WORKING PAPER
ALFRED P. SLOAN SCHOOL OF MANAGEMENT

Modeling the Effectiveness of a Strategic Planning System

N. Venkatraman
and
Vasudevan Ramanujam

Updated Version
April 1987

WP #1732-85

MASSACHUSETTS
INSTITUTE OF TECHNOLOGY
50 MEMORIAL DRIVE
CAMBRIDGE, MASSACHUSETTS 02139

Modeling the Effectiveness of a Strategic Planning System

N. Venkatraman
and
Vasudevan Ramanujam

Updated Version
April 1987

WP #1732-85

MODELING THE EFFECTIVENESS OF A STRATEGIC PLANNING SYSTEM

N. VENKATRAMAN

E52-553 Sloan School of Management
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139
(617) 253-5044 (W)
(617) 232-5642 (H)

and

VASUDEVAN RAMANUJAM

311B Wickenden Hall
The Weatherhead School of Management
Case Western Reserve University
Cleveland, Ohio 44106
(216) 368-5100 (W)
(216) 752-1257 (H)

FORTHCOMING IN

Advances in Strategic Management

(Edited by Robert Lamb and Paul Shrivastava)
Vol. 5, 1988
JAI Press

MODELING THE EFFECTIVENESS OF A STRATEGIC PLANNING SYSTEM

Abstract

A theoretical model of the influences on the effectiveness of strategic planning systems is developed and tested empirically using path analysis. The model recognizes three major conceptual domains that bear upon planning effectiveness and is intended to allow the assessment of planning effectiveness from a broader perspective than has been common in the literature to date. It proposes that the organizational context of the planning system is the primary influence on the orientation or planning system (as reflected in its functional coverage, emphasis in techniques, attention to internal and external facets). A new construct termed capability of the system is developed and it is argued that improvements in the capability of the system are impacted by the organizational context and planning orientation. Ultimate system effectiveness, in terms of fulfillments of key planning objectives, is then determined directly and indirectly by the above antecedent influences, namely, the organizational context, the planning orientation, and system capability. The model thus incorporates complex interlinkages and enables effectiveness to be construed in both outcome and process terms. Path analysis allows the empirical validation of a set of propositions underlying the model. Implications of the results for management practice, as well the theoretical and methodological contributions are elaborated.

INTRODUCTION

Strategic planning systems (hereafter, planning systems) occupy a central role in the field of strategic management (Schendel & Hofer, 1979). Enhancing the effectiveness of such systems has been a constant goal for practitioners and researchers alike. The extant research on this topic is largely limited to the analysis of the relationship between planning and financial performance (see Armstrong, 1982, and Lorange, 1979 for reviews). Even within this narrowly circumscribed stream of research, results have generally been inconsistent and confusing. For instance, Thune and House (1970), Herold (1972), and Karger and Malik (1975) established that "formal planners" significantly outperformed "informal planners," but the results of studies by Rue (1973), Grinyer and Norburn (1975), Sheehan (1975), and Kudla (1980) raise questions as to the impact of planning on ultimate financial performance. In fact, the value of planning continues to be a subject of debate (see Foster, 1986; Armstrong, 1986).

A recent research study (Ramanujam, Venkatraman & Camillus, 1986) broadened the approach to the assessment of planning effectiveness and treated both "planning" and "planning effectiveness" in multi-dimensional terms. Seven important dimensions reflecting the organizational context, systems design characteristics, and system capability were developed. That study sought to (a) uncover important differences between more effective and less effective planning systems, and (b) evaluate if these differences were specific to the various effectiveness criteria. This paper attempts an important extension of that line of research. It uses the seven dimensions of the Ramanujam et al (1986) paper to (a) develop a theoretical model proposing linkages among the seven dimensions; and (b) test the model by empirically examining the nature of their effects (i.e., direct versus indirect) on planning system effectiveness.

THEORETICAL PERSPECTIVES

Overview

The proposed theoretical model seeks to integrate concepts from organization theory with those derived from the literature on the planning systems design. This integration is based on the premise that planning systems are "inextricably interwoven into the fabric of management" (Steiner, 1979; p. 3). The model consists of three conceptual domains. The first domain reflects the organizational context of planning which is believed to be an overriding influence on both the design and effectiveness of a system. The second domain reflects four planning system design characteristics, termed collectively as "planning orientation". The final domain is designed to capture two distinct aspects of planning system effectiveness, one reflecting improvements in the capabilities of the system and the other indicating the degree of achievement of key planning system objectives. Each domain of the model is posited to influence the other domains as depicted in Figure 1. The various links in the model give rise a set of research propositions developed later.

INSERT FIGURE 1 ABOUT HERE

Planning System Effectiveness

In this research, planning system effectiveness is approached from two angles -- (a) the degree of fulfillment of planning system objectives (OBJECTIVES) and (b) the level of improvement in the capabilities of the planning system (SYSTEM-CAPAB). The use of these two complementary approaches allows an examination of both the outcome (i.e., in relation to

objectives) and process (improvements in capabilities) benefits of planning and leads to a more comprehensive evaluation of a planning systems effects.

The OBJECTIVES dimension is conceptualized with reference to operative goals pursued by organizations (Steers, 1975). The literature has emphasized the following major objectives of planning: financial benefits such as improvement in short-term and long-term economic performance (King & Cleland, 1978; Lorange & Vancil, 1977; Steiner, 1979), predicting future trends (Amara, 1981; Ansoff, 1975; King & Cleland, 1978; Paul Donovan & Taylor, 1978), evaluation of alternatives (Camillus, 1975; Lorange, 1980), avoiding problem areas (Lorange & Vancil, 1977), and enhancing management development (Hax & Majluf, 1984; King & Cleland, 1978).

The SYSTEM-CAPAB dimension is non-obvious and requires some elaboration. The underlying logic for treating this as an effectiveness dimension stems from Lorange's (1979) arguments that a system's capabilities should be treated as a measure of planning success. To quote Lorange: "many of the measures [of effectiveness] were based on some general surrogate variable, when it probably would have been more relevant to measure effectiveness as a function of how well the formal planning system's capabilities were able to meet the specific planning needs" (1979; p. 230; emphasis added). This suggests a cascading relationship. At one level, improving the system's capabilities is effectiveness. At deeper level, ultimate outcome effectiveness arises from improved system capability. Accordingly, we treat this dimension as an intermediate level in the modeling of strategic planning effectiveness.

Ideally, in designing and evaluating system, the required capabilities should be specified in relation to the unique demands of the

particular system. However, in this research study our purpose is cautious generalization under consideration. Hence, we sought to identify generic capabilities that are required of every formal administrative system. These include: the system's ability to anticipate surprises and crises (Ansoff, 1975), its flexibility to adapt to a dynamic environment (Thompson, 1967), its capability to facilitate effective management control (Anthony & Dearden 1976; Lorange & Vancil, 1977), its role in the identification of new business opportunities (Hax & Majluf, 1984; Steiner, 1979), and its ability to enhance creativity and innovation (Camillus, 1975; Shank, Niblock & Sandalls, 1973; Taylor & Hussey, 1982). In systems where these capabilities are highly developed, we would expect to encounter a greater degree of fulfillment of strategic planning objectives.

Proposition 1:

> The system capability has a significant influence on the fulfillment of planning objectives.

We now turn to influences on the system's capability itself as well as on objective fulfillment. Two contextual influences and four planning orientation factors constitute these influences, as shown in Figure 2.

INSERT FIGURE 2 ABOUT HERE

The contextual influence reflect what Steiner (1979) refers to as a "favorable organizational context for planning", and is reflected here in two dimensions -- RESOURCES and RESISTANCE.

Resources provided to the planning function (RESOURCES). It may be a truism that the success of any activity depends on the allocation of a

commensurate level of resources. Perhaps reflecting this view, Lorange argued that "A (final) requirement for successful implementation deals with the realistic assessment of resource needs. The firm must be willing to allocate the necessary resources, make the necessary staff support available, provide the necessary budgets for training, meetings..." (1980; p. 10).

Our conceptualization of the RESOURCES dimension includes both tangible and intangible resources. We consider the allocation of management personnel to the planning function, involvement of line managers in the planning process (Lorange, 1980), and the time spent by the chief executive officer and other top management personnel in planning activities (Lorange, 1980; Steiner, 1979). Indeed, Lorange specifically argues that top management must be the true sponsor for planning activities to be successful (1980; pp. 134-138), and Haspeslagh (1982) found that the CEO's commitment was important for deriving the full benefits of portfolio planning.

Organizational resistance to planning (RESISTANCE). The importance of organizational resistance has been recognized in many research streams on implementation (see for instance, Schultz & Slevin, 1975 for a discussion on implementing OR/MS models). A high level of organizational resistance to planning is obviously indicative of an unfavorable organizational context and is likely to hinder the successful implementation of planning (Ansoff, 1984; Steiner & Schollhammer, 1975).

Resistance to planning may manifest in dysfunctional managerial behavior such as not accepting the outputs of the planning exercise, and lack of involvement of line managers in the planning process. If strategic planning systems are to serve as an integral part of the

management activities of an organization, they must be viewed as the fundamental activity of the organization from which its other activities are derived (Lorange, 1980). Thus, resistance to the very idea of planning is likely to have a significant negative influence on the effectiveness of the planning system.

Consequently, we develop the following two propositions:

Proposition 2:

> The organizational context of planning has a significant effect on SYSTEM-CAPABILITY.

Proposition 3:

> The organizational context of planning has a significant effect on the fulfillment of planning objectives (OBJECTIVES).

According to our model, the second level of influence on planning system effectiveness is the systems planning orientation. Planning orientation is captured here in the following four characteristics of planning: (a) the breadth of coverage given to various functional areas (FUNCTIONS); (b) the extent of attention to internal facets (INTERNAL); (c) the extent of attention to external facets (EXTERNAL); and (d) the extent of use of planning techniques (TECHUSE).

Functional coverage in planning (FUNCTIONS). Most discussions on strategy development highlight the need to integrate functional areas to arrive at an internally consistent plan (see for instance, Camillus & Venkatraman 1984; Grant & King, 1982, Hax & Majluf, 1984; and Lorange, 1980). We argue that a uniform emphasis on all functions and a broad general management perspective are critical for successful strategic planning (Andrews, 1971). Our position is based on Snow and Hrebiniak's conclusion that "all three (Miles and Snow's) strategies require strength in general and financial management" (1980; p. 334), and Hitt, Ireland,

and Palia's results that general management and financial management are the most important distinctive competencies on an overall basis (1982; p. 290).

Attention to internal facets (INTERNAL) and external facets (EXTERNAL). It is a generally accepted axiom in the strategic planning literature that a formal approach to planning begins with an assessment of the organization's recent history and current situation. From such an appraisal, an organization can begin to form assessments of its strengths and weaknesses (INTERNAL). A comprehensive analysis of internal aspects (Ansoff, 1965; Hayes, 1985), past performance (Steiner, 1979), and reasons for past failure should ensure that the plans developed reflect the organizational feasibility of implementing them. Often plans fail because of an inadequate or incorrect assessment of internal aspects (King & Cleland, 1978). Thus, attention to internal facets is treated in this study as an important characteristic of an organization's planning orientation.

Similarly, attention to external aspects (EXTERNAL) is another important dimension of a planning system, since identification of opportunities and threats requires a strong external focus (Andrews, 1971). In addition, it is well argued in the impressive body of literature on environmental scanning that the analysis of external events and trends in the economic, political, social, regulatory and technological sectors should be the first step in the formulation and evaluation of strategic alternatives (e.g., Fahey & King, 1977; Grant & King, 1982).

Use of planning techniques (TECHUSE). Planning practices often entail the use of a variety of techniques such as portfolio approaches, financial models, and environmental scanning. Managers generally choose

from a "tool kit" of decision-structuring devices which range from simple heuristics to more complex models for evaluating alternate courses of action. Techniques are thus a critical component of formalized approaches to strategy formulation (see for instance, Grant & King, 1979; Hofer & Schendel, 1978). The underlying logic is that techniques provide a systematic basis to consider and evaluate various alternatives, and are expected to result in superior decision choices. The extent of use of these techniques is perhaps an indication of the formalization of planning as well as the comprehensiveness of the decision-making process, which has been argued to influence planning effectiveness. Thus, we have the following propositions:

Proposition 4:

> Planning orientation has a significant effect on system capability.

Proposition 5:

> Planning orientation has a significant effect on the fulfillment of planning objectives.

Thus far, we have posited two sets of direct influences on the two dimensions of planning system effectiveness (in addition to the relationships between the two dimensions of effectiveness). However, we strongly believe that any attempt at modeling planning system effectiveness should go beyond the direct effects. Limiting the analysis to the direct effects only assumes that the determinants are fairly independent and that the indirect effects are negligible. In any interrelated organizational system, such an assumption is unrealistic. Zetterberg (1965) deprecates this common assumption in the social sciences and terms it an "inventory

of causes" perspective. Hence, in our model, we accord a central role to system capability and propose that the indirect effects would be stronger than the direct effects. The modeling of theoretically-defensible indirect links with a view to evaluate the relative magnitude of direct and indirect effects on planning system effectiveness, therefore constitutes the main strength of the perspective and methodology used in this study.

Indirect Effects on Planning System Effectiveness

We begin by suggesting that organizational context, especially the RESOURCES dimension, has a significant effect on planning system orientation. The underlying rationale is that the level of emphasis given to the four identified planning activities will vary directly with the level of resources committed to them. For example, the allocation of more resources to planning is expected to lead to increased emphasis on internal assessments, external environmental analysis, as well as to the defrayal of the coordination costs involved in integrating inputs from multiple functional areas to the overall corporate plan. Thus,

Proposition 6:

> The organizational context of planning (especially the RESOURCES dimension) has a significant effect on the planning orientation.

This implies that the RESOURCES dimension can exert an indirect effect on the OBJECTIVES dimension acting through the planning orientation factors as depicted in Figure 1. For example, an analysis of the theoretical model and the propositions derived thus far would indicate that the impact of the dimensions representing the first two domains of the model on OBJECTIVES is both direct and indirect (acting through the third domain represented by SYSTEM-CAPAB).

The pivotal role of system capability. An important premise of the theoretical model is that system capability occupies a pivotal position. The underlying logic is that the quality of strategic decisions is considerably enhanced if the system is capable of meeting the various requirements of strategy formulation, evaluation, and implementation (Hax & Majluf, 1984; Lorange, 1979; Thompson, 1967). The theoretical argument that system capability occupies a pivotal role can be formally stated for empirical purposes as follows: The indirect (i.e., combinatory) effects of each of the dimensions (of the first two levels) acting through SYSTEM-CAPAB will be stronger than their corresponding direct effects on OBJECTIVES. Thus,

Proposition 7

> The indirect effects through system capability of acting organizational context planning orientation will be stronger than their corresponding direct effects on the fulfillment of planning objectives.

Figure 2 is a representation of the detailed operational model with specific hypotheses linking these dimensions. The hypotheses corresponding to the propositions developed above are presented in Table 1 and are self-explanatory.

INSERT TABLE 1 ABOUT HERE

METHODS

Data Collection and Measurements

Data for this study were collected from senior vice presidents of planning or other senior line managers through a self-administered mail questionnaire from a randomly chosen sample of Fortune 500, Fortune 500 service and Inc. 500 organizations. A total of 207 planning units (out of a target of 600) comprised the sample for this study, representing a response rate of around 33%. A more detailed description of the sample is provided in Ramanujam et.al. (1986). All the dimensions of the model were measured using multi-item scales (see the Appendix for details of measure development and validation).

Analysis

The operational model (Figure 2) and the set of hypotheses derived from it were tested using the technique of path-analysis. Path analysis offers a means for decomposing effects into their direct and indirect components (see Alwin and Hauser, 1975; Duncan, 1971; and Kenny, 1979 for background discussions). It has been previously used in strategy research for decomposing the correlational effects between market share and business profitability into direct and spurious effects (Prescott, Kohli, & Venkatraman, 1986). In this study, the objective in using path analysis was to identify the relative magnitude of direct and indirect effects (i.e., through SYSTEM-CAPAB) of various antecedent planning system and organizational context dimensions on OBJECTIVES. The required analyses were carried out in three steps as discussed below.

In the first step, a set of six ordinary least squares (OLS) regressions was estimated, in line with the model specified in Figure 2.

The six equations are as follows:

$$\text{OBJECTIVES} = a_0 + a_1\,\text{SYSTEM-CAPAB} + a_2\,\text{TECHUSE} + a_3\,\text{INTERNAL} + a_4\,\text{EXTERNAL} + a_5\,\text{FUNCTIONS} + a_6\,\text{RESOURCES} + a_7\,\text{RESISTANCE} + e_1 \quad (1)$$

$$\text{SYSTEM-CAPAB} = a_0 + a_1\,\text{TECHUSE} + a_2\,\text{INTERNAL} + a_3\,\text{EXTERNAL} + a_4\,\text{FUNCTIONS} + a_5\,\text{RESOURCES} + a_6\,\text{RESISTANCE} + e_1 \quad (2)$$

$$\text{TECHUSE} = a_0 + a_1\,\text{RESOURCES} + e_1 \quad (3)$$

$$\text{INTERNAL} = a_0 + a_1\,\text{RESOURCES} + e_1 \quad (4)$$

$$\text{EXTERNAL} = a_0 + a_1\,\text{RESOURCES} + e_1 \quad (5)$$

$$\text{FUNCTIONS} = a_0 + a_1\,\text{RESOURCES} + e_1 \quad (6)$$

The standardized beta values obtained from these equations represent the path coefficients (Wright, 1960), which indicate the direct effect of an antecedent variable on a dependent variable taken as effect (Kerlinger & Pedhazur, 1973).

In the second step, the indirect effects were calculated as a simple multiplicative measure of the magnitude of the relevant path coefficients by using the Simon-Blalock technique (see, Duncan, 1971). For example, in Figure 2, the indirect effect of RESISTANCE on OBJECTIVES through SYSTEM-CAPAB is the value obtained by multiplying the path coefficient between SYSTEM-CAPAB and RESISTANCE by the path coefficient between OBJECTIVES and SYSTEM-CAPAB.

In the third step, the ratio of the indirect effect (of each antecedent dimension through SYSTEM-CAPAB on OBJECTIVES) to the direct effect (of each antecedent dimension on OBJECTIVES) was calculated. This analysis provides the basis to examine the hypotheses H7a through H7f which posit that the indirects effect through SYSTEM-CAPAB in each case will be stronger than the corresponding direct effects.

RESULTS AND DISCUSSION

Zero-order correlations and reliability coefficients (Cronbach alpha) for all multi-item dimensions used in the study are provided in Table 2, while the results of the six regression equations are summarized in Table 3. As shown in Table 3, the F-values in all the six regression equations are significant at p-levels better than 0.001. In addition, a summary of the path-analytic calculations (Table 4) indicates that the indirect effects through SYSTEM-CAPAB are stronger than direct effects in five out of the six instances. Before proceeding to discuss the implications of these results, we briefly present the results of our attempts at rejecting rival explanations for these relationships.

INSERT TABLES 2, 3 and 4 ABOUT HERE

Rejecting Rival Interpretations of Results

Confidence in the above results can be increased if plausible rival explanations can be systematically ruled out. Two tests were carried out for this purpose. The first test focused on assessing the robustness of results across different contexts such as the sales level, business type, respondent's position (operating manager versus staff planner) and organizational level (business versus corporate). The moderating influences of these variables on the central equation (#2) were analyzed using the procedure suggested by Arnold (1982) which calls for assessing both the degree and the form of moderating influence. The results indicated insignificant effects of these moderators[1].

The second test sought to assess the stability of results in sub-samples, again using equation #2. Four sub-samples containing 75% of the sample were obtained by successively deleting 25% of the sample each time. Results of OLS regressions performed on the four sub-samples indicate that the significance of the explanatory variables do not disappear in any of the sub-samples thereby establishing the stability of the results (details available on request).

Support for the Propositions

Proposition 1 asserting that SYSTEM-CAPAB will exert a positive and significant effect on OBJECTIVES was strongly supported. This confirms our central premise that system capability occupies an important role in the overall scheme of design and implementation of strategic planning systems. This finding is further augmented by the support received for the Proposition 7 which specified that the indirect effects of the antecedent influences acting through system capability will be stronger than their direct effects on objective fulfillment. As indicated in Table 4, the indirect effects of organizational context and planning orientation on OBJECTIVES through SYSTEM-CAPAB were stronger than their corresponding direct effects in five of the six instances.

Thus, while planning orientation reflects four important design elements, SYSTEM-CAPAB is a characterization of the capability of the administrative system to provide support for strategic management. Hence, it is important to focus on those factors that improve SYSTEM-CAPAB. The three dimensions that have significant effects are INTERNAL, EXTERNAL, and RESISTANCE, and from a managerial perspective, they provide useful guidelines as to where specific attention needs to be directed to enhance the system's capability.

Proposition 2, which posited that the organizational context has a significant effect on the system capability, was only partially supported. Specifically, the contention that organizational resistance will have a significant negative effect on system's capability (H2a) was strongly supported (path coefficient = -0.479; $p < .001$). This provides empirical support to the conceptual arguments that overcoming organizational resistance and creating a favorable organizational climate is an essential prerequisite for any managerial activity (including planning) to succeed (Ansoff, 1984; Lorange, 1980; Lucas, 1978; Schultz & Slevin, 1975; Steiner & Schollhammer, 1975; Steiner, 1979).

The other hypothesis (H2b), positing a positive effect of resource commitment on system capability, did not receive support (path coefficient = 0.112; ns). However, it is interesting that the correlation coefficient between SYSTEM-CAPAB and RESOURCES is positive and highly significant ($r = 0.5815$; $p < .001$). This implies that although the direct effect is weak, the impact of additional resources assigned to planning is felt through other dimensions of planning orientation. This can be better understood through an examination of some of the later propositions.

For example, RESOURCES emerged as a key determinant of each of the four dimensions of the planning orientation. Beyond merely pointing out that increased resources positively affects the dimensions of planning orientation (which is perhaps a truism), the model can be used to examine the effect of alternative resource allocation patterns. An examination of the indirect effects of RESOURCES on SYSTEM-CAPAB through each of the four dimensions suggests that it is perhaps most beneficial to direct incremental resources to INTERNAL and EXTERNAL facets.

Proposition 4 was also partially supported. The level of attention given to both INTERNAL and EXTERNAL had a significant effect on SYSTEM-CAPAB. The emergence of external and internal facets as key influences of the system capability lends further support to the arguments that an integration of internal and external facets lies at the core of effective strategy development. What is interesting and perhaps significant is that both these dimensions emerged as significant influences on the system capability. However, this study did not examine the impact, if any, of a trade-off between internal and external facets on the system capability. Future studies should examine trade-off issue.

It is particularly interesting that TECHUSE did not have any strong effect on either SYSTEM-CAPAB or OBJECTIVES. The implication is that the planning process is not automatically improved by merely using more analytical techniques. Perhaps, it is more important to match techniques to the various problems addressed, and balance the use of analytical techniques with managerial intuition and judgements. Recent commentaries by academics and practitioners allege that the erosion of US competitiveness owes much to blind reliance on sophisticated management techniques and principles (Hayes & Abernathy, 1980; Kiechel, 1982). In a similar vein, our results perhaps reinforce the notion that the use of techniques is to be viewed more as a "means" towards certain desired "ends" (say, structuring complex problems or identifying relative merits/demerits of various alternatives) than ends in themselves.

However, it is surprising that FUNCTIONS did not emerge as a significant influence on either SYSTEM-CAPAB or OBJECTIVES. Perhaps this is due to our emphasis on breadth of coverage of multiple functional areas rather than the nature of linkage among the functions. Future research

efforts need to focus on the nature and degree of these linkages rather than merely the breadth of coverage.

The third and the fifth propositions specified the impact of the organizational context and planning orientation on the OBJECTIVES respectively. Both the propositions were rejected although an examination of the correlation matrix (Table 3) indicates that the underlying correlations are statistically significant and in the expected directions. This again indicates that although the direct effects of the various dimensions on OBJECTIVES are weak, the dimensions of both the organizational context and planning orientation exert strong indirect influences (see Table 4).

The sixth proposition and its four derivative hypotheses (H6a to H6d) were supported indicating that the degree of resource commitment to planning plays a significant role in shaping the four design elements of the planning orientation. The implication is that planning requires an infusion of adequate resources which may be in the form of not only more managerial personnel allocated to the planning efforts but also in the form of more participation from operating managers and the chief executive. Thus, it appears that if planning can draw from a broader base of resources (both tangible and intangible), it can effectively provide the required support for the effectiveness of the overall strategic planning process.

To summarize: the model proposed in this study received general support we have established that the three conceptual domains spanned by our model interact in significant and complex ways. The results indicate that merely directing additional resources to the various facets of planning orientation is unlikely to result in implementation successful planning. It is how the increased emphasis on various key dimensions of

planning orientation gets translated into improvements in system capability that leads to the fulfillment of planning objectives. This assertion received support in two ways: one, due to the strong impact of SYSTEM-CAPAB on OBJECTIVES, and the other due to the relative dominance of indirect effects of organizational context and planning orientation over their corresponding direct effects. In addition, an organizational context supportive of planning that provides resources commensurate with the objectives and corresponding reduction in the level of resistance to planning are important determinants of planning effectiveness.

Contributions

This study makes contributions to the body of research on strategic planning systems in three major ways -- theoretical, methodological, and managerial. These are highlighted next.

Contributions to theory. An important contribution pertains to our shift away from the simple "planner" versus "non-planner" categorization that has been the basis of most prior evaluations of planning. The use of multiple dimensions which reflect an integration of two different research perspectives, namely organization theory and strategic planning systems, constitutes a further theoretical advance. The formal representation of multiple "conceptual domains" in the model which emphasize not only the organizational context of planning but also the key dimensions of planning orientation follows from the integrative perspective adopted in this study. The development of a theoretical model which formally recognizes interdependence among multiple dimensions spanning three distinct conceptual domains should provide a basis for other research efforts aimed at refining and/or extending the model.

Contributions to methodology. In addition to the development of multi-item measures for the various dimensions of the model, the study employed path-modeling as the basis for adopting an "explanatory perspective".[2] Had the hypotheses been stated in terms of the strength and the direction of association between the various dimensions (and tested using the magnitude and the statistical significance of correlation coefficients) most hypotheses would be supported (see Table 2). However, in this study, we decomposed the correlation into various theoretically-defensible effects (both direct and indirect) to test the centrality of the SYSTEM-CAPAB dimension. Strategy researchers are urged to examine the potential benefits of path analysis not only in relation to planning systems research but also to a broader set of strategy research questions.

Contributions to practice. A few important pointers for enhancing general management practice can be made. Although not claimed to be "laws", these guidelines can be considered more valid than those suggested based on isolated case examples and anecdotal (and sometimes, tangential) evidence. In terms of the design elements, effective systems are likely to pay attention to not only their internal capabilities and areas of strengths but also trends in the broader external environment. This may appear to be a corroboration of conventional wisdom, but the finding that the breadth of functional coverage and the extensive use of analytical models and techniques did not lead to successful planning systems is certaintly counter intuitive.

In relation to the organizational characteristics which facilitate planning, the willingness to commit the required resources -- both tangible and intangible, as the importance of reducing the level of any resistance to formalized planning approaches are other key requirements for planning success. Involvement of line executives in planning and

staff executives in strengthening the translation of plans into budgets ensures that planning will lead to better results. Such a result is in line with Business Week's recent criticism that "the notion that an effective strategy can be constructed by someone in an ivory tower in totally bankrupt" (1984; p. 62). In addition, the central role of enhancing system capability to support the overall strategic management process has been previously emphasized and need not be repeated here.

Limitations and Extensions

First, it is necessary to recognize that data were obtained from a single respondent per unit of observation. Although these respondents were senior managers, the extent of individual biases could not be assessed. Since organizational-level constructs such as planning are best operationalized using multiple managers (Venkatraman & Grant, 1986), a possible line of extension would be to employ multiple managers. Specifically, the use of two sets of respondents --planning executives ("designers") and operating managers ("users")-- and an examination of the extent of consistency could provide useful insights into the role of planning in the overall strategic management process.

Second, the organizational context of planning, now conceptualized using two dimensions (RESISTANCE and RESOURCES), can be enlarged to include a broader set of factors. A prominent candidate for consideration is the organization's environment strategy -- which has been argued by many (Leontiades, 1983, Lorange, 1979) to be an important contingency on the design of the planning system. Additionally, the relative importance of the various dimensions of the model can be examined for different typologies of strategies to develop a richer understanding of the strategy-systems design linkage.

SUMMARY

The proposed theoretical model, which sought to integrate important dimensions presumed to influence effective implementation of strategic planning systems, was broadly supported. Specifically, the various dimensions of the model emerged as significant, although some of the constituent dimensions had a lesser role than envisaged. Analysis of the nature of the various relationships specified in the model indicated that the system capability dimension is central to conceptualizing and understanding the role of strategic planning in the broader context of the strategic management process.

ACKNOWLEDGEMENTS

This paper is based on a research project conducted by the authors in collaboration with John Camillus, Graduate School of Business, University of Pittsburgh. Comments provided by Bala Chakravarthy, John H. Grant, Anil Gupta, Ajay Kohli, and John E. Prescott were useful in refining the ideas presented in this paper.

REFERENCES

Aguilar, F. G. 1965 Scanning the business environment. New York: MacMillan.

Alwin, D. F., & Hauser, R. M. 1975 The decomposition of effects in path analysis. American Sociological Review, 40:37-47.

Andrews, K. R. 1980 The concept of corporate strategy, New York, Dow Jones-Irwin.

Ansoff, H. H. 1975 Managing strategic surprise by response to weak signals. California Management Review, 18 (2):21-33.

Ansoff, H. I. 1984 Implanting strategic management. New York, McGraw-Hill.

Anthony, R., & Dearden, J. Management control systems. Homewood, Ill., Richard-Irwin, 1976.

Armstrong, J. S. 1982 The value of formal planning for strategic decisions, Review of empirical research, Strategic Management Journal, 3:197-211.

Armstrong, J. S. 1986. The value of formal planning for strategic decisions: A reply. Strategic Management Journal, 7:183-185.

Arnold, H. J. 1982 Moderator variables: A clarification of conceptual, analytic, and psychometric issues. Organizational Behavior and Human Performance, 29:143-174.

Business Week. 1984 The new breed of strategic planner. Business Week, September 17:62-68.

Camillus, J. C., & Venkatraman, N. 1984 Dimensions of strategic choice. Planning Review, 12 (1):26-31, 46.

Cronbach, L. J. 1951 Coefficient alpha and internal structure of tests, Psychometrika, 16:297-334.

Deshpande, R., & Zaltman, G. 1982 Factors affecting the use of market research information. A path analysis, Journal of Marketing Research, 19:14-31.

Duncan, O.D. 1971 Path analysis: Sociological examples (plus addenda), In H. M. Blalock (Ed.) Causal models in the social sciences, pp. 115-138, Chicago, Ill, Aldine-Atherson.

Fahey, L., & King, W. R. 1975 Environmental scanning for corporate planning. Business Horizons, 20 (4):61-71).

Foster, M. J. 1986 The value of formal planning for strategic decisions: A comment. Strategic Management Journal, 7:179-182.

Fulmer, R. M., & Rue, L. W. 1974 The practice and profitability of long range planning. Managerial Planning, 22(6):1-7.

Grant, J. H., & King, W. R. 1979 Strategy formulation: Analytical and normative models. In D. E. Schendel & C. W. Hofer (Eds.) Strategic management: A new view of business policy and planning, pp. 104-122, Boston: Little, Brown, & Co.

Grant, J. H., & King, W. R. 1982 The logic of strategic planning, Boston: Little, Brown, & Co.

Grinyer, P. H., & Norburn, D. 1975 Planning for existing markets: perceptions of executives and financial performance. Journal of the Royal Statistical Society (A), 138(A):70-97.

Haspeslagh, P. 1982 Portfolio planning: Uses and limits. Harvard Business Review, 60(1):58-74.

Hax, A. C., & Majluf, N. S. 1984 Strategic management: An integrative approach. Englewood Cliffs: Prentice-Hall.

Hayes, R. H. 1985 Strategic planning - Forward in reverse? Harvard Business Review, 63(b), 111-119.

Hayes, R. H., & Abernathy, W. J. 1980 Managing our way to economic decline. Harvard Business Review, 58(4):67-77.

Herold, D. B. 1972 Long range planning and organizational performance: A cross-validation study. Academy of Management Journal, 15:91-104.

Hitt, M. A., Ireland, R. A., & Palia, K. A. 1982 Industrial firm's grand strategy and functional importance: Moderating effects of technology and structure. Academy of Management Journal, 25:265-298.

Hofer, C. W., & Schendel, D. E. 1978 Strategy formulation: Analytical concepts. New York: West Publishing Co.

Joreskog, K. G., & Sorbom, D. 1978 Analysis of linear structural relationships by method of maximum likelihood. Chicago, Ill: National Educational Resources.

Karger, D. W., & Malik, Z. A. 1975 Long range planning and organizational performance. Long Range Planning, 8(6): 60-69.

Kefalas, A., & Schoderbek, P. P. 1973 Scanning the business environment: Some empirical results. Decision Sciences, 4:63-74.

Kenny, D. 1979 Correlation and causation. New York: Wiley-Interscience.

Kerlinger, K. N., & Pedhazur, E. J. 1973 Multiple regression in behavioral research. New York: Holt, Rinehart, Winston.

Kiechel, W. 1982 Corporate strategists under fire. Fortune, December 27, 34-39.

King, W. R. 1983 Evaluating strategic planning systems. Strategic Management Journal, 4:263-277.

King, W. R., & Cleland, D. I. 1978 Strategic planning and policy. New York: Van Nostrand-Reinhold.

Leontiades, M. 1983 A diagnostic framework for planning. Strategic Management Journal, 4:11-26.

Lindsay, W. R., & Rue, L. W. 1980 Impact of organization environment on the long range planning process: A contingency view. Academy of Management Journal, 23:385-404.

Lorange, P. 1979 Formal Planning Systems: Their Role in strategy implementation. In D. E. Schendel & C. W. Hofer (Eds.) Strategic management: A new view of business policy and planning, pp. 226-241, Boston: Little, Brown & Co.

Lorange, P. 1980 Corporate planning: An executive viewpoint. Englewood Cliffs, NJ.: Prentice-Hall.

Lorange, P., & Vancil, R. 1977 Strategic planning systems. New York: Prentice-Hall.

Lucas, H. C., Jr. 1978 Empirical evidence for a descriptive model of implementation. MIS Quarterly, 2(2):27-41.

Nunnally, J. C. 1978 Psychometric theory. New York: McGraw-Hill.

Paul, R. N., Donavan, N. B., & Taylor, J. W. 1978 The reality gap in strategic planning. Harvard Business Review, 56(4):124-130.

Prescott, J. E., Kohli, A. K., & N. Venkatraman 1986 The market share -- profitability relationship: An empiricial examination of major assertion and contradictions. Strategic Management Journal, 7(July-August), 377-394.

Ramanujam, V., Venkatraman, N., & Camillus, J. C. 1986 Multi-objective assessment of the effectiveness of strategic planning: A discriminant analysis approach. Academy of Management Journal, 29(June), 347-372.

Ringbakk, K. A. 1971 Why planning failed. European Business.

Rue, L. 1973 Theoretical and operational implications of long-range planning on selected measures of financial performance in U.S. industry. Ph.D Dissertation, Georgia State University.

Schendel, D., & Hofer, C. W. (Eds.) 1979 Strategic management: A new view of business policy and planning. Boston: Little, Brown & Co.

Schultz, R. L., & Selvin, D. P. 1975 Implementation of OR/MS models. Elsevier-North Holland, New York.

Shank, J. K., Niblock, E. G., & Sandalls, W. T. 1973 Balance "creativity" and "practicality" in formal planning. Harvard Business Review, 51(1):87-95.

Sheehan, G. A. 1975 Long range strategic planning and its relationship to firm size, firm growth variability. Unpublished doctoral dissertation, University of Western Ontario.

Snow, C. C., & Hrebiniak, L. G. 1980 Strategy, distinctive competence, and organizational performance. Administrative Science Quarterly, 25:317-336.

Steers, R. M. 1975 Problems in the measurement of organizational effectiveness. Administrative Science Quarterly, 20:546-558.

Steiner, G. A. 1979 Strategic planning: What every manager must know. New York: Free Press.

Steiner, G. A., & Schollhammer, H. 1975 Pitfalls in multinational strategic planning. Long Range Planning, 8(2):2-12.

Stevenson, H. H. 1976 Defining corporate strengths and weaknesses. Sloan Management Review, 17(3):51-68.

Taylor, B. 1976 New dimensions in corporate planning. Long Range Planning, 9(6):890-106.

Thomas, P. S. 1980 Environmental Scanning: The state of the art. Long Range Planning, 13(1):20-28.

Thompson, J. D. 1967 Organizations in action. New York: McGraw-Hill.

Thune, P. S., & House, R. 1970 Where long range planning pays off? Business Horizons, 13(4):81-87.

Venkatraman, N., & Grant, J. H. 1986 Construct measurement in organizational strategy research: A critique and proposal. Academy of Management Review, 11:71-87.

Venkatraman, N., & Ramanujam, V. 1987a. Measurement of business economic performance: An examination of method convergence. Journal of Management, Spring, in Press.

Venkatraman, N., & Ramanujam, V. 1987b. Planning System Success: A conceptualization and an operational model. Management Science, in Press.

Wood, D. R., & LaForge, R. W. 1979 The impact of comprehensive planning on financial performance. Academy of Management Journal, 22:516-526.

Wright, S. 1960 Path coefficients and path regressions: Alternative or complementary concepts? Biometrics, 16:189-202.

Zetterberg, H. L. 1965 On theory and verification in sociology. London: The Bedminster Press.

NOTES

1. The results of testing for moderating effects (degree and form) indicate that the impact of the moderators is not significant. For instance, all the four moderators, except for organizational level had no significant effect either in moderating the degree or the form of the relationship between the independent variables and the dependent variable in equation #2. Organizational level was found to moderate only the relationships between TECHUSE and SYSTEM-CAPAB and between RESOURCES and SYSTEM-CAPAB. The role of the other independent variables was invariant across contexts. The Fisher's Z-statistic for the difference in the degree of relationship between TECHUSE and SYSTEM-CAPAB across organizational levels was 3.00 ($p < 0.05$), with a stronger relationship at the divisional level. In the case of the relationship between RESOURCES and SYSTEM-CAPAB, the degree was invariant across the levels, but the form varied (beta value of the interaction term, level X RESOURCES was 0.779 ($t = 2.037$, $p < 0.05$). Overall, we can conclude that the relationships obtained in this study are generally invariant across the four key moderators.

2. Most previous studies have adopted a "predictive" research framework, where the focus is on predicting a dependent variable (say, organizational performance) using single or multiple independent variables (say, planning activities) chosen based on their potential to enhance prediction. In such instances the aim has been to obtain a high level of R^2 using multiple individual variables representing planning practices. In an explanatory framework, on the other hand, the choice of independent variables is guided by theoretical considerations, and interest centers on the ability of the model to enhance our understanding the phenomenon of interest. Path-analysis is an operational technique for the use of an "exploratory" perspective.

TABLE 1

List of Research Hypotheses Derived
From the Theoretical Propositions

PROPOSITION NUMBER	DESCRIPTION OF HYPOTHESES	
1	Positive and significant effect of:	
	SYSTEM-CAPAB on OBJECTIVES	(H1)
2	Negative and significant effect of:	
	RESISTANCE on SYSTEM-CAPAB	(H2a)
	Positive and significant effect of:	
	RESOURCES on SYSTEM-CAPAB	(H2b)
3	Negative and significant effect of:	
	RESISTANCE ON OBJECTIVES	(H3a)
	Positive and significant effect of:	
	RESOURCES on OBJECTIVES	(H3b)
4	Positive and significant effect of:	
	FUNCTIONS on SYSTEM-CAPAB	(H4a)
	INTERNAL on SYSTEM-CAPAB	(H4b)
	EXTERNAL on SYSTEM-CAPAB	(H4c)
	TECHUSE on SYSTEM-CAPAB	(H4d)
5	Positive and significant effect of:	
	FUNCTIONS on OBJECTIVES	(H5a)
	INTERNAL on OBJECTIVES	(H5b)
	EXTERNAL on OBJECTIVES	(H5c)
	TECHUSE on OBJECTIVES	(H5d)
6	Positive and significant effect of:	
	RESOURCES on FUNCTIONS	(H6a)
	RESOURCES on INTERNAL	(H6b)
	RESOURCES on EXTERNAL	(H6c)
	RESOURCES on TECHUSE	(H6d)
7	Indirect effects on OBJECTIVES will be stronger than corresponding direct effects in the case of:	
	RESISTANCE	(H7a)
	RESOURCES	(H7b)
	FUNCTIONS	(H7c)
	INTERNAL	(H7d)
	EXTERNAL	(H7e)
	TECHUSE	(H7f)

TABLE 2

Zero-Order Correlations and Reliability (Cronbach α) Indices of the Measures Used in the Study

	RESOURCES	RESISTANCE	FUNCTIONS	INTERNAL	EXTERNAL	TECHUSE	SYSTEM-CAPAB	OBJEC-TIVES
RESOURCES	(0.597)							
RESISTANCE	-0.6404***	(0.614)						
FUNCTIONS	0.4586***	-0.4000***	(0.772)					
INTERNAL	0.2868***	-0.2677***	0.3634***	(0.540)				
EXTERNAL	0.2983***	-0.3756***	0.4969***	0.2281**	(0.613)			
TECHUSE	0.4815***	-0.3589***	0.3058***	0.2946***	0.190**	(0.834)		
SYSTEM-CAPAB	0.5815***	-0.6945***	0.4191***	0.4201***	0.4365***	0.409***	(0.874)	
OBJECTIVES	0.3127***	-0.3915***	0.1540*	0.2418***	0.2148**	0.2067**	0.5433***	(0.748)

NOTE: Cronbach α values are in the diagonal

* = p < .05
** = p < .01
*** = p < .001

TABLE 3

Summary Results of the Six Regression Equations

EQUATION NO.	1	2	3	4	5	6
Dependent Variable / Independent Variables	OBJECTIVES	SYSTEM-CAPAB	TECHUSE	INTERNAL	EXTERNAL	FUNCTIONS
SYSTEM-CAPAB	0.53312***	---	---	---	---	---
TECHUSE	-0.01644	0.09644	---	---	---	---
INTERNAL	0.04406	0.19702***		---	---	--- ---
EXTERNAL	0.00555	0.14788*	---	---	---	---
FUNCTIONS	-0.10916	0.00139	---	---	---	---
RESOURCES	0.01580	0.11213	0.48148***	0.2868***	0.3983***	0.45857***
RESISTANCE	-0.04683	-0.47922***		---	---	--- ---
RESISTANCE	-0.04683	-0.47922***		---	---	--- ---
Summary Statistics df	7,165	6,166	1,175	1,199	1,199	1,195
R^2	0.304	0.585	0.232	0.082	0.1586	0.21
F	10.322	39.054	52.812	17.84	37.523	51.925
P <	0.001	0.001	0.001	0.001	0.001	0.001

NOTE: The coefficients in the cells are standardized beta values.

* = p < .05
** = p < .01
*** = p < .001

TABLE 4

A Summary of the Direct, Indirect and Non-Causal Effects on OBJECTIVES

	(A)	(B)	(C)	(D)	(E)	
ANTECEDENT FACTOR	TOTAL ASSOCIATION WITH OBJECTIVES(r)	DIRECT (PATHS COEFFICIENTS	INDIRECT EFFECT THROUGH SYSTEM-CAPAB ON OBJECTIVES	UNANALYZED EFFECTS (A-(B+C)	RATIO OF INDIRECT TO DIRECT EFFECTS C/B	OBSERVATIONS
RESISTANCE	-0.3915	-0.04683	-0.25548	-0.08919	5.45	The indirect effect is in the expected direction and stronger than the direct effect. (H7a)@
RESOURCES	0.3127	0.01580	0.146[b]	0.1505	9.26	The indirect effect is in the expected direction and stronger than the direct effect. (H7b)
FUNCTIONS	0.154	-0.10916	0.00074	0.262	--	The indirect effect is in the expected direction and weaker than the direct effect. (H7c)
INTERNAL	0.2418	0.04406	0.1050	0.0927	2.38	The indirect effect is in the expected direction and stronger than the direct effect. (H7D)
TECHUSE	0.2067	-0.01644	0.0514	0.1717	3.12	The indirect effect is in the expected direction and stronger than the direct effect. (H7f)

[a] Indicates the number of corresponding hypotheses.

[b] Indicates the sum of all the indirect effects modeld in Figure 2.

Figure 1

A Skeletal Model of the Determinants of Planning System Effectiveness

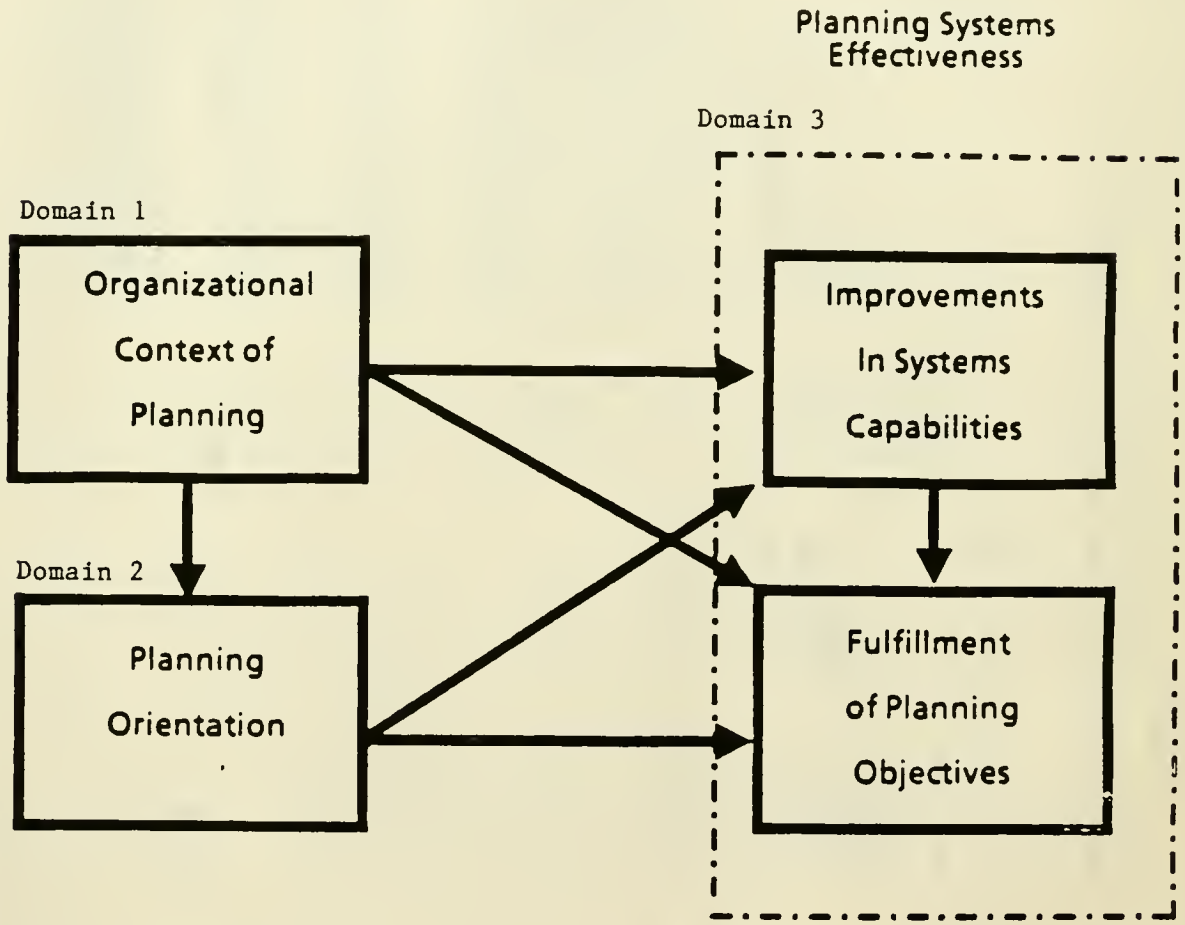
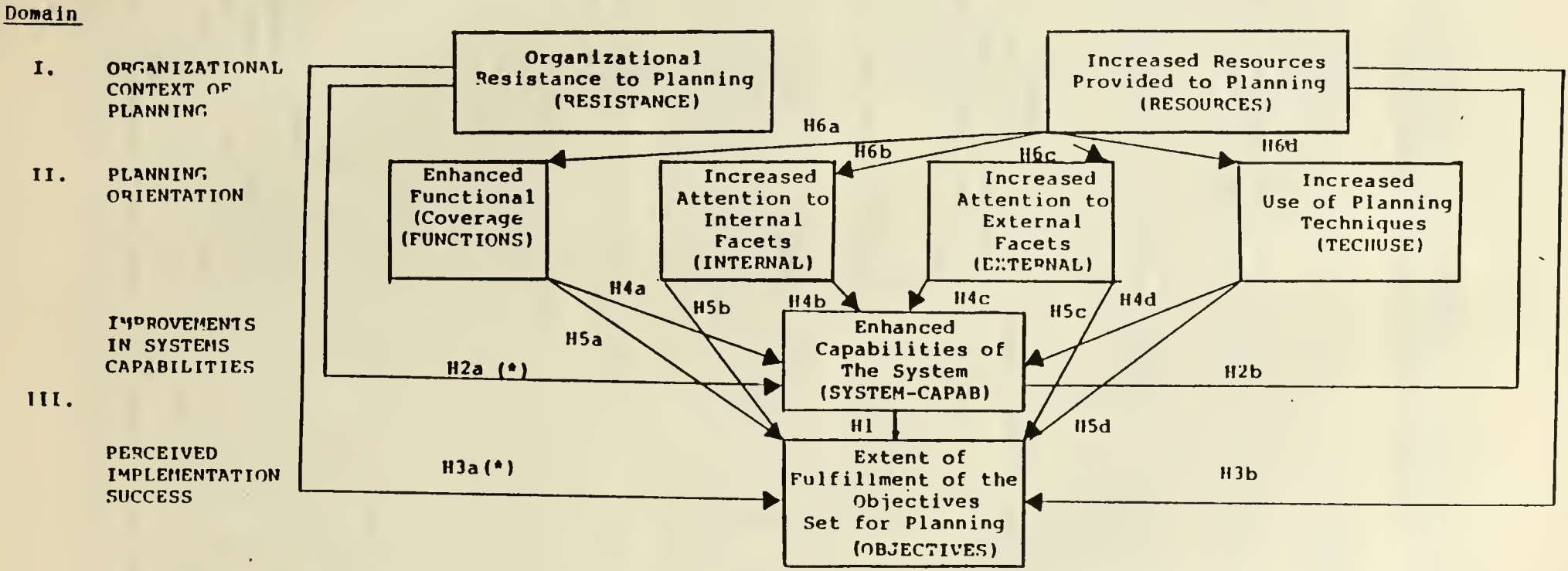


FIGURE 2
The Operational Model of the Determinants of
Planning System Effectiveness



1. One-dimenstional arrows imply causal effects. (For details of the notation, please refer to Duncan (1971).
2. All paths are hypothesized to be positive and significant (except those market "*", which are hypothesized to be negative and significant).
3. Hypotheses 7 (a to f) are not drawn since they involve multiplicative effects. Please refer to Table 1 for details.

APPENDIX

ON MEASURE DEVELOPMENT AND VALIDATION

I. Scale Details

1. OBJECTIVES - based on an indication of the extent to which the following objectives of planning have been fulfilled, on a five-point interval scale, ranging from entirely fulfilled to unfulfilled: (i) Enhancing management development; (ii) Predicting future trends; (iii) Improvement in long-term performance; (iv) Improvement in short-term performance; (v) Evaluating alternatives based on more relevant information; (vi) Avoiding problem areas.

2. SYSTEM-CAPAB - based on a five-point interval scale ranging from much improvement to much deterioration on each of the following items: (i) Ability to anticipate surprises and crises; (ii) Flexibility to adapt to unanticipated changes; (iii) As a mechanism for identifying new business opportunities; (iv) Role in identifying key problem areas; (v) As a tool for managerial motivation; (vi) Generation of new ideas; (vii) Ability to communication top management's expectation down the line; (viii) As a tool for management control; (ix) As a means of fostering organizational learning; (x) Ability to communicate line manager's concerns to top management; (xi) As a mechanism for integrating diverse functions/operations; (xii) As a basis for enhancing innovation. In addition, the following thirteenth item scaled from strongly agree to strongly disagree was added. (xiii) Today's system emphasizes creativity among managers more than our previous system.

3. TECHUSE - based on a five-point interval scale as the degree of change in the use of the following techniques in the planning activities: (i) Portfolio (e.g., BCG) approaches; (ii) PIMS Model; (iii) Financial Model; (iv) Zero-based budgeting; (v) Financial-based measures, such as value-based planning; (vi) Project management techniques (e.g., PERT/CPM); (vii) Stakeholder analysis; (viii) Scenario/Delphi techniques; (ix) Forecasting and trend analysis.

4. INTERNAL - based on a five-point interval scale ranging from significantly more emphasis to significantly less emphasis, for the following items: (i) Internal capabilities; (ii) Past-Performance; (iii) Reasons for past-failures.

5. EXTERNAL - was operationalized by using a five-point interval scale ranging from significantly more emphasis to significantly less emphasis, for the following items: (i) General economic and business trends; (ii) Regulatory issues; (iii) World-wide competition; (iv) Supplier trends; (v) Customer/End user preferences; (vi) Technological trends.

6. FUNCTIONS - was operationalized by using a five-point interval scale ranging from significantly more emphasis to significantly less emphasis, for the following items: (i) Marketing function;

(ii) Operations/manufacturing function; (iii) Finance function; (iv) Personnel function; (v) Purchasing/Procurement function; (vi) Research and Development/technology function; (vii) Computers and MIS.

7. RESOURCES - based on a five-point interval scale ranging from significant decrease to significant increase, on the following items: (i) Number of planners; (ii) Time spent by the chief executive in strategic planning; (iii) Involvement of the staff managers in strategic planning; (iv) Resources provided to strategic planning.

8. RESISTANCE - based on a five-point interval scale ranging from significant increase to significant decrease, on the following items: (i) Overall emphasis to strategic planning - R; (ii) Involvement of the line managers in the strategic planning activities - R; (iii) Acceptance of outputs of strategic planning exercise by top mangement - R; (iv) Resistance to planning in general; (v) Threats to continuation of strategic planning.

(R -- Reverse Scored)

II. Assessment of Measurement Quality

Reliability. As shown in Table 2, Cronbach alpha values range from 0.540 to 0.871 with four values exceeding Nunnally's (1978) suggested threshold value of 0.70, and three values around 0.60. As an additional assessment, item-to-total scale correlations were obtained for the eight measures. All correlation coefficients were not only in the expected direction but also significant at p-levels better than 0.01 (details available upon request). The Cronbach alpha values and the item-to-total scale correlation values taken together provide modest support for the internal consistency of measures developed here.

Validity assessments. Three separate assessments were carried out to address a variety of construct validity issues. The first was an assessment of the association between the OBJECTIVES measure and indicators of perceived organizational performance relative to competition. Since extant research has argued strongly that planning success and financial performance are related, one should expect positive and significant correlations between these constructs.

Four items representing organizational performance relative to competition (sales growth, net profit increases, market share changes, and return on investment) obtained as perceptual measures from the participating managers as a part of this study were each correlated with the six items representing the OBJECTIVES construct. 18 out of the 24 correlations were significant at a level better than $p < 0.05$. Not unexpectedly, the non-significant correlations were those relating the "soft" aspects of OBJECTIVES (e.g., avoiding problem areas) with the "hard" data on competitive performance. Further, the linear composite index of competitive performance made up of these four performance

measures correlated with OBJECTIVES at a level of ($r = 0.2838$; $p < 0.001$) -- thus providing support for convergent validity of the dependent variable, i.e., OBJECTIVES.

However, such an analysis is still subject to common method bias since data for both constructs were obtained from the same source. To enhance the confidence that can be placed on the data, objective performance data from secondary sources were assembled for a subsample of 86 organizations (approximately 40% of the study sample). The performance measures included sales growth, net profit growth, and return on investment relative to industry (operationalized as the difference between the value for the focal organization and the value for its industry category). Data for this purpose were obtained from Standard & Poor's COMPUSTAT tapes as reported in Business Week magazine's Inflation Scorecard (Business Week, March 21, 1984). The second validity assessment focused on the degree of correspondence between these two sources of data. All three perceptual measures had strong, positive and significant correlations with the corresponding objective measures (for sales growth, $r = 0.44$; $p < 0.01$; for net-profit growth, $r = 0.42$; $p < 0.01$; and for ROI, $r = 0.51$; $p < 0.01$). The above results further support our claim that the perceptual performance data used in this study are free for the large part from respondent bias (see Venkatraman & Ramanujam, 1987a).

The third test is intended to provide some support for the contention that the dimensions are independent. This issue is particularly critical to support our contention that SYSTEM-CAPAB and OBJECTIVES are separate dimensions. This was assessed using a measurement model based on the principles of confirmatory factor analysis (Joreskog & Sorbom, 1978). Results strongly indicate that the specification of one composite factor (which combines the two dimensions) should be rejected in favor of an alternate model with the specification of SYSTEM-CAPAB's effect on OBJECTIVES (see Venkatraman & Ramanujam, 1987b).

III. Construction of Linear Composites

The items representing the various constructs were combined into composite Likert-type scales. Simple aggregation was adopted to develop the scales, since in most instances, the summation of raw scores in which each item is scored identically and contributes equally to the total score is appropriate (Nunnally, 1978). Because of the missing data problem, inevitable in mail studies, the folowing guideline was adopted: a case was included in the analysis if complete data were available for at least 50% of the items which constitute the scale. For example, in a seven-item scale, if data were missing for 4 items, that case was deleted from consideration. On the other hand, if data were available for 5 of the 7 items, the average of the 5 items was taken as the scale value. Given an acceptable level of reliability of measures, this is considered to be acceptable.