructed by noting for each of their goals whether they would desire to increase or decrease the policy variables or whether they would be indifferent or whether the policy has an indeterminent effect on a goal. This is

set out in Table 6. Indeterminancy, where it exists, is resolved by the process, stated in Table 1, of taking the simplest and most direct chain of arguments. Table 4 is scanned for the path with fewest links to the point of indeterminancy and the policy it suggests noted in Table 6.

Table 6 goes here

The quest for acceptable policies: We have posited (Table 1) that in searching for solutions to organizational budgetary problems, the coalitions will search their cause maps for acceptable solutions. Looking along the rows of Table 6 it becomes obvious that before 1948 the departmental coalitions would agree unanimously on the policy of raising subscription rates to ameliorate an unsatisfactory total revenue or profit; there being no obvious conflict. One would also expect to see the policies of increasing circulation promotion expenditure and lowering advertising rates used to divert excess resources into the dominant coalition's production oriented goal of increasing the amount of printing when all other goal expectations are being met.

Referring to Tables 2 and 3, we can see that during the period 1940 through 1948, the subscription rate was increased significantly six times and decreased once, circulation promotion expenditure was increased by a significant amount five times and decreased once, and the advertising rate was lowered twice--a remarkable fit with the preferred policies argued from the reconstructed departmental maps of causality.

After the year 1948, when the believed effect of subscription rates on readers underwent a radical revision in the light of a stagnating readership, what policies were open to the management? Scanning the columns of Table 6, we see, for the emerging dominant circulation coalition, that increasing promotion expenditure, and perhaps,

lowering subscription rates would be the preferred policies. Furthermore, increasing promotion expenditure is the only clear policy for increasing total revenue. For increasing profits, there is no clear policy--all policies lead to indeterminacy. How would the organization deal with a problem in profits? It was posited earlier (Table 1) that a policy elite resolves indeterminacy by choosing policies that are based on the most simple and direct arguments offering immediate tangible results and that are most favorable to the dominant group. This would eliminate the obvious candidate policies of further increasing the subscription rates or decreasing the promotion expenditure. We are left, therefore, with manipulating advertising rates. The shortest path (see Table 6) argues for increasing advertising rates to increase both revenues and profits. If it is successful in implementation it would likely be retained for future use.

It is argued, then, that the management would prefer the policies of increasing promotion expenditures, and increasing advertising rates to meet the revenue and profit goals of the company. If circumstances allowed it, the dominant circulation coalition would have a predilection to lowering subscription rates to divert excess resources (such as profit) into their goal of increasing readership.

An examination of Tables 2 and 3 shows that after 1948 the subscription rate was lowered twice, and both the advertising rates and circulation promotion expenditures were raised ten times. Again this accords with the policies suggested by an analysis of the organization's maps of causality.<sup>6</sup>

##### 5. Organizational Origami

The Japanese art of Origami consists of folding a piece of paper to produce an object such as a bird, dog or horse. The order of the

folds will uniquely determine the object and, once a fold has been made, certain objects only can still be made and others become excluded. Similarly, the order that certain strategic decisions are made will uniquely dictate what kind of organization will evolve and what kinds will be excluded (Allen et al., 1982). The process model of organizational policy making will be used now to explain how the future of the company became enfolded (note, not unfolded) by the order of the management's responses to critical events that threatened to destabilize it. Some of these events were caused by the organization's own previous actions and some by uncontrollable events such as a war-time shortage of supplies. From this exposition, some general conclusions will be drawn about pathologies of management policy making and ways of circumventing them to enhance the survival of an organization. The success or failure of the various policies pursued by the company are summarized in Table 7.

##### Table 7 goes here

The pre-1948 strategy of the dominant production operations coalition concerned lowering advertising rates and increasing circulation promotion expenditure to stimulate demand and the amount of printing required. This was afforded by raising subscription rates. The policy appears to have been used in the first instance to ration the magazine during a period of war time paper shortage and great popularity due to its war stories. The policy was so successful in raising profits to unprecedented heights that it became retained as a general policy for raising revenues long after the war.

It can be seen from the number of times subscription rates were successfully raised (Table 7) that the organization would have had every reason to believe that the sale of subscriptions was insensitive to the subscription rate charged. This stands in direct opposition to the findings of a statistical analysis based on the complica-

ted movement of subscribers through the system (Hall, 1976) and provides an illuminating example of the contrast between intuitive and scientific causal analysis.

Unfortunately, it transpires that the organization, in this instance, learned the wrong response--a massive misattribution of causality that was to plague it for the remainder of its existence. The loss of regular readers brought about by the doubling of subscription rates over the period 1940 to 1948 was masked by the increase in trial readers inducted by ever increasing promotion expenditures. The percentage of readers who were trial subscribers rose accordingly from 36 per cent in 1940 to a high of 48 per cent in 1946 (Table 3)--loyal readers were slowly replaced by those whose loyalty was in question.

The policy of lowering advertising rates and raising circulation promotion expenditures to increase both the pages in the magazine and the number of magazines to be supplied to subscribers was met with mixed success. It has also been demonstrated that this production expansionist policy would result in an increase in production costs out of proportion to the increase in revenues from subscription and advertising sales, and hence depress the profit margin (Hall, 1976; Weick, 1977). Again, this effect was masked by environmental forces. Due to paper shortages during the war years, the number of pages in the magazine was limited and the production costs held in check. This led to a very high profit margin for a magazine publishing company of 14 per cent in 1944 (Table 2) that further locked the company into a production operations orientation. Friedrich (1970) describes the gulf that developed between the internal cultural values of the production-operations group, represented by the president at that time, Walter Fuller, and those of the editorial group as:

Walter Fuller, in any case, determined to change Curtis from a great publishing company into a great printing com-

pany. The difference is not immediately easy to understand--Curtis's own management never did understand it--for it violates our instinctive sense of economic values. But the essential difference is this: Publishing is based on ideas--and ideas are valuable--they can be bought and sold. Printing, by contrast, is a manufacturing industry, and it is based not on ideas but on physical objects--printing presses, factory buildings, paper mills, tons of wood pulp, vats of ink, fleets of delivery trucks. To a mind that does not believe in the value of ideas, wealth and security can lie only in the accumulation of physical objects. And no such mind can ever understand publishing (p. 14).

The post-1948 strategy: In 1948 the policies of the company failed as profits dropped markedly by 23% and readership stagnated at a time of growing competition from other magazines. In the ensuing evaluation of the situation it must have become apparent that the root of the problem was readership. We have shown how this led to a circulation promotion orientation and a new set of policies. How did these policies fare?

In 1951 the subscription rate was dropped by eight per cent (Table 3) but failed to produce the desired results. The readership actually declined marginally and the policy seems to have been selected out--it was never used again. The policy failed, not because it was a bad one, but because of a number of other issues. First, the magazine volume dropped by about 200 pages at the same time (Table 3) thus making the magazine less attractive to trial readers who were deciding whether to subscribe regularly (Hall, 1976). Second, the complex flow of readers through the subscription renewal system creates delays in the policy taking effect immediately; in fact the readership grew by 6 per cent in the following year (Table 3). Lastly, the policy of reducing subscription rates was probably of marginal interest to the emerging dominant Circulation coalition, who would be more interested in building their empire with more subscription salesmen. They may have found ways of lessening the effect of the policy by selling subscriptions less aggressively in order to

force the senior management to agree to divert more resources to circulation promotion activities. Again this illustrates how a dominant coalition may pursue policies that maintain the uncertainty facing the organization--in this case a high turnover of subscribers--and hence a continuing need for the coalition's services in dealing with the uncertainty--in this case selling subscriptions.

The policies that emerged after a period of transition, was to raise promotion expenditures to solicit readers, and raise advertising rates to pay for this. It can be seen from Table 7 that these policies were successful after 1951 and, therefore, reinforced and retained for further use. However, they were only successful superficially because the increase in advertising rates resulted in fewer pages in the magazine which in its turn resulted in fewer trial readers continuing with the magazine (Hall, 1976). The yield of regular readers from trial readers fell off in consequence, which reduced the effectiveness of the policy of increasing promotion expenditures. The company was faced with ever increasing promotion expenditures to meet its aspirations for growth. Circulation promotion expenditures were increased by 130 per cent over the period 1948 to 1960 but readership increased by only 60 per cent (Table 2 and 3). In consequence, profit margins became severely depressed and the company's survival put in jeopardy.

The management never seemed to find a way out of this policy cul-de-sac. The severely weakened financial situation made the company susceptible to such normal business tribulations as depressions and increases in labour costs--situations noted by Argenti (1976) for putting the final nail in the coffins of corporations. After a series of death throes documented by Friedrich (1970), Culligan (1970), Christensen et al. (1973), and Hall (1976) the magazine was discontinued in 1969.

Why was the management blind to alternative policies, and why did they stick so long to their policies in spite of evidence that all was not going well? As we have seen from the analysis of the organization's causal maps, the particular admix of goals of the dominant coalition and environmental conditioning excluded such policies as decrease circulation promotion expenditures. The organization was barren of alternative policies and all arguments backed up by experience led to repeating the same policies. Such a situation would obviously create a lot of stress within the organization. This has been shown to lead to a shortening of the time horizon, a narrowing of the perspective, and an increased rigidity and polarization of thought processes of decision makers (Mumford and Pettigrew, 1976; Staw, 1977; Staw et al., 1981). It can lead possibly to what Forrester (1970) describes as ". . . a downward spiral develops in which the presumed solutions make the difficulty worse and thereby causes a redoubling of the presumed solution (p. 55)". In the next section, we shall attempt to identify some of the pathologies of organizational decision making that may have led to this situation.

#### 6. Pathologies of Organizational Policy Making

The natural logic process model of organization policy making presented here attempts to explain how an organization, with limited understanding of its environments and a limited capacity for processing information, learns to adapt to complex environmental systems. From this point of view the intuitive processes used by organizational groups are very sensible. But, as we have seen, they can also give rise to pathological situations categorized by: (1) maladaptive mutations when the organization changes its orientation, (2) politicizing to stay in power, and (3) misattribution of causality in its environments.

Maladaptive mutations: The search for a new direction that takes place after an organizational crisis has been compared to a biological mutation (Winter, 1970:). As he puts it:

Thus, while decision rules themselves are the economic counterpart of genetic inheritance, the failure-stimulated search process (for better decision rules) apparently has no analogue to biological evolution -- it would correspond to a mechanism that automatically generates a burst of mutations when they are needed (p. 13).

However, there is a chance that a selected mutation may be maladaptive. The board of directors or whoever is responsible for selecting a new direction for an organization may wrongly diagnose the environmental uncertainty and select an inappropriate set of priorities. We have seen how a stagnation in readership growth of the old Saturday Evening Post brought about a circulation promotion orientation although the real problem was an excessively high subscription rate. The decision rules or policies that emerged were to spend heavily on circulation promotion and increase advertising rates to pay for this. The net outcome was a loss of advertising and a slimmer magazine less attractive to the newly inducted trial readers who did not stay. We could dub this a "maladaptive mutation" since Hall (1976) has demonstrated that an alternative policy offering steady growth and survival lay undiscovered!

Politicizing to stay in power: The dominant coalition can pursue policies that control the uncertainty facing the organization so that its services are in perpetual demand. This misuse of its powers can systematically divert the organization from a sensible mix of policies and may even jeopardize its survival. As we have seen for the Saturday Evening Post, this political process led, at one time, to an overspending on production activities, and at another time, to an overspending on circulation promotion. This tendency to pursue a successful strategy to some ridiculous extreme has been noted by Miller and Friesen (1980). It is most likely to occur when the

supervisory body for the organization is weak. There is evidence (Friedrich, 1970; Christensen et al., 1969) that the board of directors of the Curtis Publishing Company became progressively remote from the day-to-day operations of the firm and thus susceptible to manipulation by powerful groups within the organization.

Misattribution of causality: In interpreting causality in its complex external environments, it appears that an organization is guided by its maps of causality. Where part of the map is missing, it does not perceive any relationship. As has been described, the policy elite of the old Saturday Evening Post seemed to be oblivious to the recursive relationships that tightly coupled readers, advertising sales and magazine pages. It resulted in an unstable system. Whether the readership of the magazine increased or decreased, the same result was obtained--profits dropped (Hall, 1976; Weick, 1977).

We have posited that, if a relation is indeterminate, its nature becomes a matter of belief backed up by confirming experience. The belief is supplied by the organization's internal culture and orientation, which, as we have seen, can be inappropriate. Einhorn and Hogarth (1978) have shown that managers (and even statisticians) when faced with a task of validating hypotheses tend intuitively to rely solely on the "positive hit rate" (i.e., they look only for confirming evidence), yet this is a very poor validator of causality. They speculate that the scientific concept of "null hypothesis" (i.e., an hypothesis can only be disconfirmed by evidence but never confirmed) has either not been disseminated generally enough or runs counter to human thought processes, because it is rarely used in management situations. This kind of crude hypotheses testing could have been responsible for the massive misattribution of causality made by the management of the old Saturday Evening Post in supposing that subscription sales were price inelastic in the pre-1948 era. The re-

sults, as we have seen, were disastrous in inhibiting subscription sales at a time of increasing competition and in later driving the firm to adopt other catastrophic policies.

It is a perpetual enigma that a complex organization (like the Curtis Publishing Company) can coordinate such a rich array of highly specialized activities (from editing to printing) and yet formulate its major policy decisions on out-of-date maps of causality containing untested beliefs and the simplest of arguments. Furthermore, it seems that once these maps become established, they are difficult to change and require a crisis or substantial turnover of senior managers to affect any radical revision.

#### 7. Prescriptions for Aiding Policy Making

The pathologies outlined above appear to stem from (1) a lack of proper supervision of the management to enhance healthy adaptation and contain intergroup power-politicking, (2) the absence of any reliable procedure for formally constructing the organization's maps of causality and checking their verity, (3) the absence of guiding principles for decision making in complex interactive systems where the natural policy making process becomes less reliable, and (4) excessive institutionalization of standard procedures that leads to loss of variety of controls and ability to react to circumstances.

Supervising the management: Agenti (1976) suggests that members of the Board of Directors are usually the last to know that the collapse of the firm is imminent. Without a strong board and a timely information system to help them, who is to supervise the management of the organization? All too often the board is a compliant one heavily infiltrated by members of the management. Roos and Hall (1980), using a cause mapping technique, have shown that a viable role for the evaluator of an organization is to uncover the power strategy used by

managers in acquiring excess resources.

Procedures for constructing maps of causality: There are now available a number of simple influence diagramming techniques to assist organizational members to write down and analyse maps of causality (Hall, 1978). The meta-modeling methodology of System Dynamics (Forrester, 1968 and Coyle, 1977a), together with the user-oriented system simulation languages of Dynamo (Pugh, 1970) and Dysmap (Ratnatunga and Stewart, 1977), shows considerable promise as a tool for constructing simple but powerful corporate system models to aid policy analysis (Coyle, 1977b; Hall, 1978; Hall and Menzies, 1983) and to complement planning (Coyle, 1978).

The kind of analysis undertaken above for the Curtis Publishing Company could form the basis for a cause map analysis method. Starting with a rudimentary map of the generally accepted accounting, factual and belief relations for an organization, through successive elaborations by adding chains of arguments as they become evoked (say, through the interaction of a consultant with the management), a formal corporate system model could be developed. At each stage, the model could be tested to see whether markedly different behavior is exhibited to that expected from the simple map. Also, belief relations could be subjected to more rigorous testing. The model could be used to coach the management to handle more complexity in their policy domains in the same way demonstrated by Hall and Menzies (1983) for a failing organization. Kelohaju (1982) has devised a method that works in the opposite direction. Starting with a full-scale system simulation model, the links are systematically cut until the simplest model, that still traps the essence of the behavior of the initial model, is produced.

Some guiding principles for control: Kuhn (1976) explains General Motors success under Alfred Sloan and Ford Motors failure under Henry

Ford between 1918 and 1937 in terms of cybernetic and system theory concepts. Henry Ford's mode of organizing, on the one hand, relied more on intuition and "gut-feel", and perhaps closely paralleled the natural logic process model of policy making described above. Alfred Sloan's thinking, on the other hand, more closely paralleled the positions taken much later by the cyberneticians and system design theorists such as Ashby (1956) and Churchman (1971). The cybernetic planning approach raises for conscious debate and evaluation the selection of: goals, strategy, organizational structure, regulation, and performance evaluation. More recently, Mackenzie (1982) has put forward a systematic procedure for accomplishing much of this.

Mintzberg (1973) paints the picture of the manager, like a battle commander, reacting to situations as they arise (sometimes by the minute) with a dynamic mental map of the issues. If, like battle commanders, they could be equipped with an effective organization adaptable to the changing competition, and an easily updatable map of the ever changing policy terrain, they would be in a better position to exploit opportunities or defend against threats as they emerge in 'real time'. The providing of an effective adaptable design for the organization using, say, the algorithmic methods of Mackenzie (1978a, 1978b, 1982) and the providing of an accurate cause map using, say, the methods suggested by Hall (1978) and elaborated further here, would constitute a considerable departure from the usual Management Science approach to policy analysis. However, it might point the way for Management Science to take a more active and supportive role in senior management's affairs for which it has had little to offer so far (Mintzberg, 1973)

Loss of Control: We have seen how the process of political activity, whereby coalitions within an organization challenge each other in an attempt to expand their influence, can result in a compromise among

contending forces institutionalized in standard rules and procedures. These rules and procedures may reduce the number of regulators or policy levers available to the organization and violate Ashby's (1956) Law of Requisite Variety. The law has been paraphrased by Bossel (1977) as:

If the regulator has less variety than the system to be controlled, then there are possible states of the system which are unattainable under the command of the regulator.

In other words, the system may become uncontrollable if the number of policy levers is reduced. The advertising-editorial formula of the old Saturday Evening Post would afford such an example. This formula represented a compromise between the publisher and editor over who was to command the pages of the magazine. It resulted in the loss of regulator variety since no deviation from the formula could be detected over a twenty-year period (Hall, 1976). It led to an unstable situation as described by Hall (1976) and Weick (1977). Government intervention in the private sector can also reduce the regulator variety available to a company. The collapse of the Penn Central Railway is attributed in part to this cause (Agenti, 1976).

Day (1982) has shown that the simple feedback structures embodied in self-organizing systems, such as commodity markets, when certain critical parameters are approached, can produce wild fluctuations and chaotic results. Similarly, the unusual and sudden changes in the basic behavior of a positive feedback loop (also found in self-organizing systems such as firms and their markets), has been demonstrated by Rahn (1982). Although the study of chaos is relatively new, it does not take much imagination to perceive the potential use of system modeling to warn organizations when their markets are becoming chaotic or their own internal policies are leading them into a zone of chaos.

Again it would seem that the System Dynamics methodology could

come to the rescue here, since it is a particularly apt technique for modeling complex interactive feedback systems and analysing them for stability in the face of uncontrollable external variability. From such a study it is usually possible to demonstrate the effects on the system of, say, a proposed union-management compromise agreement, and devise policies for the organization that are "robust"-- i.e. reduce the destabilizing effects of the compromise on the system (Sharp, 1977). It offers a way for putting control back into the system.

#### 8. Implications for Government and Society

If corporations are being organized as described by the natural logic process model, rather than on, say, cybernetic principles, then we can expect that, as they become bigger and more complex, their chance of succumbing to organizational policy making pathologies increases. Some giant corporations become an important part of the social scene and their failure threatens the livelihoods of a large number of people. For example, the old Saturday Evening Post kept some eight thousand people in employment! What should government do about it? Is it possible to legislate the strengthening of the supervisory role of boards of directors, or impose other forms of supervision on the management? Or might this not become yet another intervention of government in the private sector reducing the variety of corporate actions and, hence, actually, hastening the demise of companies in trouble--i.e., breaking the Law of Requisite Variety stated above?

Should government policy be directed to keeping tottering giants alive by massive injections of subsidies, erecting tariff barriers or nationalizing them? This is not an argument of public vs. private ownership or Capitalism vs. Socialism, since we are concerned here

about a general malaise of bureaucratic organizations. Publicly owned enterprises are just as likely to suffer from them (Roberts, 1975), and, given a less stringent set of financial and market constraints, they may even be more susceptible!

Alternatively, should the opposite policy be adopted to actually hasten the demise of ailing giants to prevent a wastage of resources as they use up their accumulated strength to maintain a stranglehold on the market? There is usually a viable kernel in a moribund organization that can be resuscitated by the timely but painful surgical operation of cutting out the dead parts (Agenti, 1976). Alternatively, the management can be fired wholesale and replaced, as when one company is taken over by another (Nystrom et al., 1976)--the organizational equivalent of a cortical transplant.

If organizations have some natural life and death cycle (Kimberly et al., 1980), perhaps government policy should be directed to stimulating the growth of young companies to replace the ailing ones. What kind of primordial culture is required for seeding young companies? How can employees be transferred smoothly from ailing to growing organizations with the least disruption to their lives? The evolutionary view of organizational adaption requires exploring--it might provide some clues to answering these questions.

#### 9. Summary

This paper has attempted to cover much territory (perhaps too much!). In the first place it has been argued that longitudinal studies of organizational adaption are difficult to undertake. Not only is it hard to obtain data of sufficient richness over an extended period, but theories with which to organize the data are lacking. A process-theoretic approach is used to postulate a descriptive theory of the natural logic of organizational policy making.



The model is used to explain how the policies of a sample firm became adopted and how, together with critical events, this caused the firm to evolve in particular directions rather than in others. Some implications follow from this analysis in terms of pathologies of policy making, prescriptions for avoiding them, and questions for government and society concerning sustaining and regulating firms whether privately or publicly owned.

A new role for Management Science in senior management affairs is suggested that would involve systematic procedures and algorithms for equipping organizations with effective and adaptive organizational designs and accurate and updatable cause maps of the organization's policy domains. Thus equipped, it would be left to the managers to exploit opportunities or defend against threats as they emerge in 'real time'--something they are already conditioned to doing.

#### Notes

1. This section is a revised and condensed version of a working paper originally presented at the International Institute of Management Conference on The Functioning of Complex Organizations, Berlin, 1978, and subsequently published (Hall, 1981). The remainder of the paper is completely original although drawing on data from a previous study (Hall, 1976).

2. Whilst being conducted on a tour through a petro-chemical distillation plant, it came to the attention of the author and his students that there was a major discrepancy between the description of the unevenness of the production throughput, as given by the operating personnel, and the extremely smooth output of the plant, as reported to the senior management at the head office. When confronted with

the evidence, the plant manager explained that he had a target to achieve. When a crude oil with a high yield was processed, the excess production was pumped into various storage tanks around the refinery field. It was pumped back into the system to make up the shortfall when a poor quality crude was fractionated. By this means, he was able to report a steady achievement of his targets to the head office, in spite of enormous variations in production. This provides a striking example of an equivocality-reducing enactment process. It implies, however, that such primary operating data are unreliable for management science purposes!

3. A policy is defined here as an important decision resulting from group processes within the organization and not imposed from above or without (as for example, a president or receiver empowered to make sweeping changes unilaterally). It may or may not be tied to a strategy or longterm master plan for the organization. In fact the natural policy making process (e.g., raising prices to offset short-run profit shortfalls) may systematically subvert a strategy (e.g., to produce a low priced product for mass sale). This interplay of natural policy process and strategy raises some interesting questions for business policy research.

4. A project is underway to build a computer simulation version of this process model of organizational policy making. It is the intention to examine the budget planning process in detail--eg., how many cycles through the budget were required, was an acceptable decision found or was it necessary for the dominant coalition to force a decision, what did the organization learn from the results and how did this effect subsequent decisions?

5. To examine this phenomenon, students in classes studying decision making participated in a magazine publishing game (Hall, 1974). Working in teams and assuming the roles of managers of the depart-

ments of a magazine publishing company, the participants (over 200) made decisions and received feedback from a computer simulation model that simulated twenty years of operations spread over a ten week period. After instruction in cause mapping (Axelrod, 1976; Hall, 1978) they were asked to draw the perceived relationships in the computer model. Few were able to discern any of the six feedback loops built into the model. Nor could the participants interpret the meaning of such loops in causality when made aware of their presence. This is consistent with the observations of Axelrod (1976).

6. Explaining the policies of a firm is no mean feat, given the prevailing mood in financial and accounting research circles that time-series of company policy decisions can best be viewed as a 'random walk' phenomenon. In a similar vein, psychologists have suggested that groups exhibit much riskier and more random decision behavior than individuals (Wallach et al, 1962), although arguments against this are put forward in Hall (1981).

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TABLE 1 - A Summary Description of the Enactment Process of Policy Making

		Driving Forces	The standard procedures evoked from the Retained Set
1980	Boos, Leslie L. and Roger I. Hall, "Influence Diagrams and Organizational Power." <i>Admin. Sci. Qtrly.</i> , Vol. 25 (1980), pp. 57-71.		
1977	Salancik, G.R. and J. Pfeffer, "Who Gets Power--and How They Hold on to It: a strategic-contingency model of power." <i>Organizational Dynamics</i> , Winter (1977) pp. 3-21.		
1977	Sharp, J.A., "System Dynamics applications in industrial and other systems." <i>Journal of Operational Research Society</i> , Vol. 28, 3 (1977), pp. 489-504.		
1977	Staw, Barry, "Knee-deep in the Big Muddy: a study of escalating commitment to a chosen course of action." <i>Organizational Behavior and Human Performance</i> , Vol. 16 (1977), pp. 27-44.		
1981	Lance E. Sandelands and Jane E. Dutton, "Threat-Rigidity Effects in Organizational Behavior: a multi-level analysis." <i>Administrative Science Quart.</i> 26, (1981), pp. 501-524.		
1974	Steinbruner, J.D., <i>The Cybernetic Theory of Decision</i> . Princeton: Princeton University Press, 1974.		
1976	Turner, Barry A., "The organizational and interorganizational development of dissenters." <i>Administrative Science Quarterly</i> , Vol. 21 (1976.), pp. 316-331.		
1982	Wallach, Michael A., Nathan Kogan and Dave J. Bern, "Group Influence on Individual Risk Taking." <i>Journal of Abnormal and Social Psychology</i> , Vol. 65, (1982), pp. 75-86.		
1969	Weick, Karl E., <i>The Social Psychology of Organizing</i> . Reading, Mass: Addison-Wesley, 1969.		
1976	"Educational Organizations as Loosely Coupled Systems." <i>Admin. Sci. Qtrly.</i> , Vol. 21 (1976), pp. 1-19.	FORMULATE BUDGET PLANS	
1977	"Organizational design: organizations as self-designing systems." <i>Organizational Dynamics</i> , (1977), pp. 31-44.	Reduce the uncertainty of producing unsatisfactory financial results at year end.	Construct a budget plan using the structure of the financial accounts as the basis of the plan.
1970	Winter, Sidney G., "Satisficing, selection and the Innovating 'remnant'." University of Michigan: Institute of Public Policy Studies, discussion paper no. 10, 1970.	Reduce ambiguity about the assumptions to be used for computing each line of the budget.	Estimate each budget item using clearly established relationships retained from past experience. If these relationships are unclear, use simple forecasts based on extrapolating past results.
		RECOGNIZE PROBLEMS	
		Reduce disagreement in recognizing problems.	Compare the results computed by the budget with the organization's expectations for each goal. Identify shortfalls and surpluses in achieving the goals. These define the organization's problems.
		Reduce uncertainty and disagreement in diagnosing the cause of problems.	Use standard financial procedures to compute operating ratios and growth rates of items in the proposed budget. Compare with previous year's figures to identify the symptoms of the problem.
		CHOOSE REMEDIAL POLICIES	
		Seek to increase subunit status or defend against threats to it.	Each subunit evokes preferred policies to dispel the symptoms of the dissatisfied goals using its retained map of causality.
		Minimize inter-group conflict.	A search is made for acceptable policies that do not violate subunit goals.
		Bring closure to the policy process when inter-group conflict cannot be avoided.	Select policies that meet the goals of the politically powerful subunits at the expense of the politically weak.
		Bring closure to the policy process when choosing among several competing policies.	Choose the policy most frequently used before.
1978a	Macbeath, Kenneth D., <i>Organizational Structures</i> . Arlington Heights, Ill.: ANI Publishing, 1978.		
1978b	"A Process Based Measure for the Degree of Hierarchy in a Group: applications to organizational design." <i>Enterprise Management</i> , Vol. 1 (1978), pp. 17-18.		
1982	"A Strategy and its Application for Organizational Design." <i>Organizational Systems Inc.</i> , P.O. Box 1118 Lawrence, Kansas 66044, 1982.		
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1982	Rahn, R. Joel, "Unity-Gain Positive Feedback Systems." <i>Dynamics</i> , Vol. 8 (1982), pp. 96-104.		
1977	Ratnawat, A.K. and C.J. Stewart, <i>Dynasap User's Manual</i> . University of Bradford: System Dynamics Research Group, 1977.		
1975	Roberts, Marc J., "An evolutionary and institutional view of the behaviour of public and private companies." <i>American Economic Review</i> , Vol. 62 (1975), pp. 415-426.		

TABLE 1 - continued

Driving Forces
Bring closure to the policy process when indeterminacy exists.
Bring closure to the policy process when indeterminacy exists under stressful conditions.
Avoid uncertainty concerning the reaction of the organization's environment to its actions.
Bring order to planning and coordinating the proposals of subunits.

MAKE THE PLAN WORK

Reduce the uncertainty of not meeting budgeted targets.
Reduce the uncertainty associated with over achieving targets.
Reduce the uncertainty of negative reactions to policies that manipulate slack.

The standard procedures evoked from the Retained Set

Evoke policies that attend to the dissatisfied goals one at a time.
Choose the policy based on the most simple and direct argument offering immediate tangible results.
Make only small incremental changes to the policy variables chosen for implementation and wait for feedback of results before making further changes.
Enter the authorized changes to policy variables into the budget and recompute the shortfalls and surpluses.
Repeat the process until all problems are solved or no solution can be found.

If the target is being under subscribed and slack resources exist, invoke a slack reduction program (e.g., cut production costs).
If the target is over subscribed, invoke a slack absorption program (e.g., increase discretionary expenditures on promotion, or research and development).

Control internal variables only (i.e., do not change variables that affect the environment, such as prices if at all possible).

TABLE 2 - Major Cost and Revenue Items for the Curtis Publishing Company<sup>a</sup>

Year	Production Costs (c\$m)	Relative change (%) % of Total Revenue	Promotion Costs (c\$m)	Relative change (%) % of Total Revenue	Circulation Costs (c\$m)	Relative change (%) % of Total Revenue	Advertising Rev. (c\$m)	Relative change (%) % of Total Revenue	Total Revenue (c\$m)	Relative change (%)	Profits (c\$m)	Relative change (%)	Profit Margin % of Total Revenue
Phase 1													
1940	46.7	-	29.4	-	23.4	-	74.0	-	97.4	-	7.6	-	8
1941	51.0	9*	29.8	1	24.8	6*	75.0	1	99.8	1	5.8	-24*	5
1942	51.2	0	29.5	-1	33	14*	61.4	-18*	89.7	-10*	-2.0	-134*	-4
1943	48.2	-6*	47	30.9	5*	30	72.8	19*	103.2	15*	11.7	665*	11
1944	48.5	1	44	32.8	6*	30	78.1	7*	110.7	7*	16.1	43*	14
Phase 2													
1945	52.7	9*	46	33.7	3*	29	81.8	5*	115.1	4*	14.5	-10*	13
1946	78.2	48*	53	41.3	23*	28	106.2	30*	146.9	28*	9.5	-34*	7
1947	86.7	11*	53	37.9	-8*	23	119.0	12*	162.3	10*	17.3	82*	11
1948	89.0	3*	55	40.4	6*	25	116.1	-2	163.1	1	13.3	-23*	8
1949	88.4	-1	54	42.0	4*	26	112.1	-3*	164.1	1	13.7	3*	8
1950	88.5	0	50	50.0	19*	28	117.8	5*	177.9	8*	18.1	32*	10
Phase 3													
1951	85.0	-4*	50	50.6	1	30	113.0	-4*	169.6	-5*	13.5	-25*	8
1952	86.0	1	49	57.1	13*	33	116.8	3*	175.9	4*	11.6	-14*	7
1953	88.8	3*	48	61.1	7*	33	122.0	5*	187.1	6*	15.1	30*	8
1954	84.4	-5*	46	67.1	10*	36	118.9	-3*	184.9	-1	11.5	-24*	6
1955	84.1	0	44	74.6	11*	39	125.4	5*	191.2	3*	9.4	-18*	5
1956	79.5	-5*	41	74.0	-1	39	126.1	1	192.2	1	15.6	66*	8
1957	85.9	5*	43	78.6	6*	39	132.4	5*	201.8	5*	12.9	-17*	6
1958	93.0	8*	46	83.0	6*	41	127.8	-4*	200.7	-1	-2.0	-116*	-1
1959	104.5	12*	47	89.3	8*	40	145.2	14*	221.6	10*	-2.0	0	-1
1960	107.9	3*	48	92.8	4*	41	147.0	1	225.2	2	-5.8	-190*	-3

Source: Moody's Industrial Manual -- money values expressed in millions of constant dollars (c\$m) \* signifies a significant change of 3% or greater in deflated money values

<sup>a</sup> Excluding miscellaneous items and papermaking.

TABLE 3 - Decision Variables and Results for the old Saturday Evening Post

Year	1		2		1		2		2		3	
	Subscription Rate	Advertising Rate	Relative change (%)	C \$/page (000)	Relative change (%)	Readers (mls)	Relative change (%)	Proportion of Trial	Pages	Relative change (%)	Pages	Relative change (%)
Phase 1												
1940	3.08	19.6	-	19.6	3.25	36	-	2796	5604	-	5604	-
1941	2.96	18.7	-5*	18.7	3.39	37	-4*	2863	5666	2*	5666	1*
1942	3.52	20*	-8*	17.3	3.33	34	-2*	2372	5332	-17*	5332	-6*
1943	4.15	18*	-2	16.9	3.44	38	3*	2822	5628	19*	5628	6*
1944	4.50	8*	2	17.3	3.39	47	-1*	2932	5700	4*	5700	1*
Phase 2												
1945	4.79	6*	-1	17.1	3.45	51	2*	3143	5822	7*	5822	2*
1946	4.86	2	0	17.1	3.78	48	10*	4033	7336	28*	7336	26*
1947	5.21	7*	-1	16.9	3.96	46	5*	4449	7920	10*	7920	8*
Phase 3												
1948	6.02	16*	-2	16.5	3.90	45	-1*	4351	7780	-2*	7780	-2*
1949	5.97	-1	4*	17.2	4.02	44	3*	4132	7568	-5*	7568	-3*
1950	5.97	0	-1	17.1	4.03	42	0	4425	7808	7*	7808	3*
Phase 4												
1951	5.52	-8*	-1	16.9	4.00	43	-1*	4363	7664	-1*	7664	-2*
1952	5.40	-2	15*	19.5	4.22	45	6*	4194	7600	-4*	7600	-1*
1953	5.36	-1	7*	20.8	4.52	44	7*	4186	7644	0	7644	1*
1954	5.34	0	9*	22.7	4.70	40	2*	3686	6992	-12*	6992	-8*
1955	5.36	0	7*	24.2	4.70	40	2*	3686	6896	0	6896	-1*
1956	5.28	-1	6*	25.6	4.91	40	5*	3507	6616	-5*	6616	-4*
1957	5.10	-3*	7*	27.4	5.30	47	8*	3300	6490	-6*	6490	-2*
1958	5.00	-2	11*	30.3	5.75	44	8*	2892	6038	-12*	6038	-7*
1959	14.93	-1	13*	34.1	6.12	42	6*	2817	5932	-3*	5932	-2*
1960	14.85	-2	6*	36.1	6.30	43	3*	2788	5910	-1*	5910	0

Sources: 1 Assoc. of National Advertisers money values expressed in constant dollars (C\$)  
 2 Advertising Age \* signifies a significant change of 1% or greater for readers  
 3 Physical count of annual volumes or pages with precise counts and 3% or greater for less  
 by the author precise money values

TABLE 4A- Comparison of Production and Promotion Operating Ratios.

Year	Percentage of total revenue devoted to:	
	production activities	promotion activities
1940	48	30
1941	51	30
1942	57	33
1943	47	30
1944	44	30
1945	46	29
1946	53	28
1947	53	23
1948	55	25
1949	54	26
1950	50	28
1951	50	30
1952	49	33
1953	48	33
1954	46	36
1955	44	39
1956	41	39
1957	43	39
1958	46	41
1959	47	40
1960	48	41

Source: Table 2

change in orientation and period of transition

TABLE 4 - Paths through the Organization's Maps of Causality  
 -- from policy variables to end ownership objectives

Path #	Policy:	No. of links	Arguments
<u>Change subscription rates</u>			<u>Increasing subscription rates leads to:</u>
1	C1,C4-B1,B6,B8 <sup>3</sup>	4	more circulation revenue, total revenue and profit.
2	C1,C5,C4-B1,B6,B7,B8	5	more, fewer or no change <sup>1</sup> in readers, circulation revenue, total revenue and profit.
3	C1,C5-P1,P4-B4,B5,B8	4	more, fewer or no change <sup>1</sup> in readers, volume of production, production expenses and a loss, gain or no affect <sup>1</sup> on profit.
4	C1,C5-A2,A3,A5,A4-B2,B6,B7,B8	7	more, fewer or no effect <sup>1</sup> in readers, advertising rate per reader, ad'g pages sold, ad'g revenue, total revenue and profit.
5	C1,C5-A2,A3,A5-E1,E3-P2,P3,P4-B4,B5,B8	8	more, fewer or no change <sup>1</sup> in readers, ad'g rate per reader, ad'g pages sold, magazine pages, amount of printing, production expense, costs, and loss, gain or no affect <sup>1</sup> on profit.
<u>Change circulation promotion expense</u>			<u>Increasing promotion expenditure leads to:</u>
6	C2-B3,B5,B8	2	increasing costs and decreasing profits.
7	C2,C3,C5-P1,P3,P4-B3,B5,B8	6	more trial readers, readers, increasing printing, production expense and costs, and decreasing profits.
8	C2,C3,C5,C4-B1,B6,B7,B8	6	more trial readers, readers, circulation revenue, total revenue and profit.
9	C2,C3,C5-A2,A3,A5,A4-B2,B6,B7,B8	8	more trial readers, readers, lower ad'g rate per reader, more ad'g pages sold, ad'g revenue, total revenue and profits.
10	C2,C3,C5-A2,A3,A5-E1,E3-P2,P3,P4-B4,B5,B8	9	more trial readers, readers, lower ad'g rate per reader, more ad'g pages sold, magazine pages, printing, production expense and less profit.

(continued)

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TABLE 4 - continued

<u>Change advertising rates</u>			<u>Increasing advertising rates leaders to:</u>
11	A1,A4-B2,B6,B7,B8	4	more ad'g revenue, total revenue and profit.
12	A1,A3,A5,A4-B2,B6,B7,B8	6	higher ad'g rate per reader, fewer ad'g pages sold, less ad'g revenue, total revenue and profit.
13	A1,A3,A5-E1,E3-P2,P4-B4,B5,B8	7	higher ad'g rate per reader, fewer ad'g pages sold, magazine pages, less printing, production expense, costs and more profit.
Recursive path <sup>2</sup>			
14	A2,A3,A5-E1,E3,A2	4	more readers leads to lower ad'g rate per reader, more ad'g pages and magazine pages which attracts yet more readers.

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Note:

1. Depending upon whether the sign of correlation for the link C1 to C5 is +, - or zero.
2. This path will affect all paths containing the concepts A2 and A3. It links the policy variable Advertising Rate A1 to Readers A2-- a counter-intuitive relation.
3. Non active links between the same concept in different departmental maps of causality are shown with a hyphen, e.g. C4-B1.
4. The number of links is one less than the number of concept variables in the causal path.

Source: Figure 2

TABLE 5 - Policy Arguments based on Paths through the Maps of Causality.

Policy	Path No.	EFFECT ON DEPARTMENTAL GOALS OF								EFFECT ON POLICIES ON SUPERORDINATE GOALS OF					
		Circulation:		Publisher:		Editorial:		Production:		President & Board					
		Readers	Circulation Revenue	Advertising Pages	Advertising Revenue	Magazine Volume Pages	Amount of Printing & Production Expense	Total Revenue	Profits						
		b	a	b	a	b	a	b	a	b	a	b	a		
<u>Increase subscription rates</u>	1			+	+							+	+	+	+
	2	0	-	0	-							0	-	0	-
	3	0	-							0	-			0	+
	4	0	-			0	-	0	-			0	-	0	-
	5	0	-			0	-			0	-			0	+
<u>Increase promotion expenditure</u>	6														
	7	+								+					
	8	+		+								+		+	+
	9	+				+		+				+		+	+
	10	+				+			+			+		+	+
<u>Increase advertising rates</u>	11							+				+		+	+
	12					-		-				-		-	-
	13													+	+

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Note: b - before 1948  
 a - after 1948  
 +, 0, - sign of correlation from policy to goal  
 Source: Table 4

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TABLE 6 - Desired policies for Attaining Departmental Goals

Policy Variable	DEPARTMENTAL GOALS					COMPANY GOALS		
	Circulation: Readers	Circulation Revenue	Publisher: Advertising Pages	Advertising Revenue	Editorial: Magazine Volume Pages	Production: Amount of Printing & Production Expense	President & Board: Total Revenue	Profits
<b>Before 1948:</b>								
Subscription rates	indifferent	increase	indifferent	indifferent	indifferent	indifferent	increase	increase
Promotion expenditure	increase	increase	increase	increase	increase	increase	increase	indeterminant [lower]
Advertising rates	indifferent	indifferent	lower	indeterminant [increase]	lower	lower	indeterminant [increase]	indeterminant [increase]
<b>After 1948:</b>								
Subscription rates	lower	indeterminant [increase]	lower	lower	lower	lower	indeterminant [increase]	indeterminant [increase]
Promotion expenditure	increase	increase	increase	increase	increase	increase	increase	indeterminant [lower]
Advertising rates	indifferent	indifferent	lower	indeterminant [increase]	lower	lower	indeterminant [increase]	indeterminant [increase]

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Source: Table 5

[Policies suggested by causal chains with fewest links]

TABLE 7 - Environmental Conditioning of the Organization's Policies

Year	POLICIES:				
	Raise subscription rates to raise revenues	Lower advertising rates to increase ad. page sales	Raise promotion expenditure to increase readers	Lower subscription rates to increase readers	Raise advertising rates to raise revenues
1941		successful			
1942	unsuccessful <sup>1</sup>	unsuccessful <sup>2</sup>			
1943	successful	successful	successful		
1944	successful		unsuccessful <sup>3</sup>		successful
1945	successful		successful		
1946			very successful		
1947	successful				
1948	failure	failure	failure <sup>4</sup>		
1949			successful		
1950			unsuccessful <sup>4</sup>		
1951			failure		
1952			successful		successful
1953			successful		successful <sup>5</sup>
1954			successful		unsuccessful <sup>5</sup>
1955			successful		successful
1956					successful
1957			successful		successful <sup>5</sup>
1958			successful		unsuccessful
1959			successful		successful
1960			successful		successful

Notes:

1. & 2. Loss of advertising and revenue following publication of anti-jewish article.
3. Probably due to paper rationing limiting availability of the magazine.
4. Probably due to very high subscription rate.
5. Due to down turn in business cycle, advertising sales were reduced.

Source: Tables 2 and 3

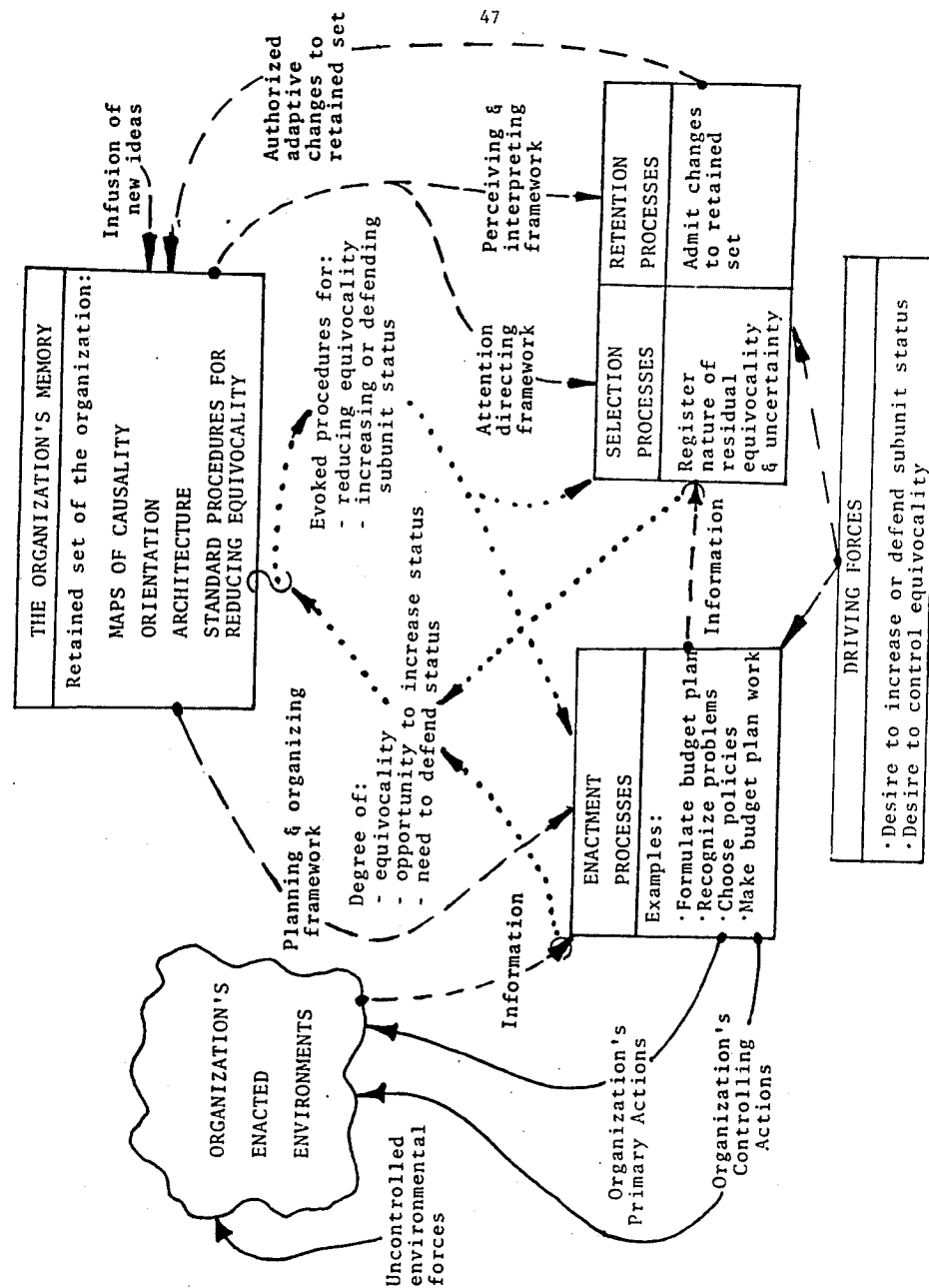
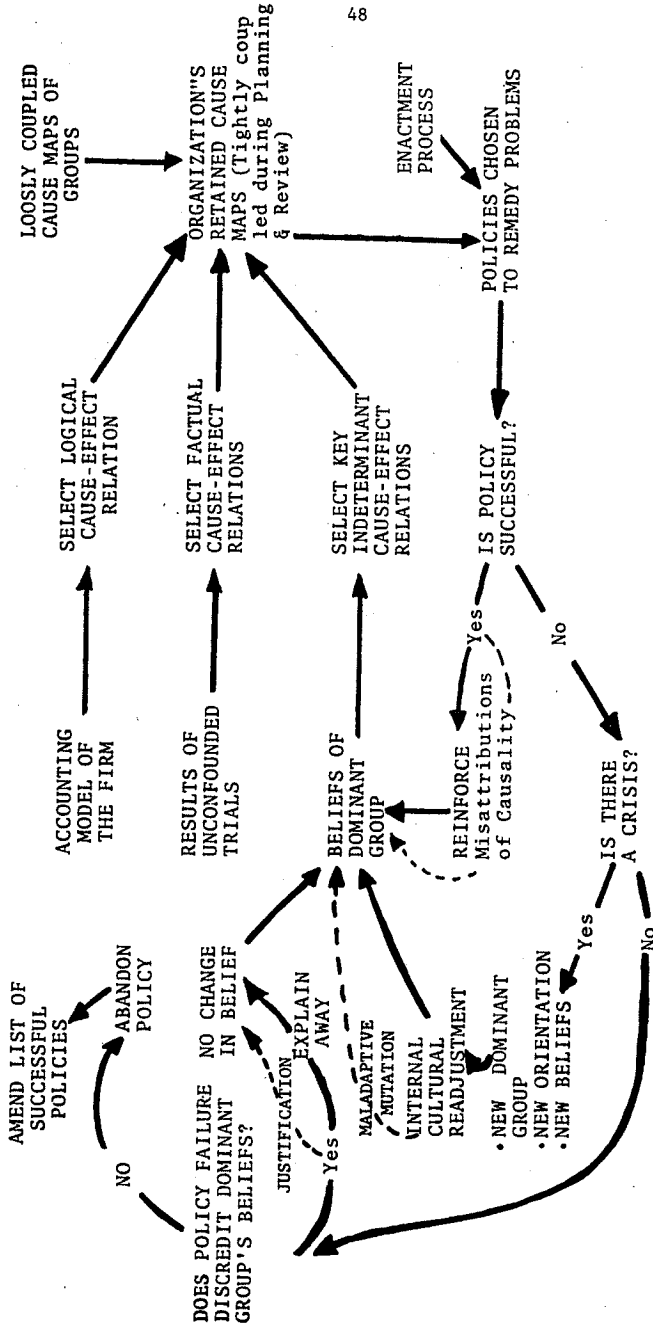


FIGURE 1. A Process Model of Policy Making





Pathologies of the selection and retention process  
FIGURE 2. The Process for Selecting and Retaining a Cause Map

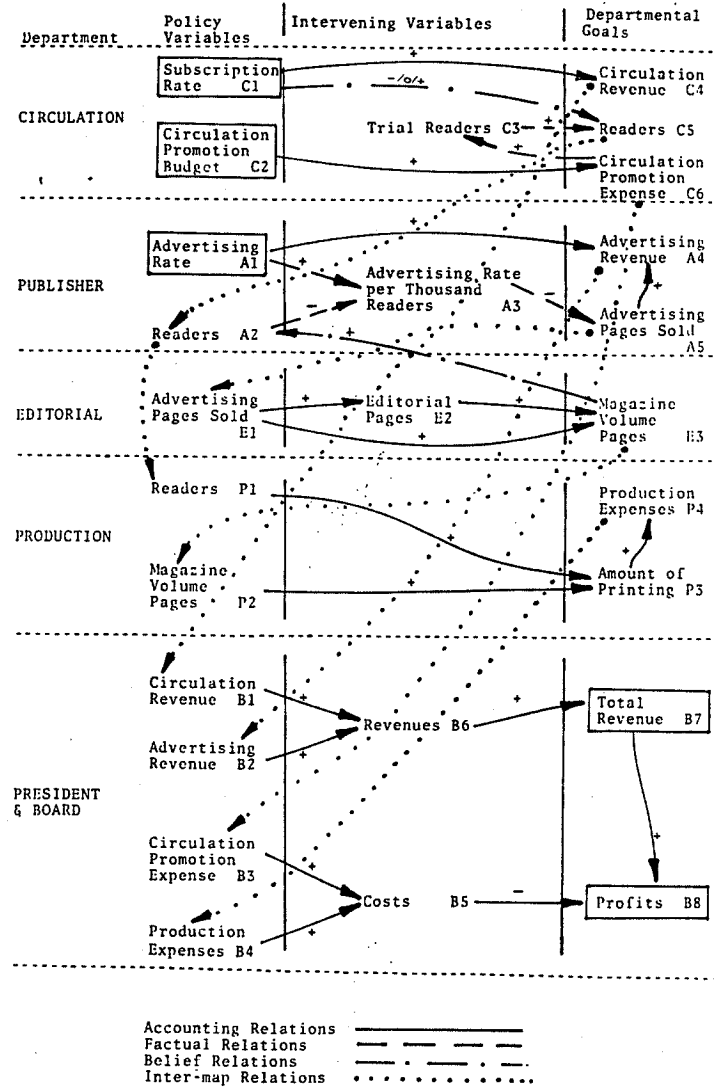


FIGURE 3. The Organization's Cause Maps