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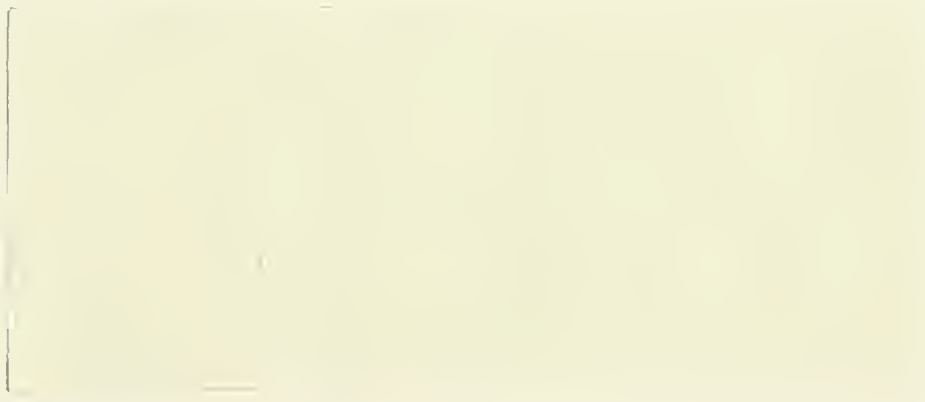

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ABSTRACT

Seven key dimensions of a planning system, five reflecting its deisgn aspects and two tapping the organizational context of planning, are developed from the literature. Discriminant analysis is employed to evaluate the ability of these seven dimensions to distinguish between more effective and less effective planning systems, using three different criteria of planning effectiveness. While influences on effectiveness seem to vary depending on the effectiveness criterion used, on an overall basis, the most important dimensions were system capability (or its creativity and control orientation), resources provided for planning, and functional coverage.

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The relationship between strategic planning (hereafter, planning) and organizational performance is one of the most extensively researched issues in the strategic management field. An illustrative list of studies addressing the impact of planning on performance includes Ansoff, Avner, Brandenburg, Portner, and Radosevich (1970), Fulmer and Rue (1974), Grinyer and Norburn (1975), Herold (1972), Karger and Malik (1975), Kudla (1980), Lindsay and Rue (1980), Malik and Karger (1975), Rue and Fulmer (1973), Thune and House (1970), and Wood and LaForge (1979). A complete review and critique is provided by Armstrong (1982) and Lorange (1979).

Despite the large number of research efforts aimed at elucidating the link between planning and performance, the results of the above body of research are fragmented and contradictory. This state of affairs has arisen because most previous research on the effectiveness of planning systems has suffered from two major conceptual shortcomings. First, most studies have used rather simplistic conceptualizations of the notion of planning. Thus, researchers have been attempting to show differences in financial performance between "planners" and "non planners" or "formal planners" and "informal planners". Second, most studies have been solely preoccupied with the linkage between planning and the financial aspects of corporate performance, even though conceptual writings on formal planning systems stress several non-financial and intangible benefits (Camillus, 1975; Steiner, 1979).

With regard to the first issue, crude dichotomizations along a single dimension, namely the presence or absence of planning or its degree of formality, are clearly suspect, given that the debate as to what the term "planning" connotes is still a live one (Mintzberg, 1981; Snyder, 1982). Such conceptualizations are inconsistent with the multidimensional view of planning systems that is becoming more and more visible in the literature

(e.g., King & Cleland, 1978; Lorange, 1979, 1980; Lorange & Vancil, 1977). Similarly, with regard to the second issue, the exclusive emphasis on financial performance is conceptually flawed and is open to attack as being narrowly focused. A broader concept of effectiveness is needed.

A truly meaningful assessment of the value of planning systems should, therefore, recognize their multidimensional nature and the plurality of approaches that can be used to assess their worth. Such an assessment is attempted in this research study. Three distinctive features of this study should be noted. First, based on an extensive literature review, we identify seven distinct design and contextual dimensions of planning systems that are widely believed to influence their effectiveness. Second, we explicitly recognize the many possible meanings of effectiveness in the context of planning, and use multiple criteria for assessing planning system effectiveness. Third, we cast the study in a comparative mode by using the technique of discriminant analysis in order to bring the differences between more effective and less effective planning systems into sharp relief.

The purpose of this paper is to test the proposition that relatively more effective systems will differ from relatively less effective ones along the seven key design and contextual dimensions referred to above and that the relative importance of these dimensions will vary depending upon the criterion of effectiveness used.

DIMENSIONS OF A PLANNING SYSTEM

Planning systems are multifaceted management systems that are contextually embedded. Hence, they cannot be adequately described in terms of one or two characteristics such as "formality". Although employing different

terminology, most writings (e.g., King & Cleland, 1978; Lorange & Vancil, 1977; Steiner, 1979) emphasize the notion that planning systems are best described in multidimensional terms. Unfortunately, there is as yet no consensus as to what these dimensions are.

Nevertheless, in one way or other, most researchers emphasize two sets of impacts on a planning system's effectiveness. These include (i) The design elements of the planning system and (ii) the organizational context of planning. We synthesized seven dimensions that tap these two aspects. Five design elements were included in this study. They are: (i) system capability, (ii) use of techniques, (iii) degree of attention to internal facets, (iv) degree of attention to external facets, and (v) functional coverage. The organizational context of planning was captured in the following two dimensions: (i) resources provided for strategic planning, including top management support, and (ii) resistance to planning, or, in Steiner's (1979) words, "anti-planning biases". While other dimensions can be identified that might conceivably influence the effectiveness of planning, the above seven have the support of an extensive literature. Also, they are variables that are relatively more amenable to control by managers.

Table 1 summarizes the seven dimensions and indicates the literature support for each of them. A brief discussion of each dimension is provided in the following paragraphs.

INSERT TABLE 1 ABOUT HERE

Design Elements

System Capability. Strategic planning systems differ in the extent to which they emphasize creativity as opposed to control (Camillus, 1975; Shank, Niblock, & Sandalls, 1973). It has been stressed that these two somewhat opposing orientations need to be balanced in order to enhance the effectiveness of a system. An excessive emphasis on creativity at the expense of control or vice versa is apt to be dysfunctional. We conceptualize systems capability in terms of the ability of the system to foster control as well as creativity. The creative capability of the system is assessed in terms of its ability to anticipate suprises and crises, its ability to adapt to unforeseen changes, etc. On the other hand, the control aspect of the system refers to the degree of emphasis given to managerial motivation, upward and downward communication within the organizational hierarchy, integration of diverse operational areas, etc.

Use of Techniques. A variety of analytical techniques and methodologies have been developed to aid managers in identifying and dealing with strategic decisions and problems (Grant & King, 1979). The use of these techniques is one indication of the extent of formalization of the planning process. The extent of reliance on planning techniques and methodologies is also an indicator of the organization's approach to decision-making, i.e., comprehensive versus incremental (Fredrickson, 1984).

The extent of reliance on planning techniques is thus an important dimension of the planning system. Since the use of formal techniques is premised on the assumption that they lead to more effective definition and resolution of the ill-structured problems of planning, this dimension can also be expected to impact the effectiveness of the planning system itself over time.

Attention to Internal Facets. A formal approach to planning usually begins with an assessment of the organization's recent history and current situation. This step or stage in planning is variously referred to as "situation audit", "appraisal", etc. (Ansoff, 1965; Steiner, 1979). In this assessment, the organization's internal capabilities receive close study to identify its strengths and weaknesses. Often plans fail because of an inadequate or incorrect assessment of the organization's internal aspects (King & Cleland, 1978). The degree of attention to internal aspects such as past performance, current strengths and weaknesses, and diagnostic assessment of recent failures or performance shortfalls is treated in this study as a distinct and important influence on the effectiveness of an organization's planning.

Attention to External Facets. One of the purposes of planning is to adapt the organization to environmental demands and pressures. Analyzing external opportunities and threats is a major element of planning (Andrews, 1971). There is no need to belabor the importance given in the literature to external orientation as an influence on planning effectiveness. The extent of attention devoted to various aspects of the environment is therefore included in this study as a further aspect of a planning system's design.

Functional Coverage. This term refers to the degree of emphasis accorded to various functional areas in planning. Functional coverage can vary because of strategic differences in the competitive postures of firms in an industry. Some firms may attempt to compete on the basis of price and volume, while others may emphasize product differentiation and customer service. The distinctive competencies demanded by these alternate approaches are usually manifested as a pattern of emphasis on different functional areas (Hitt, Ireland, & Palia, 1982; Snow & Hrebiniak, 1980). In the former case,

manufacturing efficienies may be key, while in the latter case, the marketing function may receive special emphasis. A balanced emphasis on all functions may be more important in yet other situations, where general management is the key success factor. The degree of emphasis given to various functional areas was, therefore, included as a planning system design dimension.

Organizational Context of Planning

Resources Provided for Planning. Many authors have emphasized that planning in an organization cannot be successful unless adequate resources are committed to that activity (e.g., King & Cleland, 1978; Steiner, 1979). These resources may be physical, e.g., the creation and maintenance of a separate planning staff and office, or they may be intangible, e.g., the time spent by the CEO and other key managers in the planning function. Planning is not a costless activity. If benefits are expected from planning, the organization must be willing to incur a commensurate level of tangible and intangible costs of doing effective planning as well.

Resistance to Planning. Early research on planning systems emphasized the importance of identifying and overcoming the sources of resistance to organizational planning (Steiner, 1979; Steiner & Schollhammer, 1975). Resistance to the system may be manifested in lack of acceptance of the outputs of planning, withdrawal or nominal participation in planning activities without active involvement on the part of operating managers, gaming behaviors, etc. The level of resistance to the idea and processes of planning can be expected to exert a negative influence on the effectiveness of the planning system.

MULTIPLE CRITERIA OF PLANNING SYSTEM EFFECTIVENESS

In this study planning system effectiveness was approached from three perspectives. First, the extent of fulfillment of key planning objectives was examined. Second, in keeping with most prior research, economic performance of the organization was included as a further effectiveness criterion. Third, an overall measure of satisfaction with the planning system was also considered.

Fulfillment of Planning Objectives

We considered six commonly emphasized objectives of planning, namely, (i) predicting future trends, (ii) evaluating alternatives, (iii) enhancing management development, (iv) avoiding problem areas, (v) improving short-term performance, and (vi) improving long-term performance. Each of these objectives is discussed and justified next.

Predicting Future Trends. Planning is often justified on the grounds that contemporary organizational environments have become increasingly turbulent, thereby necessitating some formal mechanisms for environmental monitoring and coping with environmental change (Ansoff, 1984; Gluck, Kaufman, & Walleck, 1980, 1982). An objective that follows from this reasoning is the improvement of the ability of a planning system to predict future trends. It is not suggested that planning should necessarily result in accurate predictions of the future, but at a minimum planning should aid an organization in delineating probable, plausible, and preferable future states of the world (Amara, 1981). In fact, according to Paul, Donavan, & Taylor (1978), one of the major problems with planning is the inability of planners

to produce reasonably valid forecasts of the future. Thus, predicting future trends is considered an important task of planning and constitutes our first objective.

Evaluating Alternatives. Critics of planning always point out the tendency of planning to degenerate into a "numbers game". A good planning system, it has been proposed, should not only serve as a vehicle for mind-stretching (Camillus, 1975), but also should delicately balance control and creativity considerations (Shank, Niblock, & Sandalls, 1973). The extent to which a planning system fosters the creative generation and exploration of alternative courses of action thus becomes a further important test of its effectiveness, and is second in our list of objectives.

Avoiding Problem Areas. Yet another approach to the evaluation of planning is to examine the extent to which the system results in an accumulation of experience and enhances organizational learning (e.g., Shrivastava & Grant, 1985). An evolutionary approach to systems design (Lorange & Vancil, 1977) is consistent with the idea that effective planning systems are adaptive learning systems. Learning can be said to be occurring if the system increases the probability of goal achievement and minimizes the recurrence of errors. A corollary is that an effective planning system should enable an organization to avoid problem areas. This is the third objective for planning.

Enhancing Management Development. Formalization of planning should lead to an improvement in the quality of management and facilitate management succession. This constitutes the long-term "educational" value of the planning process (Hax & Majluf, 1984; Lorange & Vancil, 1977). The contribution of planning to the development of an organization's management depth is by no means an easy achievement to evaluate. Yet, some attention to

this important objective appears to be warranted in evaluating a planning system. This is the fourth objective.

Improving Short-term and Long-term Performance. Finally, the importance of performance, both short-term and long-term, cannot be overemphasized. In a sense, performance improvement is the raison d'etre for adopting elaborate planning systems in the first place. This is implicit in the exclusive performance focus of the impressive body of planning system evaluation studies identified earlier. These are the fifth and the sixth objectives.

Performance Relative to Competition

In addition to the achievement of key planning objectives, it was posited that effective systems would result in better levels of organizational performance. There is a subtle difference between achieving performance objectives and being a relatively higher performing organization. Hence, performance was included as a separate criterion of planning effectiveness. Four performance indicators, considered relative to the competition rather than in absolute terms, were used in this study, namely, sales growth, earnings growth, market share changes, and return on investment.

Satisfaction with The Planning System

Adopting the approach common in the management information systems implementation literature (Lucas, 1978), "satisfaction" with the planning system was treated as an additional effectiveness criterion. Satisfaction is particularly important when the system's use is mandatory as opposed to voluntary, which is likely to be the case for an organization's planning system. Satisfaction with the system is likely to reflect objective fulfillment, thus satisfaction can be also be regarded as an additional internal validation criterion for the objective fulfillment variables.

RESEARCH METHODS

Data

Two hundred and seven executives, representing both the planning function and other operating functions, completed a detailed questionnaire on their company's planning practices. This sample represents a response rate of 34.5 percent of 600 executives of Fortune 500, Fortune 500 Service, and Inc 500 companies who received the questionnaire. This level of response from a list of predominantly Fortune 1000 firms is considered higher than is usual for mail surveys of this population (Gaedeke & Tootelian, 1976). The characteristics of the sample are shown in Table 2.

INSERT TABLE 2 ABOUT HERE

The sample is biased in favor of larger firms, with 60.9 percent having sales in excess of $1 billion. Similarly, planning executives (68.5%) and respondents at the corporate level of their organizations (81.5%) constitute a dominant part of the sample.

Since smaller firms do not usually undertake planning to any significant extent (Robinson & Pearce, 1984), the size bias in the sample is not believed to be serious from the point of view of drawing tentative generalizations about the planning processes of firms that do plan. A comparision of the responses of operating executives and planning executives using t-tests indicated that planning executives as a group did not tend to systematically overrate or underrate their planning systems. However, since data were obtained from a single respondent from each organization, there is a real

possibility of response bias or selection bias. A tradeoff between overall sample size and number of responses per firm became inevitable in view of resource limitations and we leaned in favor of a large sample size. Given that our target respondents were top level planning or operating executives, it was assumed that they would be quite knowledgable about their planning systems and generally unbiased in their responses.

Measurements

The seven systems dimensions were measured by multi-item scales. The lack of valid and reliable measurement scales has been one of the impediments to the development of middle-range theories of strategy and strategic planning (Venkatraman & Grant, 1986). In this study, content validity of each dimension was sought to be assured by the use of multiple experts (including the authors) and an iterative procedure for ensuring an exhaustive coverage of the domain of the construct, while the use of multi-item scales was motivated by the aim of enhancing the reliability of measurements (Nunnally, 1978).

Effectiveness was measured using both single-item and multi-item scales. The six individual objective fulfillment variables and their simple additive composite made up the objective fulfillment battery. The four relative performance items and their composite constituted the relative performance battery. SATISFN was measured by a single item scale. All variables were measured using appropriately anchored 5-point Likert scales.

The multi-item scales used in this study are described in Appendix 1. Means, standard deviations, reliabilities (Cronbach alphas) and intercorrelations for the planning system dimensions are reported in Table 3. Corresponding statistics for the effectiveness variables and composites are shown in Table 4.

INSERT TABLE 3 AND TABLE 4 ABOUT HERE

It should be noted that the planning systems dimensions used in this study were specified a priori because of the availability of extensive literature support (see Table 1). Nevertheless, factor analysis of the variable set was undertaken to determine if any further parsimony could be accomplished in the number of planning system dimensions used. Three to seven factor solutions were prepared and the varimax rotated factor scores were carefully studied. Since none of the factor structures were easy to interpret, it was decided to rely on the seven originally specified dimensions.

Choice of Analytic Technique

Given the interest in exploring the systems dimensions contributing to differences in effectiveness between more effective and less effective systems, discriminant analysis was deemed to be the appropriate analytical approach. Although the use of an alternative analytical methodology such as multiple regression may seem just as appropriate given the interval nature of the effectiveness variables, an examination of the correlation matrix for the independent variable set revealed significant multicollinearity in the data. This further reinforced the original decision to use discriminant analysis as

the analytical method, since multicollinearity does not affect the interpretation of discriminant analysis results, many researchers' belief to the contrary (Eisenbeis, 1977).[1]

Groupings for Discriminant Analysis. The effectiveness groupings for discriminant analysis were constructed as follows. Since responses were provided on a five point scale, all respondents choosing 1, 2, or 3 were placed in one group, and those checking 4, or 5 were placed in the other group.[2] In the case of the two composites, the median was used as the cut point to yield the two groups for discriminant analysis.

Tests of Multivariate Normality. The accuracy of the classifications that result from the application of discriminant analysis are sensitive to the assumption that the predictor variables constitute a multivariate normal population. To test for this, the z-tests for the significance of the coefficients of skewness and kurtosis discussed by Bock (1975) were employed. The discriminating variables used in this study displayed significant deviation from normality.[3] This calls for caution in interpreting the accuracy of the classifications reported here. However, our primary concern

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[1]Thirteen regressions were nevertheless run. They yielded statistically significant models with multiple R values in the range 0.42 to 0.75. The signs of the coefficients of the independent variables were uninterpretable because of multicollinearity in the data. This multicollinecinty is likely to be due to common method variance arising from our data collection approach.

[2]Before assigning the neutral responses (scored 3) to the low effectiveness groups, ANOVAs were run for each grouping variable for all seven discriminating dimensions. Scheffe pairwise comparisons across the three groupings showed that the neutral groups were more similar to the low effectiveness groups than the high effectiveness groups, thus justifying the pooling of the neutral ratings with the low effectiveness ones.

[3]This problem persisted even when various data transformations were tried. The detailed results of this analysis are not reported here in the interest of conserving space.

in this study is with descriptive rather than predictive relevance (Frank, Massy, & Morrison, 1965). The failure of a key model assumption, which is critical for prescriptive studies, is therefore not believed to constitute a serious challenge.

Analysis. A total of 13 discriminant analysis runs were performed for this study. These include the seven runs based on the objective fulfillment variables and their composite, the five runs based on the performance variables and their composite, and the run based on "overall satisfaction". The seven discriminators being composite dimensions, missing data on even one of the component variables for any respondent led to the loss of that case. The discriminant analyses were run using 93 cases that had complete data for constructing all the seven planning system dimensions. A comparison of these 93 cases with the 114 excluded cases with respect to various characteristics confirms that this data reduction did not lead to any significant biasing of the sample used for discriminant analysis (see Table 2).

RESULTS AND DISCUSSION

Overall Results

Table 5 shows the results for the discriminant analysis run using SATISFN as the effectiveness criterion, and serves as a prototype for Tables 6 and 7, which summarize the results for the objective fulfillment and relative performance variables, respectively.

INSERT TABLES 5, 6, AND 7 ABOUT HERE

The above tables provide for each run (i) the size of the two effectiveness groups, (ii) the significance level of the discriminant function, using Bartlett's approximate chi-square test, (iii) the result of Box's test for equality of group dispersion matrices, (iv) classification results, (v) the expected accuracy of a chance model using random assignment of cases to the groups based on their sample prior probabilities, and (vi) the standardized discriminant function coefficients for the discriminating dimensions.

Of the 13 discriminant functions, 12 were significant at $p < 0.05$. The run for earnings growth was significant at $p < 0.10$. That the same seven dimensions lead to significant discriminant functions for each of the effectiveness criteria used, is encouraging. To a degree, this is not surprising. The objective fulfillment variables were all highly intercorrelated, as were the relative performance variables (see Table 4). In addition, the objective fulfillment variables had high correlations with the satisfaction variable (as expected). The generally low and non-significant correlations between the objective fulfillment and relative performance variables does confirm our initial treatment of the two as distinct effectiveness criteria. In light of this, the uniformly good discrimination achieved across all the runs attests to the value of the seven planning system dimensions in classifying planning systems along either type of effectiveness criterion.

Equal group sizes are an important consideration in interpreting bias in discriminant analysis (Morrison, 1969). The grouping procedure used in this study yielded nearly equal group sizes (i.e., with the smaller group accounting for no less than 45 percent) for all but the runs based on alternative evaluation, long-term performance, sales growth, and earnings

growth. For these runs, the benchmark chance model accuracies are accordingly higher. In other words, the discriminant function's classification accuracy is compared against a higher "test" value in judging its worth as a discriminating tool. As can be noted in Table 6, the most unequal group sizes resulted for evaluating alternatives. Even in this case the discriminant function's overall classification accuracy of 66.7 percent is somewhat better than the 63.9 expected accuracy of the corresponding chance model. For earnings growth the discriminant function's overall classification accuracy was about 9 percentage points better than that of the corresponding chance model. In all other cases the overall classification accuracy of the corresponding discriminant function was at least 15 percentage points higher than the respective chance model. Thus, the results of the discriminant analysis runs are informative.

Traditionally, the relative importance of the discriminating variables has been believed to be reflected in the absolute magnitudes of their standardized discriminant function coefficients, which are treated as being analogous to the beta weights in a regression model (Klecka, 1975). However, some methodologists question this approach. While many alternative ranking schemes exist, the procedure suggested by Mosteller and Wallace (1963) was used in this study for ranking the discriminating dimensions.[4] A summary of the relative importance rankings for the 13 runs is provided in Table 8.

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[4] In this procedure, the variables are ranked on the basis of the absolute value of the product $b_j (\bar{x}_{j1} - \bar{x}_{j2})$, where b_j is the unstandardized discriminant function coefficient of the variable j, $\bar{x}_{j1}$ is the mean of this variable for group 1, and $\bar{x}_{j2}$ is the mean for group 2. For a discussion of the superiority of this procedure over the conventional use of the standardized discriminant coefficients for ranking, see Mosteller and Wallace (1963) or Joy and Tollefson (1975).

INSERT TABLE 8 ABOUT HERE

Satisfaction with the Planning System - Results and Discussion

For the grouping based on satisfaction with the planning system, the three top ranked discriminators were resistance to planning, system capability, and resources provided for planning. Attention to internal facets ranked as the least important discriminating dimension. These findings suggest that satisfaction with planning is largely a function of the organizational context of planning.

On a univariate basis, the low satisfaction group differed from the high satisfaction group along all but one dimension: attention to external facets. However, in the discriminant analysis, attention to external facets emerged as the fourth most important discriminator.

If use of techniques, attention to internal facets and functional coverage can be considered to represent aspects of the planning process that tap its degree of formality, then it appears that formality of planning and satisfaction are unrelated or only weakly related.

The implications of these findings for managers concerned with enhancing satisfaction with planning would appear to be to pay specific attention to the organizational context of planning, particularly, to the sources of resistance to planning, it any, and the level of resources committed to planning activities. Enhancing the external orientation of the planning system also appears to contribute to greater satisfaction with planning. Presumably, externally oriented planning systems are perceived as being conducive to more meaningful planning exercises and thereby result in greater

satisfaction with planning. Of course, these are conjectures subject to further empirical testing, since discriminant analysis results can only yield tentative clues as to causal linkages.

Objective Fulfillment - Results and Discussion

Turning to the runs for the objective fulfillment variables, system capability appears to be the key discriminator on an overall basis. It ranked first in four of the seven objective fulfillment runs. It was, however, ranked last in the run for short-term performance and sixth in the run for long-term performance. Thus, system capability appears to be more related to the process-based as opposed to the outcome-based objectives of planning. Further support for this conjecture is provided in the fact that system capability ranked near the bottom in three of the five runs based on the relative performance variables, although when the grouping for discriminant analysis was based on the performance composite, it ranked second (see Table 8).

Although resistance to planning was never ranked as the top discriminator in the objective fulfillment runs, it was never ranked lower than fourth. In five runs, it was ranked either second or third. Thus resistance to planning appears to be a key discriminator for objective fulfillment.

Use of techniques, functional coverage, and resources provided for planning were ranked among the top three discriminators in three runs each. Each ranked at the bottom in one run. While use of techniques was top ranked in the runs for predicting future trends and short-term performance, it was ranked last in the run for enhancing management development. Thus, the contributions of techniques seem limited to the relatively more tangible objectives. Functional coverage ranked second in the run for enhancing

management development and third in the runs for predicting future trends and the objective composite. Why functional integration should contribute to improved prediction of future trends is not clear, but that such integration can lead to management development is intuitively tenable. Functional emphasis and integration can result in the identification of key success factors and in developing a general management perspective. Such integration can also be expected to result in reduced conflict across functional boundaries. Resources provided for planning was found to be an important discriminator for the performance objectives and in stimulating a wide variety of alternatives and their evaluation.

Attention to internal facets as well as attention to external facets appear to be the least important discriminators as far as the objective fulfillment variables are concerned. However, attention to external facets ranked relatively high with reference to the performance objectives, while the highest rankings for attention to internal facets were achieved in the runs for avoiding problem areas and evaluating alternatives.

Relative Performance - Results and Discussion

Resources provided for planning emerged as the key discriminator as far as the relative performance runs were concerned. It ranked consistently as the first or second factor. In contrast, use of techniques had consistently low rankings in these runs. It ranked last in two runs, namely those for earnings growth and return on investment, and in no run did it achieve a ranking higher than 4. This finding lends support to recent criticisms of the technique orientation in contemporary management (Peters & Waterman, 1981), and particularly to the attacks against popular planning techniques such as PIMS and BCG (Kiechel, 1982; Wensley, 1982). Techniques have a role to play in strategic planning, but the results of this study suggest that

effective planning requires more than the mere use of sophisticated analytical techniques.

The consistent and relatively low ranking of resistance to planning in the runs for relative competitive performance is also an interesting finding. In early writings on planning, considerable emphasis was placed on the resistance issue. It is tempting to speculate that such emphasis, while appropiate in the early days of planning, is perhaps less critical today. Today planning has increasingly been recognized and accepted as a line manager's job (Business Week, 1984). The issue of introducing it to the organization and securing the commitment of managers may have simply become less crucial. This does not, however, minimize the need for managing organizational resistance to planning.

Attention to external facets ranked at the top in the runs for earnings growth and market share changes, and was third in the run for sales growth. Thus, an external orientation appears to be important for effectiveness in relative competitive performance. However, attention to external facets was not a key discriminator for return on investment and the performance composite.

Both attention to internal facets and functional coverage showed considerable rank instability from run to run. The former's high ranking in the run for sales growth is not easy to interpret, while the high ranking of functional coverage in the run for return on investment is explainable as being possibly due to the efficiences achieved by good functional coordination.

A Synthesis

Considering all the thirteen runs together, both system capability and resources provided for planning ranked at the top in four runs each. System capability ranked as one of the three top discriminators in eight runs and resources in nine. System capability ranked at the bottom in only two runs and resources in only one. Thus, on an overall basis there is little doubt that system capability and resources provided for planning are key dimensions from the standpoint of planning system effectiveness construed in the broadest sense.

Although it ranked at the top in only one run, resistance to planning was never ranked at the bottom and was among the top three discriminators in six of the runs. However, its discriminating influence was limited to the runs involving objective fulfillment and satisfaction. In contrast, functional coverage, which also ranked among the top three discriminators in six runs, was found to be an important discriminator for three of the seven objective fulfillment runs and three of the five relative performance runs. We are therefore inclined to interpret functional coverage to be a more important discriminator than resistance to planning on an overall basis.

IMPLICATIONS

The importance of the context of planning is underscored by the fact that each of the three effectiveness criteria employed in this study appears to be influenced significantly by at least one of the two contextual dimensions. Both resources provided for planning and resistance to planning were key discriminators for satisfaction as well as objective fulfillment, whereas resources ranked consistently at the top for relative competitive

performance. Future studies should include additional contextual dimensions, as compared to the two used in this study. Some possible candidates are environmental volatility, leadership styles, planning system maturity, etc.

Among the design elements, system capability proved to be a powerful discriminator for satisfaction and objective fulfillment, but proved less important for relative performance (except for the performance composite). In contrast, attention to external facets was an important discriminator for relative performance, but not for objective fulfillment. Functional coverage was an important discriminator for both objective fulfillment and relative performance. These results suggest that the importance of the design elements varies considerably depending on the effectiveness criterion used. The implication of this conclusion for systems design is that efforts to create a "supersystem" capable of achieving numerous purposes at the same time is unlikely to be productive and that systems design should be tailored to specific purposes of planning. Tradeoffs are inevitable if a planning system is to meet multiple aims (King, 1983).

The implication of the overall importance of resources and functional coverage is straight forward. Effective planning requires an infusion of adequate resources to the planning effort. This in turn requires high levels of involvement on the part of not only staff managers but also operating managers and the chief executive officer. As for functional coverage a high score along this dimension would result from uniformly high scores on all the component items in this scale. This implies that functional integration and a general management perspective are crucial for effective planning.

The finding that system capability emerged overall as the most important discriminator raises important questions about the role of creativity and control as key considerations in planning systems design. Some component

items of this dimension tapped a creativity orientation, while others tapped a control orientation. While it is conventional to think of creativity and control as opposed orientations, our data suggested that the two tend to go together, as implied by Peters and Waterman (1981) in their discussion of "simultaneous loose-tight properties" in the context of organizational excellence. This was the reason why creativity and control aspects were included within the same dimension. For the present, we suggest that effective planning is achieved by a high degree of attention to both creativity and control as opposed to trading the one off against the other. This hypothesis is currently being subjected to further empirical analysis by examining interactive models of the creativity and control subdimensions of the system capability construct.

CONCLUSIONS

Most prior research on the effectiveness of planning systems has pursued the implicit question, "Does planning pay?" In contrast, this study was based on the premise that planning is a multidimensional and indistinguishable feature of the overall management process, and hence we pursued the question, "What dimensions of planning are associated with effectiveness, effectiveness being approached from multiple perspectives?"

The results of this study suggest that determinants of planning system effectiveness tend to vary depending on the specific effectiveness criterion used. Nevertheless, on an overall basis, the key dimensions seem to be system capability, resources provided for planning and functional coverage.

Every effort was made to use an appropriate methodology and to execute it as rigorously as possible. However, a key limitation of this study is our

reliance on data from a single respondent in each firm. There is a possibility that this may have introduced response or function bias in the data and may raise questions about the generalizability of our findings, since organization level constructs such as those used here are probably best measured using multiple respondents drawn from different functional and hierarchical levels.

The following are some possible extensions of this study. One line of inquiry would be to examine in detail the propositions suggested by the results summarized in Table 8. A second extension would be to examine the interrelationships among the planning system dimensions, instead of treating them as separate entities as was done in this study. Third, the seven systems dimensions can be considered jointly to develop rich empirically-based taxonomies of planning systems and their effectiveness implications can be further explored. Lastly, the relationships between the seven dimensions and the three effectiveness criteria can be simultaneously analyzed using approaches such as MANOVA and canonical correlation analysis (Ramanujam & Venkatraman, 1985).

We believe that research on planning systems is at a critical crossroad. We hope this study will stimulate further efforts in new directions and lead to an enhanced understanding of the role and value of planning systems in the formulation and implementation of strategy.

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Table 1
Dimensions of a Planning System

Dimension	Description	Key Supporting Literature
Design Elements		
System capability	The ability of the formal planning system to balance creativity and control; the adaptive capability of the system and its flexibility to support strategy formulation and implementation	Ansoff (1975; 1984) Anthony & Dearden (1976) Camillus (1975) Lorange & Vancil (1977) King & Cleland (1978) Thompson (1967)
Use of techniques	The degree of emphasis given to the use of planning techniques to structure the unstructuredness of ill-defined, messy strategic problems	Grant & King (1979, 1982) Hofer & Schendel (1978) Hax & Majluf (1984)
Attention to internal facets	The degree of attention to internal (i.e., organizational) factors, past performance, and analysis of strengths and weaknesses	Camillus & Venkatraman (1984 Grant & King (1982) King & Cleland (1978) Lorange & Vancil (1977) Stevenson (1976)
Attention to external Facets	The level of emphasis given to monitoring environmental trends	Aguilar (1965) Fahey & King (1977) Keegan (1974) Kefalas & Schoderbek (1973) Thomas (1980)
Functional coverage	The extent of coverage given to different functional areas with a view to integrate different functional requirements into a general management perspective.	Hitt, Ireland & Palia (1982) Hitt, Ireland & Stadter (198 Lorange (1980) Snow & Hrebiniak (1980)
Organizational Context of Planning		
Resources provided for planning	The degree of organizational support in the form of number of planners, involvement of top management in planning, etc.	King & Cleland (1978) Steiner (1979)
Resistance to planning	The need to anticipate and overcome resistance to planning and to create a favorable climate for effective planning.	Steiner (1979) Steiner & Schollhammer (1975 Schultz & Slevin (1976)

Table 2
Characteristics of Sample Companies and Respondents[a]

	Full Sample (n=207)	Sample used in this study[b] (n=93)
1. Sales of the Responding Unit		
Less than $250 million	17.4	24.4
$251 million - $ 1 billion	21.8	21.1
Over $ 1 billion	60.9	54.4
2. Primary Business Category of the Responding Unit		
Consumer goods	19.2	13.0
Capital goods	18.7	20.7
Raw or semi-finished materials	12.8	10.9
Components for finished goods	8.9	12.0
Service sector	40.4	43.5
3. Organizational Level of Responding Unit		
Corporate	81.5	80.4
Business unit	18.5	19.6
4. Title/Job Responsibility of Responding Executive		
Planning	68.5	67.0
Other line function	31.5	33.0
5. Maturity of the Planning System (Year planning began)		
Before 1960	6.2	5.9
During 1961-1975	36.7	37.6
After 1976	55.2	56.5

[a]All figures are percentages. Non responses have been excluded.

[b]A reduced sample was used for analysis in this study because of missing data problems. Based on chi-square tests, the reduced sample is not statistically different with respect to any of the five company and respondent characteristics summarized in this table, except sales categories.

Table 3
Means, Standard Deviations, Reliabilities, and Intercorrelations of the Seven Planning System Dimensions[a]

Dimension	Mean	s.d.	1	2	3	4	5	6	7
1. System capability	3.65	0.62	(93)						
2. Use of techniques	3.18	0.45	60	(71)					
3. Attention to internal facets	3.36	0.61	52	45	(68)				
4. Attention to external facets	3.62	0.50	45	22	19	(51)			
5. Functional coverage	3.57	0.36	39	28	34	47	(36)[b]		
6. Resources provided for planning	3.61	0.74	64	49	36	36	40	(76)	
7. Resistance to planning	1.66	0.61	-69	-43	-28	-41	-33	-70	(70)

[a]All values are based on the sample of 93 firms used in the discriminant analysis runs. Decimal points are omitted for reliabilities and correlations. Reliabilities are shown within parentheses. All correlations are significant at $p<.05$.

[b]The reliability for this dimension for the full sample (n=207) was 0.77. Although there were differences for the other dimensions as well, they were less stark.

Table 4

Means, Standard Deviations, and Intercorrelations of the Effectiveness Variables[a]

Variable	n	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Predicting future trends	93	3.33	0.86	-												
2. Evaluating alternatives	93	3.75	0.72	35	-											
3. Avoiding problem areas	93	3.45	0.83	41	59	-										
4. Enhancing management development	92	3.26	0.91	69	43	41	-									
5. Improving short-term performance	93	3.46	0.84	38	34	26	37	-								
6. Improving long-term performance	92	3.67	0.76	40	54	41	50	31	-							
7. Objective composite[b]	91	3.48	0.59	77	72	70	80	63	72	-						
8. Sales growth	87	3.61	0.99	29	11*	14*	26	32	23	35	-					
9. Earnings growth	86	3.58	1.18	14*	01*	13*	12*	41	13*	25	60	-				
10. Market share changes	86	3.49	0.95	26	09*	04*	26	36	25	32	69	54	-			
11. Return on investment	85	3.40	1.17	15*	-06*	03*	15*	35	09*	19	52	79	51	-		
12. Performance composite[c]	85	3.51	0.90	20	03*	09*	22	45	19	32	82	89	79	86	-	
13. Satisfaction with the planning system	93	3.41	0.99	28	37	32	32	38	29	45	31	33	15*	21	29	-

[a]All correlations (decimal points are omitted) except the starred ones were significant at $p<.05$.

[b]The reliability of this composite was 0.82.

[c]The reliability of this composite was 0.86.

Table 5
Discriminant Analysis Results for Grouping Based on Satisfaction

1. Group sizes:	
Number of "dissatisfied" planners (Group 1)	: 42
Number of "satisfied" planners (Group 2)	: 51
2. Significance level of the linear discriminant function	: ***
3. Assumption of equality of group dispersion matrices (p for Box's M)	: Not valid (***)
4. Classification accuracy, %[a]	
Group 1	: 78.6
Group 2	: 84.3
Overall	: 81.7
5. Accuracy of chance model based on sample group probabilities, %	: 50.5
6. Standardized discriminant function coefficents.	
System capability	: -0.33
Use of techniques	: -0.07
Attention to internal facets	: 0.05
Attention to external facets	: 0.50
Functional coverage	: -0.17
Resources provided for planning	: -0.23
Resistance to planning	: 0.71

[a]The failure of Box's M test for equality of group dispersion matrices suggests that quadratic classification procedures are more appropriate. However, the use of a quadratic clarification rule did not lead to a noticeable change in classification accuracies.

***p<.01

Table 6
Discriminant Analysis Results for Groupings Based on Objective Fulfilment Variables

		Objective fulfillment measure						
		Predicting future trends	Evaluating alternatives	Avoiding problem areas	Enhancing management development	Improving short-term performance	Improving long-term performance	Objective composite
1.	Group Sizes							
	Group 1: Entirely unfulfilled, Somewhat unfulfilled, or neutral	42	22	43	48	46	30	46
	Group 2: Somewhat fulfilled or entirely fulfilled	51	71	50	44	47	62	45
2.	Significance level of the linear discriminant function	**	*	*	**	**	**	**
3.	Assumption of equal group dispersion matrices (p for Box's M)	Not valid (*)	Not valid (**)	Valid (ns)	Valid (ns)	Valid (ns)	Valid (ns)	Not Valid (*)
4.	Classification accuracy, % linear classification rule[a]							
	Group 1	64.3	68.2	69.8	81.2	65.2	66.7	73.9
	Group 2	68.6	67.6	62.0	72.7	72.3	74.2	71.1
	Overall	66.7	67.7	65.6	77.2	68.8	71.7	72.5
5.	Accuracy of chance model based on sample group prior probabilities, %	50.5	63.9	50.3	50.1	50.0	56.0	50.0
6.	Standardized discriminant function coefficents							
	System capability	0.51	-0.90	1.17	0.65	0.00	0.08	0.35
	Use of techniques	0.59	0.05	-0.56	-0.07	0.82	-0.42	0.27
	Attention to internal facets	-0.16	0.21	0.33	0.27	-0.10	0.14	0.27
	Attention to external facets	-0.51	0.54	-0.51	-0.12	0.21	0.38	-0.22
	Functional coverage	0.42	-0.02	0.16	0.49	0.09	0.22	0.34
	Resources provided for planning	-0.11	-0.15	-0.31	-0.39	0.69	0.46	-0.03
	Resistance to planning	-0.21	0.35	-0.19	-0.40	0.77	-0.35	-0.36

[a]The failure of Box's M test for equality of group dispersion matrices in the runs for predicting future trends, evaluating alternatives, and objective composite suggested that quadratic classification procedures were more appropriate. However, the use of quadratic classification did not, in general, lead to a noticeable change in classification accuracies.

* $p<.05$

** $p<.01$

ns: not significant

Table 7
Discriminant Analysis Results for Groupings Based on Performance Relative to the Competition

	Performance measure				
	Sales growth	Earnings growth	Market share changes	Return on investment	Performance composite
1. Group Sizes					
Group 1: Equal, worse, or much worse	36	33	42	40	43
Group 2: Better or much better	51	53	44	45	42
2. Significance level of the linear discriminant function	**	*	***	***	***
3. Assumption of equality of group dispersion matrices (p for Box's M)	Not valid (***)	Valid (*)	Not valid (***)	Valid (ns)	Not valid (***)
4. Classification accuracy, % linear classification rule[a]					
Group 1	69.4	63.6	71.4	70.0	72.1
Group 2	68.6	60.4	72.7	75.6	71.4
Overall	69.0	61.6	72.1	72.9	71.8
5. Accuracy of chance model based on sample group prior probabilities, %	51.5	52.7	50.0	50.2	50.0
6. Standardized discriminant function coefficients					
System capability	0.07	-0.12	-0.02	0.69	0.55
Use of techniques	-0.18	-0.06	0.15	0.02	-0.51
Attention to internal facets	0.39	0.28	0.29	-0.46	0.15
Attention to external facets	0.22	0.66	0.69	0.24	0.09
Functional coverage	0.07	0.24	0.10	0.56	0.45
Resources provided for planning	0.76	0.67	0.42	0.73	0.66
Resistance to planning	0.06	0.50	0.23	1.02	0.39

[a]The failure of Box's M test for equality of group dispersion matrices in the runs for sales growth, market share, and performance composite suggested that quadratic classification procedures were more appropriate. However, the use of quadratic classification did not, in general, lead to a noticeable change in classification accuracies.

* p<.10
** p<.05
*** p<.01
ns: not significant

Table 8
Relative Importance Rankings of the Planning System Dimensions in the 13 Discriminant Analysis Runs

Effectiveness Measure	Dimension						
	System capability	Use of techniques	Attention to internal facets	Attention to external facets	Functional coverage	Resources provided for planning	Resistance to planning
Objective Fulfillment Variables							
Predicting future trends	2	1	5	7	3	6	4
Evaluating alternatives	1	6	4	5	7	3	2
Avoiding problem areas	1	3	2	7	6	5	4
Enhancing management development	1	7	5	6	2	4	3
Improving short-term performance	7	1	6	4	5	2	3
Improving long-term performance	6	5	7	3	4	1	2
Objective composite	1	4	5	6	3	7	2
Relative Performance Variables							
Sales growth	5	4	2	3	7	1	6
Earnings growth	6	7	5	1	3	2	4
Market share changes	7	5	3	1	6	2	4
Return on investment	3	7	6	5	2	1	4
Performance composite	2	5	6	7	3	1	4
Satisfaction Variable							
Satisfaction with the planning system	2	6	7	4	5	3	1

APPENDIX 1

Multi-item Measurement Scales for the Planning System and Composite Effectiveness Dimensions

1. SYSTEM CAPABILITY was measured by using a five-point interval scale ranging from much improvement to much deterioration on the following 12 items: ability to anticipate surprises and crises, flexibility to adapt to unanticipated changes, as a mechanism for identifying new business opportunities, role in identifying key problem areas, as a tool for managerial motivation, as a means for generating new ideas, ability to communicate top management's expectations down the line, as a tool for management control, as a means of fostering organizational learning, ability to communicate line management's concerns to top management, as a mechanism for integrating diverse functions/operations, and as a basis for enhancing innovation. In addition, the following item, scaled from strongly disagree to strongly agree was included: today's system emphasizes creativity among managers more than our previous system.

2. USE OF TECHNIQUES was measured by using a five-point interval scale ranging from significant decrease in use to significant increase in use on the following 9 items: portfolio (e.g., BCG) approaches, PIMS models, financial models, zero-based budgeting, value-based planning, project management techniques (e.g., PERT/CPM), stakeholder analysis, scenarios/Delphi techniques, and forecasting and trend analysis.

3. ATTENTION TO INTERNAL FACETS was measured by using a five-point interval scale ranging from significantly less emphasis to significantly more emphasis on the following 3 items: internal capabilities, past performance, and reasons for past failures.

4. ATTENTION TO EXTERNAL FACETS was measured by using a five-point interval scale ranging from significantly less emphasis to significantly more emphasis on the following 5 items: general economic and business conditions, regulatory issues, world-wide competitive trends, supplier trends, customer/end user preferences, and technological trends.

5. FUNCTIONAL COVERAGE was measured by using a five-point interval scale ranging from significantly less emphasis to significantly more emphasis on the following 7 items: marketing function, operations/ manufacturing function, finance function, personnel function, purchasing/procurement function, research and development/ technology, and computers and MIS.

6. RESOURCES PROVIDED FOR PLANNING was measured by using a five-point interval scale ranging from significant decrease to significant increase on the following 4 items: number of planners, time spent by the chief executive officer in strategic planning, involvement of staff managers in strategic planning, and resources provided for strategic planning.

7. RESISTANCE TO PLANNING was measured by using a five-point interval scale ranging from significant decrease to significant increase on the following 5 items: overall emphasis on strategic planning*, involvement of line managers in strategic planning*, acceptance of the outputs of the strategic planning exercise by top management*, resistance to planning in general, and threats to the continuation of strategic planning.

8. PLANNING SYSTEM EFFECTIVENESS: OBJECTIVE FULFILLMENT over the past five years was measured by using a five-point interval scale ranging from entirely unfulfilled to entirely fulfilled on the following 8 items: predicting future trends, evaluating alternatives based on more relevant information, avoiding problem areas, enhancing management development, improvement in short-term performance, and improvement in long-term performance.

9. PLANNING SYSTEM EFFECTIVENESS: PERFORMANCE RELATIVE TO COMPETITION over the past five years was measured by using a five-point interval scale ranging from much worse to much better on the following 4 items: sales growth, earnings growth, market share change, and return on investment (ROI).

*Reverse coded to indicate resistance.