

STRATEGIC PLANNING AND FORECASTING FUNDAMENTALS

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Individuals and organizations have operated for hundreds of years by planning and forecasting in an intuitive manner. It was not until the 1950s that formal approaches became popular. Since then, such approaches have been used by business, government, and nonprofit organizations. Advocates of formal approaches (for example, Steiner, 1979) claim that an organization can improve its effectiveness if it can forecast its environment, anticipate problems, and develop plans to respond to those problems. However, informal planning and forecasting are expensive activities; this raises questions about their superiority over informal planning and forecasting. Furthermore, critics of the formal approach claim that it introduces rigidity and hampers creativity. These critics include many observers with practical experience (for example, Wrapp, 1967).

This chapter presents a framework for formal planning and forecasting which shows how they interact with one another. Suggestions are presented on how to use formal planning for strategic decision making. (For simplicity, references to planning and forecasting in this chapter will mean formal strategic planning and forecasting.) Planning is not expected to be useful in all situations, so recommendations are made on when planning is most useful. Descriptions of forecasting methods are then provided. Finally, suggestions are made on which forecasting methods to use when developing plans for a company.

Where possible, the advice on planning and forecasting is supported by relevant research. In some areas much research exists. (For a review of the psychological literature on forecasting and planning, see Hogarth and Makridakis, 1981.) In many areas, however, little research has been done.

Various aspects of formal planning and forecasting are illustrated here by using the strategic decision by Ford to introduce the Edsel automobile in 1957. In this situation, formal planning and forecasting would have been expected to be useful. Judging from published accounts by a participant at Ford (Baker, 1957) and an observer (Brooks, 1969), Ford did not use formal planning and forecasting for the strategic decisions involved in the introduction of the Edsel. (Of course, having decided intuitively to proceed, they did carry out operational planning for the production of the car.) The introduction of the Edsel is regarded as one of the largest business errors of all time. Ford itself lost \$350 million. Their dealers also lost a substantial

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amount. Is it possible that formal planning and forecasting might have protected Ford from such a large strategic error?

Figure 2-1 provides a framework to conceptualize strategic planning within a company. A scanning of the environment yields relevant data for the “Data Bank.” This data bank (or information system) would contain such data as government regulations, demographic indicators, industry sales, the resources of the company and of its competitors, and information on available technologies for production. Ideally, these data would be assembled in a central location, such as in a filing cabinet, chart room, or computer.

The left-hand side of Figure 2-1 examines planning. A variety of planning processes can be used. These will be described in more detail below. The planning processes draw upon information from the data bank (evidence on the current situation) and also upon the forecasts (evidence on what will happen in the future). The two-way arrow from “Data Bank” to “Planning Processes” indicates that the planning process, to a large extent, dictates what information is required. It is recommended that formal planning start with the planning process rather than with the data.

The planning process produces a set of plans. These describe objectives and alternative strategies. One strategy is selected as a basis for action. In practice, the actions actually taken by the company can deviate substantially from the intended strategy. The actions lead to results, both intended and unintended. A record of these results is kept in the data bank.

The right-hand side of Figure 2-1 examines forecasting. To make forecasts for a company, it is necessary to have information about the company's proposed strategies (thus the arrow from “Plans” to “Forecasting Methods”). An examination of the forecasting methods, then, will help determine what data are required (thus the two-way arrow from “Data Bank” to “Forecasting Methods”). The forecasting methods, to be described in more detail below, yield a set of forecasts. What will happen if the company attempts strategy A and environment X occurs? How likely is environment X? How much confidence can we have in the forecast? These forecasts are then used as inputs to the planning process.

Note the distinctions between forecasting and planning. Planning provides the strategies, given certain forecasts, whereas forecasting estimates the results, given the plan. Planning relates to what the firm should do. Forecasting relates to what will happen if the firm tries to implement a given strategy in a possible environment. Forecasting also helps to determine the likelihood of the possible environments.

The remainder of this chapter discusses the items in the two circles on Figure 2-1, the Planning Process and Forecasting Methods.

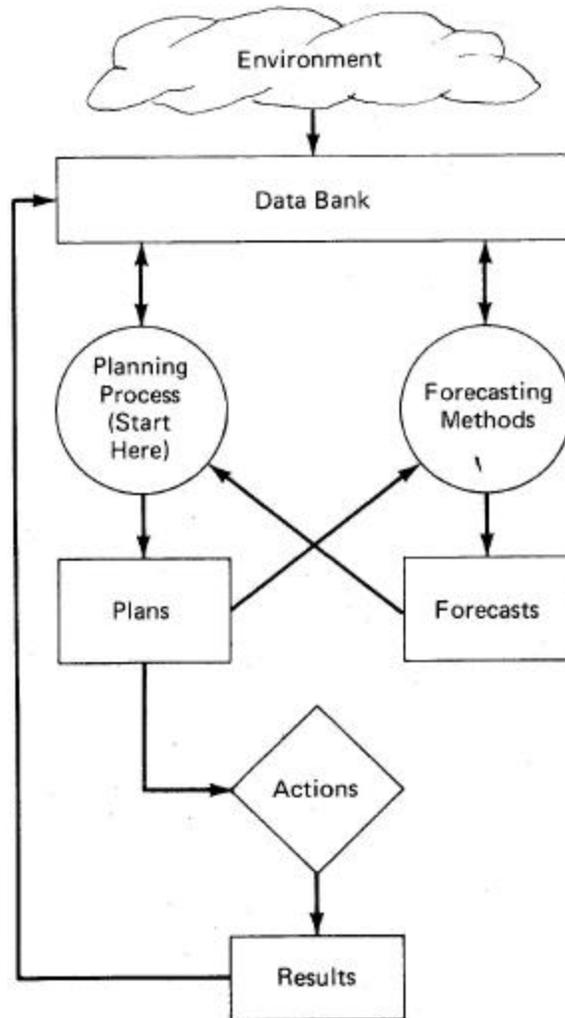


FIGURE 2-1
Framework for formal planning and forecasting.

DESCRIPTION OF THE STRATEGIC PLANNING PROCESS

Formal strategic planning calls for an explicit written process for determining the firm's long-range objectives, the generation of alternative strategies for achieving these objectives, the evaluation of these strategies, and a systematic procedure for monitoring results. Each of these steps of the planning process should be accompanied by an explicit procedure for gaining commitment. This process is summarized in Figure 2-2. The arrows suggest the best order in which to proceed. The need for commitment is relevant for all phases. The specification of objectives should be done before the generation of strategies which, in turn, should be completed before the evaluation. The monitoring step is last. The dotted line indicates that, to some extent, the process is iterative. For example, the evaluation may call for going back to the generation of new strategies, or monitoring may require a new evaluation of strategies.

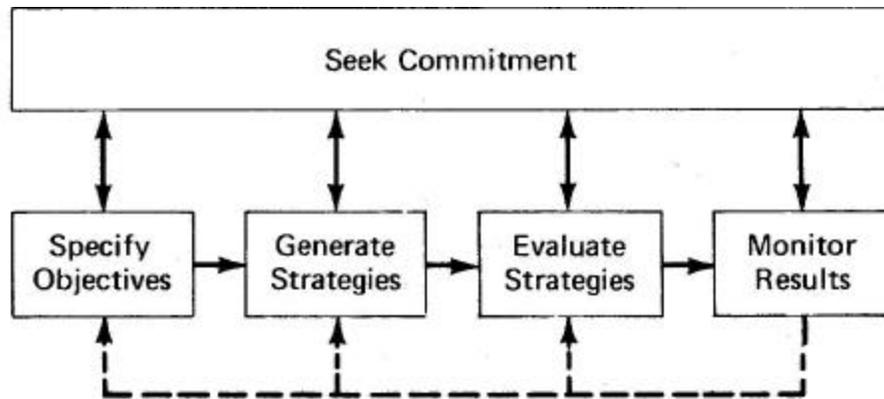


FIGURE 2-2
The planning process.

The various steps of the planning process are described below along with some formal techniques that can be used to make each step explicit. (Although commitment is the first step, it is easiest to discuss this last.) This discussion is prescriptive; it suggests how planning should be done. Numerous accounts are available of how formal strategic planning is done (for example, see Wood, 1980, and the extensive review of the descriptive research by Hofer, 1976).

Specify Objectives

Formal planning should start with the identification of the ultimate objectives of the organization. Frequently, companies confuse their objectives (what they want and by when) with their strategies (how they will achieve the objectives). For example, suppose that a company desires to make money for its stockholders. To do this, it decides to build a tunnel through a mountain in order to charge tolls to automobiles. They plan to complete the tunnel in five years. On the way through the mountain, they strike gold. To mine the gold, activities on the tunnel must be suspended. Does the company pursue its objective of making money or does it stay with its strategy of tunnel building? What would your organization do?

The analysis and setting of objectives has long been regarded as a major step in formal strategic planning. Informal planners seldom devote much energy to this step. For example, in Baker's (1957) summary of the Edsel, less than 1 percent of his discussed concerned objectives. Unfortunately, the identification of objectives is a difficult step for organizations. It is even difficult for individuals. The simplest way to demonstrate this is the following: Ask yourself to set objectives for your use of this chapter. Write your objectives. Be specific. Find measurable objectives. Set time deadlines for implementing changes. It is possible (for example, you could have as an objective that you will take action within the next month on at least one technique to improve the strategic planning of your organization), but it is stressful.

The difficulties in setting objectives have led some observers to recommend that formal planners ignore this step. The recommendation here is just the opposite. Significant time and money should be allocated to the analysis of objectives. This difficult step might be aided by use of an outside consultant to help the group focus only upon the objectives. The question can also

be attacked by asking what results would define successful performance by the company over the next twenty years. At this stage, no concern should be given as to how to achieve the objectives.

Companies pursue many objectives and planners should explicitly recognize all of the important objectives of the system. One way to help ensure that the analysis of objectives is comprehensive is to use the stakeholder approach. This calls for a listing of all groups that contribute resources to the firm. Then a description is provided of the objectives of each of these stakeholders.

Applying the stakeholder approach in the Edsel case, the following groups would be included: creditors, stockholders, employees, consumers, suppliers, dealers, and the local community. In many cases, these groups will have conflicting objectives. The planners would write out the objectives for each group, for example, return on investment (ROI) for stockholders; stability, good wages, and good working conditions for employees; safe and reliable products at a low price for consumers; ROI for the dealers. Specific measures would then be established for each objective (for example, ROI should exceed 10 percent per year after taxes in real dollars). In contrast to this stakeholder approach, Ford's informal approach led to a narrow objective: "to obtain 3.3 percent to 3.5 percent of the auto market" (Baker, 1957). Explicit consideration was not given to other stakeholders.

A strengths and weakness analysis should then be conducted. This calls for an inventory of the organization's resources (such as financial, marketing, production). What do they have now and what do they plan to have? The objectives would then be drawn from what is desired (stakeholder analysis) and what is feasible (strengths and weakness analysis).

The written statement of objectives should start with the ultimate objectives. These general objectives would then be translated into more specific objectives so that each decision maker can see how to contribute to the overall objectives. In addition to being specific, the objectives should be measurable (Latham and Kinne, 1974). The objectives would include statements on what is desired and when. Thus, the marketing department can refer to the planning manual to determine its role in meeting the overall company objectives.

One danger in planning is that the objectives may become confused with the strategies. For example, a company might decide that one strategy, to better meet the needs of its stakeholders, is to increase its market share during the next five years. But this strategy might falsely be regarded as an objective by the marketing department. Five years later, the department might still pursue market share—even if it is detrimental to the company's objectives. (They continue to build the tunnel and ignore the gold.)

Advocates of informal planning argue that specific written objectives create political problems within the organization. Vague objectives allow or the greatest flexibility in actions. Politically oriented leaders often prefer that the objectives be unstated. But evidence from studies in organizational behavior suggests that explicit and specific objectives are of substantial benefit, especially when used in conjunction with the other planning steps (see reviews of this research in Latham and Yukl, 1975; Tolchinsky and King, 1980; and Locke et al., 1981).

Once the objectives have been specified, the planners can proceed to the generation of strategies. If the objective setting was successful, the remaining steps will be easier.

Generate Alternative Strategies

A strategy is a statement about the way in which the objectives should be achieved. Strategies should be subordinate to objectives. That is, they are relevant only to the extent that they help to meet the objectives.

This advice is obvious but often ignored. The generation of alternative strategies helps to avoid this problem. It recognizes explicitly that the objectives may be achieved in many different ways.

Strategies should first be stated in general terms. The more promising strategies should be explained in more detail.

The planning process is not complete until the company has at least one (and preferably more than one) operational strategy. An operational strategy describes:

1. What tasks must be done
2. Who is responsible for each task
3. When each task must be started and completed
4. The resources (time and money) available for each task
5. How the tasks relate to one another

This operational strategy becomes the basis for action by various functions in the firm: finance, personnel, production, and marketing.

Alternative strategies can improve the adaptability of the organization in two ways. First, by explicitly examining alternatives, it is likely that the organization will find some that are superior to their current strategy. Second, the environment might change; if alternative (contingency) plans have been prepared, the organization is in a better position to respond successfully. Alternatively, they can select a strategy that performs well even if the environment changes.

Organizations sometimes have difficulty developing alternative strategies to deal with unfavorable environments (threats). One technique that can help organizations with this problem is the use of scenarios. This involves having decision makers write stories about the future of their company. They can write a scenario describing what will happen to their company if the threat occurs, given their current strategy. Then, they could write about a desired future. What would they want the company to be like? The question then becomes, "What must we do to achieve this type of future?" Consideration can be given to changing the organization's resources or to the use of alternative strategies.

The development of scenarios calls for creativity within the organization. To bring out this creativity, it is helpful to use brainstorming. Key stakeholders for the organization can be asked to consider alternative strategies, alternative resources, and alternative environments by following these rules for brainstorming:

1. Gain agreement within the group to use brainstorming.
2. Select a facilitator. The facilitator:
 - a. Records ideas as they are mentioned
 - b. Encourages quantity of ideas
 - c. Reminds the group not to evaluate (either favorably or unfavorably)
 - d. Encourages wild ideas
 - e. Does not introduce ideas

For a more complete description of scenarios, see Armstrong (1978a, pp. 38-43), Ackoff (1970, pp. 24-29), and Chapter 10.

It is difficult to say how many alternative strategies should be listed. Certainly more than one! But the number could quickly get out of hand considering the vast number of possible combinations. Try to list strategies to deal with dramatically different yet likely environments. After this larger list has been developed, screen the list to determine which strategies should be developed in more detail.

Two guidelines appear to be of particular importance for the development of a strategy. The strategy should be comprehensive and it should provide *slack*.

To ensure that strategies are comprehensive, planners have typically suggested the use of flow charts. These list each of the key tasks that must be accomplished and show how each task relates to the others. Numerous publications have offered advice in this area (for example, Ansoff, 1965; Steiner, 1979). Slack means that resources (time, money, facilities) should not be fully committed to the recommended strategy. Some resources should be held in reserve; these can be used to relieve stress if parts of the plan break down. Slack is analogous to the use of inventories. *The use of slack adds flexibility to the plan.*

The Edsel case illustrated the informal approach to strategic planning. Ford decided to build a large, powerful, and ornate automobile. They did not report that they examined alternatives. Their plan did not appear to be comprehensive, and no mention was made of provision for slack. The environment changed prior to the introduction. Ornate cars were not so popular, small foreign cars were capturing a growing market segment, large powerful engines were the subject of much criticism, and a small recession was under way when the first Edsels came onto the market. But Ford had no contingency plans. In retrospect, low-cost contingency plans could have been introduced. For example, the distribution of the cars could have been done primarily through existing dealers rather than through the new Edsel dealer network. (This recommendation was proposed by management students who developed a plan for a disguised version of the Edsel case. Most of these students, who had been asked to try formal planning, decided to use the existing dealer network.)

Evidence from studies in organizational behavior suggests that, in general, the generation of ideas should be separated from the evaluation of ideas (Mater, 1963); they cannot be done together with much effectiveness. Thus, this step of generating alternatives should be completed before the next step is begun.

Evaluate Alternative Strategies

Once sufficient strategies have been proposed, the evaluation of alternatives can begin. This requires a procedure by which each alternative plan is judged for its ability to meet the objectives of the organization. Such a process is not simple, because conflicting objectives usually exist among stakeholders. Furthermore, the presence of uncertainty complicates the choice of a strategy. For example, one should consider not only how well the strategy does for the most likely situation, but also how well it does against other possible situations, especially those that are dramatically different.

One procedure for the evaluation of alternatives is the Delphi technique. Various strategies (for a given environment) are presented to the key stakeholders. Each person works independently to rank these alternatives. A summary of the group rankings is then presented to these same stakeholders, and they are asked to provide a second ranking, still working independently. This procedure can be repeated for a number of "rounds" As a variation, group discussion can be used to exchange information between rounds. The Delphi technique provides a more efficient and less biased way to use the information held by the key decision makers than that provided by informal methods (for more on Delphi see Linstone, 1975).

The use of scenarios is also relevant to evaluation, particularly when dealing with negative evidence from the environment. Much research suggests that organizations avoid unpleasant information. As an example of this tendency to reject negative evidence, Griffith and Wellman (1979), in a study of expansion plans in six hospitals, found that forecasts of decreasing demand were ignored. As a result, the hospitals overbuilt. The use of scenarios might have identified the reactions to unfavorable forecasts prior to investing money on these forecasts. The hospitals could then have canceled the proposed expenditures on forecasting if they could not decide how the forecasts might affect their decision making.

Other formal procedures for evaluation can also be used. For example, structured rating sheets can be used to evaluate the *general* strategies against the stakeholders' objectives and to gauge the extent to which negative information was considered. Also, one could rate each *operational* strategy on the extent to which it succeeded in the following areas: provided adequate resources, allowed adequate slack, set reasonable time deadlines, presented a comprehensive strategy, and presented an operational strategy. The use of the devil's advocate, when a person argues against a favored alternative, can help to ensure that both sides of a plan are considered (Cosier, 1978).

The major point for evaluation is to use formal procedures and to not use informal ones, such as the traditional group meeting. The latter provides one of the poorest ways to evaluate strategies. Janis (1971) examined a number of major failures in strategy evaluation, such as the

Bay of Pigs, and concluded that much of the blame was due to the lack of formal processes for evaluation. He provided a checklist that groups can use to improve their ability to generate and evaluate alternative strategies.

The evaluation step concludes with the selection of an operational strategy. This is the strategy the company will attempt to implement. (This strategy should contain contingency plans also.) But will the strategy really meet the objectives? To assess this, the next step of the planning process, monitoring results, is taken. This step is prepared prior to the implementation of the strategy.

Monitor Results

The value of feedback has been well established in laboratory studies, especially when combined with the setting of objectives (Tolchinsky and King, 1980; Ilgen, Fisher, and Taylor, 1979). Field studies have also demonstrated the value of explicit feedback (for example, Becker, 1978). It seems important, then, to provide feedback to the organization on how well they are meeting their objectives. In other words, specific procedures should be developed to “monitor results.”

The monitoring system should allow for corrective action. To do this, the following items should be measured in a systematic way:

1. Changes in the environment (sometimes called “environmental scanning”)
2. Changes in the organization's capabilities (and in their competitors' capability)
3. Actions that were actually taken by the organization (did they implement the desired strategy?)
4. Actions by major competitors
5. Results

Planning involves a trade-off between consistency and flexibility. Formal planners try to develop a strategy so that a complex organization can operate in a coordinated manner. The members of the organization must sacrifice flexibility in order to follow a consistent strategy. However, changes in any of items 1 to 5 above could suggest a change in strategy. Thus, the monitoring system should signal when a change in strategy should be considered.

Fixed review times should be selected in advance. Many firms conduct a review once a year. At these times, decisions should be made whether to continue with the original strategy, revise the strategy, or switch to a contingency plan. For very large changes it is best to view the strategy as being experimental and to schedule more frequent review periods, perhaps quarterly. In addition to fixed review times, the monitoring system should also have control limits. These would be upper and lower bounds for each of the above five areas. When the system goes outside of these limits, a planning review would be conducted whether or not it was time for the fixed review.

The monitoring of outcomes should relate back to the objectives for each stakeholder. This should allow for a comparison to be made between results and objectives in order to decide whether the strategy is successful for each stakeholder.

The monitoring system is expected to have a greater impact if it is tied into the organization's incentive system. This helps to ensure that the participants are committed to the objectives described in the plan. Companies sometimes develop comprehensive plans, but then focus solely on the stockholders or the managers. The monitoring system should focus on the long-range impact of the plan on all of its stakeholders. For example, to recognize the interests of its customers, IBM uses consumer-satisfaction surveys to help determine management's compensation.

In the Edsel case, no monitoring procedure had been developed. Substantial confusion seemed to occur when the initial results were examined. What results constituted a failure? This had not been defined in advance. Some months after what seemed to be a disastrous introduction, Ford told its dealers that there was no cause for alarm (Brooks, 1969). Apparently, Ford was unable to respond rapidly to evidence that their strategy was failing.

The Edsel monitoring procedure, or lack of it, is apparently not unusual. Horovitz (1979), in a survey of the planning practices of 52 large firms in Great Britain, France, and West Germany, found that virtually none of them had a formal procedure for monitoring results of their long-range plans.

One way to improve the monitoring of results is to have an evaluation performed each year by an independent auditor. The following questions could be addressed: Is the monitoring system comprehensive? Is the planning process adequate? Is the forecasting process adequate? (A procedure for the auditing process for forecasting is provided in Armstrong, 1982a.)

Seek Commitment

Business plans and forecasts are frequently ignored; at other times they are used to rationalize a course of action previously decided. What can be done to develop commitment to the planning process? What can be done to ensure that the various stakeholders will cooperate and try to implement the chosen strategy? Attention should be given to commitment throughout each of the above steps in planning.

Formal planning calls for an explicit procedure for gaining commitment to the plan. A first condition is that key stakeholders should be evolved in the planning process. This would mean, at least, that information should be obtained from these stakeholders.

Publicly stated objectives are a requirement if the objectives are expected to have an impact on behavior. Each stakeholder group and each key decision maker should be aware of the objectives. This can help to achieve consensus.

Commitment to objectives is expected to be higher if those who are affected by the strategic decisions participate in the objective-setting process. In other words, self-set objectives are more likely to be attained than objectives set by others. This generalization is based on laboratory studies (for example, Bass, 1977) and on field studies. Participation is not necessary in all situations; however, it generally helps, and seldom does it make things worse.

Participation by stakeholders is also helpful in the generation and evaluation of alternative strategies (Van de Ven, 1980). This is most important where the strategy involves large changes, because the threat to the various stakeholders is reduced if they have some control over these changes.

Commitment can be maintained more effectively if the monitoring system provides quantitative feedback on success in meeting each objective. Key decision makers can then use this feedback to make tactical changes. Stakeholders can see how the strategy is meeting their objectives.

Rather than seeking commitment to the plan, top management sometimes uses planning as a way to gain control over others. They may use it to reduce the authority of subordinate managers and unilaterally to reduce the ability of these managers to act. This may help to explain why planning is more popular among top management. For example, in a survey done by Ang and Chua (1979), 80 percent of top management reported that they were "very favorable" toward long-range planning; 30 percent of the operating managers agreed. If plans are imposed on others, their impact might be detrimental. Operating management could feel less responsible for the success of strategic decisions. They might even feel threatened by the strategic decisions and attempt to reduce their effectiveness.

To avoid having the monitoring system used to control others, it is best to provide managers with information about how their group has performed, not the individuals within their group. Their subordinate managers, in turn, would receive information only about their group. Overall, then, sufficient feedback is received, but it is used to guide one's own actions as a manager. "How can I help my group to perform?" is the issue, not "How can I control the managers under me?"

SITUATIONS FAVORING THE USE OF STRATEGIC PLANNING

Consider a simple example: planning for lunch on a workday. Generally, you need not do much. When you are hungry, you may send for a sandwich, or you may walk to the nearest restaurant. What happens, however, when a group of managers from corporate headquarters comes for a meeting that includes lunch? You obtain input to decide what type of atmosphere and food would be appropriate. After deciding on a restaurant, you ask your secretary to make reservations and arrangements for transportation to and from the restaurant. Obviously, you will charge the luncheon to the company's expense account.

As implied by this example, some everyday activities can benefit from planning. In particular, planning is most helpful in situations that involve more complexity (a fancy meal),

change (a large increase in the number of people to be fed), uncertainty (what do our guests like? how will everybody get to the restaurant?), and an inefficient market (expense account).

Planning is also expected to be very useful for organizations facing major strategic decisions as these generally involve high task complexity, change, uncertainty, and inefficient markets. These characteristics are summarized below:

1. High complexity of the task means that there is a greater need for explicit plans to ensure that the various bits and pieces fit together. The production and marketing of an automobile, for example, is a complex task.
2. Large changes create a need for planning because organizations are designed to deal primarily with repetitive situations. The changes could come from the environment (an economic recession), from competitors (foreign competition in automobiles), or from the firm itself (a decision to introduce a new line of automobiles). For large changes, the standard bureaucratic responses would be less useful. Large changes call for planning rather than merely reacting.
3. Uncertainty can lead to a waste of resources. Organizations must be prepared to meet different environments. Planning can address “what if” questions so that the firm can develop ways to respond. As uncertainty increases, the need for planning also increases. Ford faced an uncertain economy when it introduced the Edsel.
4. Inefficient markets call for planning because the price system does not dictate the organization's actions. The organization has much flexibility in how it acts. Thus, planning is expected to be more relevant to government organizations, nonprofit organizations, regulated sectors, and protected industries. Ford, for example, received some protection from foreign imports. (Managers in competitive markets may feel that planning is more important as competition *increases*. This is because poor planning could lead to the failure of the company. However, failure is a natural event in competitive markets. An efficient market would inform stakeholders and would help to ensure that their needs are met, no matter what an individual company does. If they plan poorly, another company will replace them.)

Planning is expected to be most relevant when all four of these conditions hold. Ford faced this situation when introducing the Edsel. A more extreme example of a company that meets all four conditions would be a utility deciding whether to build an atomic reactor. It has a complex task, large changes are involved, uncertainty is high (for example, what if the law is changed so that the company must bear the Full costs of waste disposal?), and the market is inefficient (huge subsidies are paid by the government and the local community bears the costs of disasters).

One industry that has been moving toward the above four conditions is banking. According to Wood (1980), change and uncertainty have increased in this industry during the 1970s. During this period, the use of formal strategic planning increased from 6 percent of the banks prior to 1970 to 80 percent by the end of 1977.

Another example that met the above four conditions was Ford's introduction of the Edsel. The market inefficiencies in this case, however, were not large.

At the other extreme would be a company that meets none of the conditions. Here formal planning would be of little value. An example would be the normal operations for an existing middle-priced restaurant in New York City.

An investment in formal planning might be considered like an insurance policy: It might be needed. But in situations where the risk is small the investment in insurance may not be necessary.

The above conditions are inferred from research in organizational behavior (see review in Armstrong, 1982b). Perhaps there are other conditions that are more important. A survey of the empirical field research on the value of strategic planning yielded twelve studies: Van de Ven (1980), Ansoff et al. (1970), Thune and House (1970), Herold (1972), Wood and LaForge (1979), Karger and Malik (1975), Harju (1981), Kudla (1980), Leontiades and Tezel (1980), Grinyer and Norburn (1975), Kallman and Shapiro (1978), and Fulmer and Rue (1974). A systematic analysis of results from these studies concluded that the evidence was consistent with the position that planning is useful for organizations (Armstrong, 1982b). But the studies provided little useful data on "how to plan" and on "when to plan" because few of them provided adequate information on the planning processes used or on the situations in which the planning was used.

THE FORECASTING METHODS

Forecasting methods, as defined here, are *explicit procedures for translating information about the environment and the company's proposed strategy into statements about future results*. What would be the results if the environment were favorable and we did A? What if it were unfavorable and we did A? What if it were unfavorable and we did B?

Before discussing how the forecasting methods can be used in strategic planning, a general description is provided here on the various methods that can be used in forecasting. A number of schemes exist for classifying forecasting methods (see, for example, Chisholm and Whitaker, 1971; Chambers, Mullick, and Smith, 1974). These schemes are based upon the type of data used, the type of people doing the forecasting, or the degree of sophistication of the methods used to analyze data. The scheme used below is based upon the methods used to analyze the data.

Research on methods for analyzing data has historically been organized along three continuums: subjective versus objective, naive versus causal, and linear versus classification methods. The discussion below considers the fictitious end points of each continuum.

Subjective versus Objective Methods

Subjective methods are those in which the processes used to analyze the data have not been well specified. These are also called implicit, informal, clinical, or intuitive methods. They may be based on simple or complex processes. They may use objective data or subjective data as inputs. Subjective methods may be supported by much formal analysis or by none. But the critical point is that the analyst makes the forecast in his or her head. For example, executives could be asked to make annual forecasts of automobile sales for the next five years. They would be provided with any information they request, but they would produce the final forecasts by thinking.

Objective methods are those that use well-specified processes to analyze the data. Ideally, they have been specified so well that other analysts can replicate them and obtain identical forecasts. These are also called explicit, statistical, or formal methods. They may be based on simple or complex processes. They may use objective data or subjective data as inputs. They may be supported by much formal analysis or none. But the critical factor is that the inputs are translated into forecasts using a process that can be replicated by other analysts. Furthermore, the forecasting process could be programmed on the computer. An example would be an econometric model to forecast industry automobile sales.

The choice between subjective and objective methods is an important one. Most forecasts are made using subjective methods (Rothe, 1978). It also seems that the more important the forecast, the greater is the likelihood that subjective methods will be used. (But the popularity of a method is a poor guide in determining which method is most useful.)

Naive versus Causal Methods

A continuum of causality exists in forecasting models. At the naive end, no statements are made about causality (automobile sales can be plotted against time and the trend can be projected); at the causal end, the model may include many factors (the real income per capita, the real price of gasoline, the real price of automobiles, the population, and the real price of substitute forms of transportation).

Causal methods are more complex than naive methods. First, data must be obtained on the causal factors. Estimates of causal relationships are obtained from these data. These estimates of the causal relationships should be adjusted so that they are relevant over the forecast horizon. Next, one must forecast the changes in the causal variables. Finally, the forecasts of the causal variables and the relationships are used to calculate the overall forecast.

Causal methods are of more obvious value in planning. They can be used in any phase of planning. However, naive methods can be used in some phases. For example, naive methods can provide forecasts of environmental factors.

Linear versus Classification Methods

Methods that are objective and that rely upon causality can be categorized according to whether they use linear or classification methods. This decision generally has only a small impact on accuracy. It depends mostly upon convenience and the availability of data (classification methods typically require much data).

The linear method is based upon the usual way we think about causality: “If X goes up, this will cause Y to go up by so much.” An attempt is made to find linear relationships between X and Y. Linear methods are used because it is easier to work with models where the terms can be combined by using simple arithmetical operations. Thus, one might try to predict automobile sales by forecasting changes in income and price, and then multiplying by the relationships of these factors to auto sales.

The classification approach groups similar behavioral units. These groups or segments would be expected to respond in a similar fashion. For example, to forecast automobile sales, one segment might be “family size of two, age of head of household 65 to 75, low income, living in apartment in a large city, near mass transportation.” Another segment might be “family size of five, age of head of household 25 to 35, high income, living in house in a suburb, not near mass transportation.” The people within each segment would be expected to have similar behavior with respect to the purchase of automobiles, but the segments differ substantially from one another (low automobile purchases in the first group and high in the second group). To make a prediction using the classification method, forecasts would be made of the population of each segment and also of their behavior. These are then combined to get a forecast of auto sales for each segment. By summing across segments, an overall forecast is obtained (for example, total industry sales). The classification approach is most useful when the groups differ substantially from one another.

The Methodology Tree

The methodology tree (Figure 2-3) is used to summarize the above discussion on the choice of a forecasting method. The first decision to be made is whether it is most appropriate to use a subjective or objective method. The subjective branch leads to the “judgment” leaf. An extension of this is called “bootstrapping.” This involves the development of an objective method to replicate the judgmental forecasts. This can be done by asking the judges to specify the rules they used to make forecasts. Alternatively, one can statistically analyze the judgmental forecasts and the data used by the judges to infer what rules were used. The bootstrapping model can then be used to make the forecasts.

The objective branch offers a number of approaches to forecasting. One must decide whether it is most appropriate to use naive or causal methods. The naive branch leads to the “extrapolation method.”

Use of the causal branch requires an additional decision. Should you use linear or classification methods? The linear branch leads to “econometric methods” and the classification branch leads to “segmentation methods.”

The thickness of the branches of the methodology tree indicates which decisions are most important in the selection of a forecasting method. The “leaves” of the tree (boxes) can be used as a checklist for selecting 3r method.

The methods will be discussed in a somewhat more detailed fashion below. For a more in-depth description, many sources exist (e.g., Wood and Fildes, 1976; Wheelwright and Makridakis, 1980).

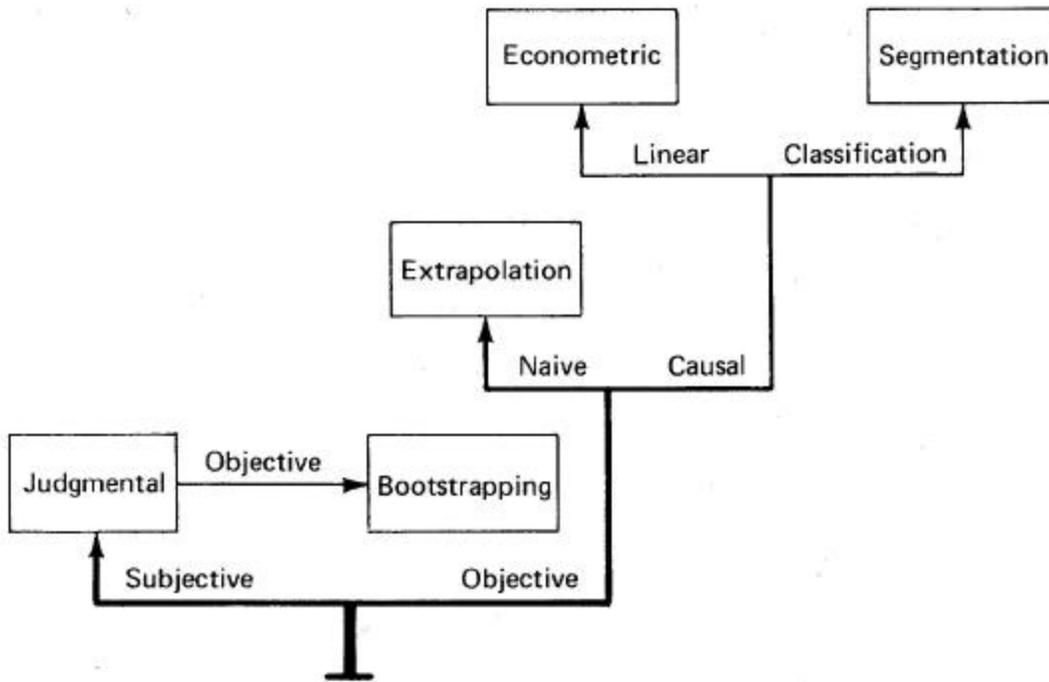


FIGURE 2-3
Forecasting methodology tree.

MATCHING THE FORECASTING METHOD TO THE SITUATION

Formal forecasting methods help to improve planning in two ways. First, they can increase accuracy over what would occur with informal methods and, thus, reduce uncertainty. Second, they can provide better estimates of the degree of uncertainty (risk).

Improved accuracy and better estimates of risk are needed for various Phases of the forecasting and planning processes. These needs are described below, starting with the environmental forecast.

Environmental forecasts are useful as an input to strategic planning. The identification of possible states of the environment and a forecast of their likelihood can provide ideas on what strategies should be considered by your company.

Environmental forecasts also can help to provide better industry forecasts (the total demand for a product class in a given market). Industry forecasts can be made for each of the possible states of the environment and also for various assumptions about the future behavior of the companies in this industry. Forecasts would be required for each of the company's major products and markets.

The company then can forecast what actions it will actually take. Ideally, the company's optimal strategy would be translated directly into actions. However, the actual strategy (actions) frequently departs from the proposed strategy due to communication problems, lack of interest, resistance to the strategy by those in the company, insufficient resources within the company, or a decision to abort the strategy because of environmental changes (such as a change in available technology).

Actions by the company are also influenced by the actions of its competitors. Thus, it is helpful to forecast how the competitors will react to environmental changes. For industries that are not highly competitive (that is, for most situations), you should also try to forecast how competitors will react to major strategy changes by your company.

Forecasts of the actions (and reactions) by a company and its competitors can help to forecast the company's market share. Sales forecasts can then be calculated by multiplying the forecast market share times the industry forecast. This should be done for each major product market.

Costs should also be forecast. These depend primarily upon environmental changes, the actions taken by your company, and the level of your company's sales.

The company is then in a position to forecast results. The sales and cost forecasts allow for a forecast of profits. It would also be possible to examine the forecast costs and benefits to each of the company's stakeholders.

This list of the forecasting needs in company planning is summarized in Figure 2-4. The exhibit elaborates on the "Forecasts" box of Figure 2-1. It starts with environmental forecasts and then proceeds downward through the other areas until forecasts are obtained from results in the organization. The larger arrowhead indicates the preferred sequence. The smaller arrowhead indicates that some backtracking will probably be needed. Below, a discussion is provided on techniques that can be used for each of the areas listed in Figure 2-4. In some cases, existing knowledge on the most useful techniques is scarce. Thus, an open-minded use of the methodology tree (Figure 2-3) is advised.

Environment

Environmental forecasts are needed to help the company formulate its strategy. It is important that the forecasting methods first identify the possible states of the future. For this,

brainstorming among a variety of experts would be useful. Particular attention would be given to the more important of these possible states. Importance should be judged not only by the likelihood of the environmental change, but also by its potential impact on the company if it does occur. The use of structured judgmental methods provides an obvious starting point to assess the likelihood of the events. However, extrapolation from analogous events in history can also be useful.

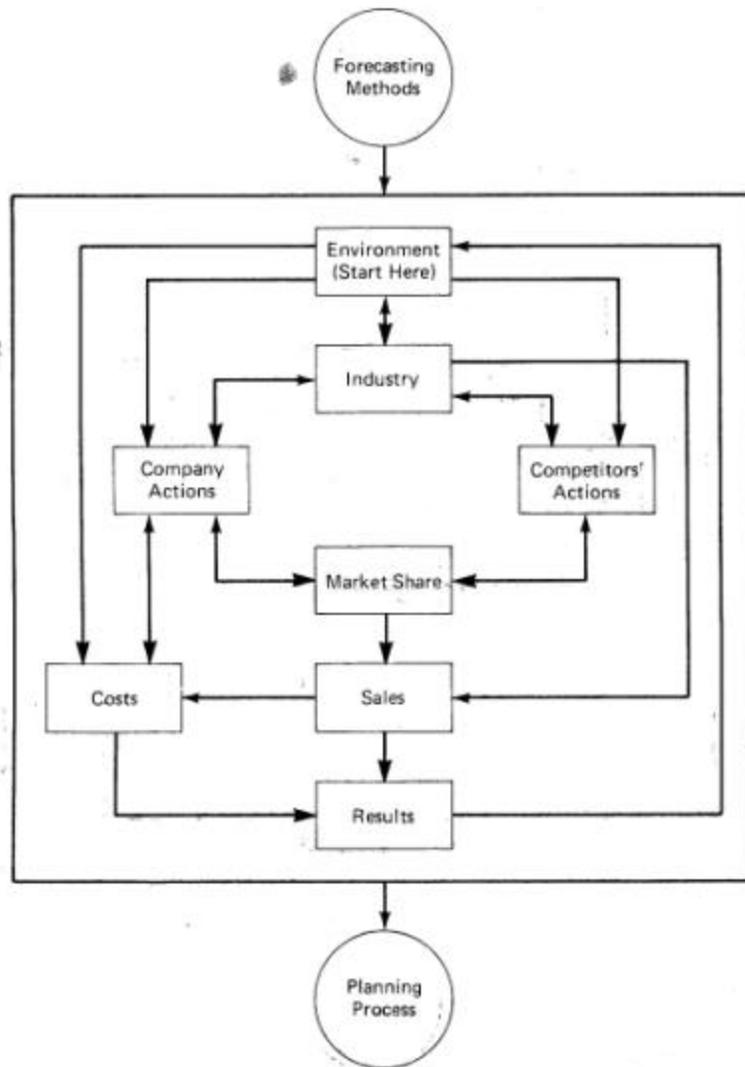


FIGURE 2-4
Need for forecasts in company planning.

An environmental change can directly affect company actions (e.g., a change in export laws), or it can indirectly affect the company by its impact on the industry (e.g., increased energy costs).

Surprisingly, the accuracy of industry forecasts is not highly sensitive to the accuracy of the environmental forecast (evidence on this point is summarized in Armstrong, 1978a, pp. 219,

241, 378). It is expected that this generalization will not hold for extremely large environmental changes such as wars, depressions, shortages, government controls, or major technological innovations. But, generally, highly accurate environmental forecasts are not required for industry forecasts.

It is important to determine which are the important factors in the environment that might affect the industry. It is also important to predict the direction of change in the important factors, and to then get “approximately correct” predictions of the magnitude of the changes in these factors. For the direction of change in environmental factors, only general trends, not cycles, should be considered. Other than recurrent events owing to the seasons of the year (seasonality), cycles have been of little value for improving the accuracy of forecasts. The reason? One must also predict the phases (timing) of the cycles. If the timing is off, large errors can occur.

Ample data exist on trends in the environment. The more important factors are published in magazines, newspapers, and financial newsletters. The problem is not a lack of data; rather, it is how to use the data. Companies often spend much time and money seeking information from the environment that will confirm their beliefs. Frequently they ignore negative or "disconfirming" information that is easily available. It seems useful, therefore, to severely limit the budget for the collection of environmental data. Seldom is the additional information expected to have a strong positive impact on decision making. (Most of the evidence in this area is from studies in psychology; Goldberg, 1968, provides a summary of this research.)

This advice on environmental forecasts is counterintuitive. People typically expect that better environmental forecasts are of great value to the company. Thus, much time and money are spent by firms to obtain “better forecasts.” For example, many companies purchase econometric forecasts to obtain short-range forecasts of GNP, inflation rates, and unemployment. This practice is widespread despite the fact that little evidence exists to suggest that these forecasts are superior to other, cheaper alternatives such as extrapolations or forecasts by a panel of experts (Armstrong, 1978b).

Industry

After preparing the environmental forecasts, the company should prepare industry forecasts. In some cases, these have been prepared by others. For example, Predicasts, Inc. of Cleveland, Ohio, summarizes the U.S. forecasts in a quarterly publication called *Predicasts*. They publish forecasts for other countries in their *Worldcasts*. The disadvantages of using forecasts prepared by others are that:

1. They may not use the product-market definitions that are relevant to your company
2. A time lag exists from the time the forecast was made until it was published
3. Forecasts are not updated frequently
4. The original sources (as cited in *Predicasts* and *Worldcasts*) often do not provide sufficient information on the assumptions behind the forecasts

For these reasons, medium-sized and large firms are best advised to develop their own industry forecasting models.

Much of the error in industry forecasts is due to errors in estimating the current status. What are the industry sales now? Thus, some useful though often ignored advice is to break the forecasting problem into two subproblems. First, estimate the current sales level. Then use methods to forecast change over the forecast horizon. The forecast is the sum of the current sales plus the change in sales over the forecast horizon.

Judgmental methods are often appropriate for estimating current sales. Experts, such as sales people, are likely to have up-to-date information on the current sales. In contrast, objective data are often reported after much delay.

To obtain judgmental estimates of current sales, use structured methods such as the following: First, provide those concerned with up-to-date information in an easy-to-read format (such as tables or graphs). Then, replace the group meeting with a survey. After each person makes his or her best estimate, an average of their forecasts is calculated. A refinement, helpful when there may be ambiguities in the question, is the Delphi technique, described earlier in this chapter.

Although judgment might be useful for estimating current sales, it is not so relevant in forecasting change. For this task, objective methods are more appropriate (see Armstrong 1978a, pp. 363-372 for a summary of the evidence leading to this conclusion).

If experts are used to forecast change, there is no need to obtain the “best” experts (Armstrong, 1980). According to the research, sufficient expertise in the area of interest can be obtained in a few months. Thus, it is advisable to obtain inexpensive experts.

Of the objective methods available to forecast change, econometric methods are perhaps the most useful. The econometric model should aim at two desirable, but conflicting, goals in industry forecasting: (1) include all important factors, and (2) keep it simple. Research in this area suggests that little complexity is needed. Often, “near optimal” results have been obtained with the use of only two or three variables.

The magnitude of the causal relationships in an industry-forecasting model can be estimated judgmentally. However, for most situations it is safer to obtain estimates from historical data or from experiments. Regression analysis provides a common and useful way of estimating these relationships. In some cases, these estimates can be obtained from published studies using regression analyses of similar products. Surprisingly, accurate estimates of regression coefficients are often not necessary (Dawes 1979), although exceptions to this generalization do occur (Remus and Jenicke 1978). A reasonable approach, recommended in econometrics, is to start with judgmental (*à priori*) estimates of causal relationships, then update these by use of regression analysis.

Another objective method relevant to long-range market forecasting is the segmentation model. This approach is expected to be accurate, but it requires much data. Furthermore, it is difficult to use when examining changes in the company's strategies or in competitive responses.

The resulting industry forecasts can be used as an input to the planning process. For example, different strategies might be required depending on whether the organization is in a growing or declining industry.

Company Actions

Forecasts for the environment and the industry can then be considered along with the company's proposed strategies to predict what actions would actually be taken. In other words, what will the strategy look like in practice? Forecasting is aided if the company considers well-defined and operational strategies, if the people in the company will be firmly committed to implementing the strategy, and if the company will have adequate resources.

But will all of the stakeholders be successful at implementing the strategy? One way to forecast the actual actions by the company is to survey these stakeholders. They would be presented with a description of a strategy and would be asked how successful they would be in carrying out their part. Perhaps a given strategy is not realistic from their viewpoint.

In some situations, such as when negative effects would be encountered by the company, it may be difficult to forecast stakeholder actions by direct questioning. Here, "group depth interviews" may be useful. To do this, groups of key decision makers in the organization meet with a consultant. The consultant presents scenarios with different strategies and environments. The decision makers are then asked how they would act in these situations. The reason for meeting in a group is because the decisions of these people are interdependent. A similar procedure could be followed with the stakeholders.

Forecasts should also be made of the company's resources. Will financial resources, supplies of raw materials, and personnel be adequate for a given strategy? Forecasts of labor-management relations might be important at this stage.

Competitors' Actions

A company's strategy is often dependent on the actions of its competitors. But the competitors are unlikely to tell you about their intentions. In many cases, it may be sufficient to forecast the competitors' actions using expert judgment. In doing this, it may be helpful to consider a forecast of the competitors' resources.

If a substantial amount of historical data exists, it may be possible to find analogous situations. Summaries of how competitors reacted in past situations may allow for a forecast of how they will respond to changes in the environment or to different strategies that your company might use. For example, how do your major competitors react to new product introductions?

One technique that is useful in forecasting competitors' actions is role-playing. This involves having some members of your management team act as if they were in their current role while others play the role of competitors. Role-playing can be used to test various strategies. It is

especially useful for analyzing unusual strategies when secrecy is important (such as with new products). It is also useful when it would be impractical to test out a strategy with a field experiment.

Role-playing is relatively easy to carry out. The following rules are suggested:

1. Assign people to roles of key decision makers for the company and its major competitors. Provide a short description of the role, the environment, the firm's capabilities, and the selected strategy. Use four pages, one for each of these four topics.
2. The role players should not step out of their roles; that is, once they meet, they should "be" that person at all times. Ask the role players to prepare individually and then return to the meeting place when they are ready to stay with their roles.
3. The players should improvise as needed.
4. The players should act as they themselves would act in that role, asking themselves, "What would I do, given this strategy?"

Role-playing has been popular in political science and in the military, where it is called gaming. The use of role-playing in business has been limited. Busch (1961) said that the Lockheed Corporation used role-playing to forecast the behavior of their customers. IBM used a form of role-playing to forecast the reactions of a jury in a trial (*The Wall Street Journal*, February 3, 1977). Armstrong (1977) used it to forecast the actions by members of the board of directors of the Upjohn Corporation in a case in which the government tried to force Upjohn to remove one of its drugs from the market.

Forecasts from role-playing may differ greatly from those provided by other methods. Four studies have contrasted the accuracy of role-playing with judgmental forecasts. In three studies, role-playing was superior, and there was no difference in the fourth. Armstrong (1978a, pp. 118-121) summarized this evidence.

In the Edsel case, it would have been useful to identify the key competitors of the Edsel and to conduct role-playing to predict their reactions. For example, one of the key competitors was Ford's Mercury division. Role-playing might have predicted what happened. (What actually happened, according to Brooks, 1969, was that Mercury launched a large advertising campaign in retaliation against the introduction of the Edsel. Furthermore, Mercury production workers apparently sabotaged the Edsel cars that were being produced in the same plants.)

Market Share

Given the forecast actions by the company and by its competitors, what market share can the company expect? Research in this area has provided few generalizations on which methods are most effective. However, a number of techniques seem reasonable.

For small changes in strategy, it may be sufficient to extrapolate the company's market share. Alternatively, you might employ the judgment of a group of experts using structured

methods to obtain these forecasts. In most situations it is better to first obtain forecasts independently with both extrapolation and judgment methods, and then use the average of these forecasts.

For large changes in strategy, the use of econometric methods is desirable. This assumes that one has data on the dependent variable (for example, sales) and on the key aspects of the strategy. If significantly different strategies were used in the past (such as the use of different prices) and if this led to substantial differences in sales, the econometric model may be useful in identifying the effects due to changes in the strategy.

In some cases (such as with new products), data are not available for the sales variables. Here the use of bootstrapping can be considered. The bootstrapping model is developed from management's judgment and from the data they use. Typically, the model is estimated by regression analysis. An example of such a model would be:

$$M = c + b_p P + b_a A$$

where M is management's forecasted market share

c is a constant

P is the product's price relative to its competition

A is the product's advertising relative to its competition

b_p and b_a are coefficients reflecting the relationships used by management

The bootstrapping model offers some advantages. First, it applies management's beliefs in a consistent manner. Thus, it can evaluate a large set of alternative strategies in a consistent way. Second, bootstrapping can provide insight to management's current forecasting beliefs, and this may foster learning. Finally, bootstrapping is slightly more accurate than the judges themselves (evidence is summarized in Armstrong, 1978a, pp. 251-259, and in Camerer, 1981). Thus the name: It is like lifting oneself up by the straps on one's boots. An application of this model for new product forecasting is described by Montgomery (1975).

Costs

The company is now in a position to forecast its costs. An explicit forecast should be made of the costs of a given strategy to each of the important stakeholders. For example, in the Edsel case, how much would Ford's strategy cost the employees, the dealers, the customers, the local community, and the stockholders? The formal approach is expected to produce better forecasts of the costs to each member of the system than would be obtained by informal forecasting methods.

Forecasts of costs can be used in the evaluation of the strategies (thus the two-way arrow from "Costs" to "Company Actions" in Figure 2-4). Where will the company's future costs be low relative to its competitors?

The cost forecasts depend upon the environment, the actions taken by the company, and its sales. Thus, forecasts of these other areas should be made before making the cost forecasts.

The best methods for forecasting costs will depend upon the industry he strategy, and stakeholders. It is difficult to provide generalizations on what method is best in which situation. A logical starting point, however, is the use of extrapolations. For example, learning curves can be used to forecast decreases in manufacturing costs. The simplest way to do this is to estimate a straight line on log paper to reflect what is typically a constant percentage decrease in manufacturing costs as volume increases. Experience curves attempt the same thing using the decrease in total costs as volume rises. But large changes in technology or in supplies can lead to significant departures from this extrapolation. In view of the potential for errors, it seems reasonable to base the forecast on two or more different methods.

Sales Forecasts

Completion of the market share and industry forecasts allows for a calculation of the sales forecast. If uncertainty has been estimated for both the industry and market share forecasts, these can be used to estimate the uncertainty in the sales forecast.

Results

By using forecasts from the preceding steps, calculations can then be made of the forecasted costs and benefits of each strategy for each of the major stakeholders. For example, profit and loss statements could be prepared for the stockholders, environmental impacts could be summarized for the local community, and the effects of product usage could be summarized from the consumer's point of view.

The forecasts should examine not only the expected results for a given strategy, but also the uncertainty. What are the most favorable and least favorable results that might occur? Furthermore, they should describe how the strategy performs in different environments. These forecasts of results provide the basis for selecting among the various strategies. How do they each perform against the original objectives? If none of the strategies is acceptable, it is useful to go back to the planning process for the generation of additional strategies.

SUMMARY

A framework was presented to show the relationship between strategic planning and forecasting (Figure 2-1). To make forecasts, it is necessary to consider the strategies; to plan, it is helpful to have good forecasts of the environment and of the impact of various strategies.

A description of the planning process was then provided (see Figure 2-2). This stressed the need for commitment-seeking in all steps of the planning process. Some of the major guidelines for planning were:

1. For objective setting, start with the ultimate objectives for each stakeholder. Translate these into specific, challenging, and measurable objectives by considering the comparative strengths and weaknesses of the company.
2. Develop alternative strategies for each of the more important possible states of the environment. Particular attention should be given to unfavorable situations; scenarios and brainstorming can be used here to increase creativity and openness within the organization. The plans should be comprehensive and they should contain slack. The more promising strategies should be specified in operational terms. Contingency plans should also be prepared for alternative environments.
3. Evaluate alternative strategies explicitly. The Delphi technique can be used here as well as group depth interviews, scenarios, rating sheets, and the devil's advocate.
4. Establish a monitoring system to obtain information on:
 - a. Environmental changes
 - b. Changes in the company's capabilities and in the capabilities of its competitors
 - c. Actions taken by the organization
 - d. Actions taken by major competitors
 - e. Results

This information should be compared with predetermined standards to indicate when the strategy should be reexamined. Furthermore, fixed review periods should be scheduled.

Participation of the company's stakeholders in each of the above four steps should help to increase the commitment of these stakeholders to making the strategy a success.

This advice on formal strategic planning is summarized in the checklist of Figure 2-5. Although it may help to use some of the planning techniques separately, it seems best to use them in combination with one another.

Formal planning is expected to be most useful in situations where:

1. The task is complex
2. Large changes occur (in the environment, by competitors, or by the company itself)
3. Uncertainty is high
4. The market is inefficient

When one or more of these conditions do not hold, an investment in normal planning would be expected to yield a smaller return.

Various forecasting methods were described. They were classified using the forecasting methodology tree (see Figure 2-3). This described the methods as subjective or objective, naive or causal, and linear or classification. The tree can be used as a checklist in selecting a method or a given forecasting problem.

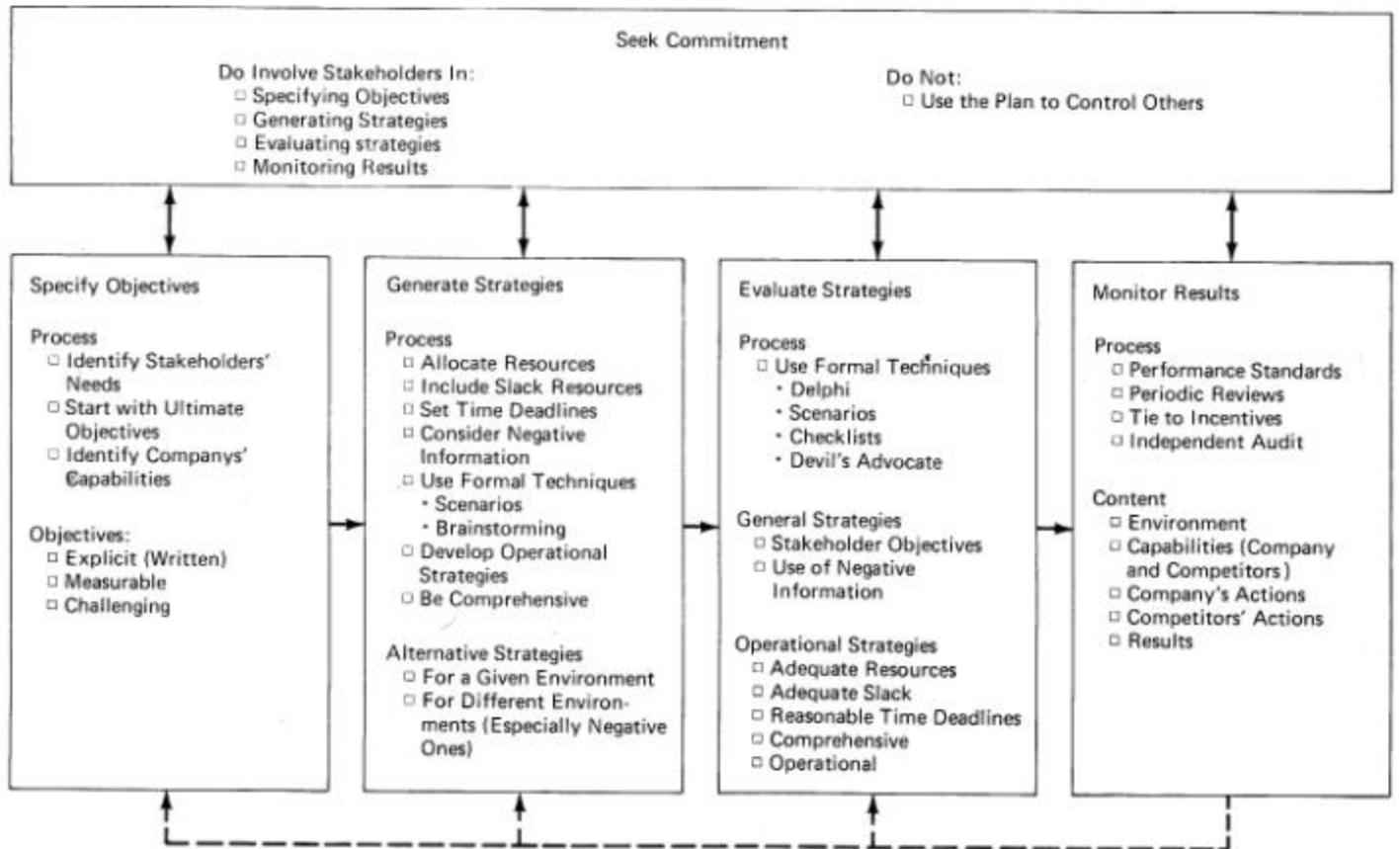


FIGURE 2-5
Planning process checklist.

Suggestions were made for the use of forecasting methods for the various needs in the company's planning (see Figure 2-4). This included methods for forecasting the environment, industry, company actions, competitors' actions, market share, and costs. These forecasts allow one to calculate sales forecasts and then to examine the costs and benefits for each stakeholder.

Some of the more important suggestions were:

1. Use structured judgmental methods to forecast the possible environmental states, their likelihood, and their potential effect on the company and the industry. As an input to the industry forecast, concentrate on identifying the important factors and their direction of change. Generally, only approximately correct predictions are needed for the magnitude of change. Do not forecast long-range cycles.
2. To obtain industry forecasts, first estimate current sales, and then forecast changes. Judgmental forecasts are often appropriate for estimating current sales. Simple econometric and segmentation methods are useful to forecast changes.
3. Organizations do not always have operational strategies. When they do have such strategies, they do not always follow them. To forecast what actions the company

will actually take, use surveys or group depth interviews with the key decision makers and stakeholders. Group depth interviews seem especially useful for dealing with situations that could be unfavorable to the organization.

4. Competitive reactions to large changes in the environment or to changes in your company's strategy can be forecast by historical analogies or by role-playing.
5. Market share can be forecast by extrapolation or by judgment. If large changes in strategy are considered, econometric models are appropriate. However, when data are lacking on actual results, bootstrapping can be used.
6. Forecast the costs for each stakeholder by using forecasts of the environment, company actions, and sales levels. Try to obtain forecasts using different methods in order to compensate for errors inherent in single method.

This chapter has summarized the current state of the art in formal planning and forecasting. The evidence to date suggests that formal planning and forecasting are valuable for organizations.

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