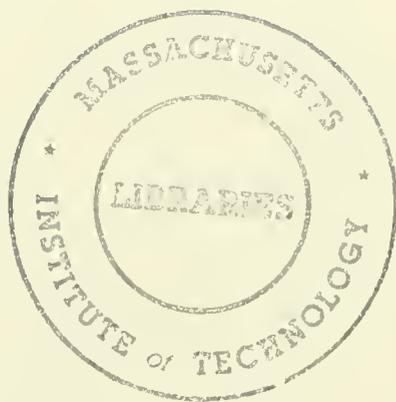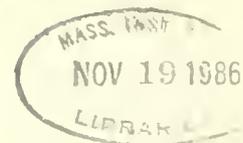# WORKING PAPER
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Planning Systems Characteristics
and Planning Effectiveness

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and
N. Venkatraman

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Planning System Characteristics and Planning Effectiveness*

Summary

The nature of the multivariate relationship between six characteristics of planning systems and three different conceptualizations of planning effectiveness is examined using canonical correlation analysis. The analysis indicates that the organizational context of planning - captured here by two key characteristics -- <u>resistance to planning</u> and <u>resources provided for planning</u> -- is the dominant impact on planning system effectiveness, broadly construed. While individual design elements of the planning system such as <u>use of techniques</u> and <u>external orientation</u> do influence effectiveness, the contextual dimensions appear to be overriding. Implications for further research on planning systems and directions for future extensions of this study are discussed.

INTRODUCTION

An issue of central concern in the literature on strategic planning is the relationship between planning and organizational performance. Numerous empirical studies have attempted to clarify the presence or absence of a linkage between planning and performance. Reviews of this literature can be found in Armstrong (1982), Hofer and Schendel (1978), and Lorange (1979). As these reviews all agree, the findings of this body of research are characterized by fragmentation and controversy. For instance, while Thune and House (1970), Herold (1972), and Karger and Malik (1975) established that formal planners significantly outperform informal planners, studies by Rue and Fulmer (1973), Grinyer and Norburn (1975), Sheehan (1975), and Kudla (1980) raise questions as to the value of planning for organizational performance. Thus, the relationship between planning and performance remains largely an open and debatable question.

This study seeks to examine afresh the relationship between planning and performance. In an effort to bring about greater rigor and clarity to the study of this relationship, we begin with a detailed examination of the major shortcomings of previous studies. Our hope is to introduce conceptual and methodological improvements to overcome as many of these problems as possible so that a redirection of planning systems research can be accomplished.

SHORTCOMINGS OF PREVIOUS RESEARCH

We believe that at least three major limitations have to be overcome in furthering planning systems research. The first limitation pertains to the conceptualization of "planning" and "planning systems." Early research studies have generally tended to view planning in terms of dichotomous classifications such as "planner" versus "nonplanner" or "formal planner"

versus "informal planner" (e.g., Herold, 1972; Thune and House, 1970). While
these labels may have been appropriate in the early stages of formal planning
systems research, they are probably no longer appropriate. For instance, few
large corporations would belong to the "nonplanner" category today. Thus, an
expanded conceptualization of the notion of planning is needed.

Recognizing this requirement, some recent research studies have employed
richer conceptualizations of planning. Wood and LaForge (1979, 1981) seek to
classify organizations based on a seven-level Guttman-type scale of planning
sophistication. A score of zero on their scale implies a complete absence of
formal planning, while a score of six indicates comprehensive planning.
Despite this improvement, the scale treats planning in essentially
unidimensional terms. Yet the conceptual literature emphasizes that planning
is a multifaceted management system (Hax and Majluf, 1984; King and Cleland,
1978; Lorange and Vancil, 1980) that is an integral feature of the overall
management process of an organization (Steiner, 1979). These writings would
strongly argue in favor of a multidimensional treatment of planning in
empirical research.

The second limitation pertains to researchers' almost exclusive
preoccupation with the financial payoffs from planning. The typical approach
has been to seek relationships between planning and accounting indicators such
as return on investment, and return on equity (Thune & House, 1970) or market-
based indicators such as abnormal returns (Kudla, 1980). Given that planning
can be expected to confer many benefits of a tangible and intangible nature
(Camillus, 1975; Hax & Majluf, 1984; King & Cleland, 1978; Steiner, 1979), it
is logical and necessary to expand the conceptualization of planning

effectiveness to include "process benefits," in addition to "outcome benefits," as some authors have recently argued (e.g., Greenley, 1983; King, 1983).

The third limitation is of a methodological nature, and relates to the approach used to specify and test relationships between planning systems and planning effectiveness. Because of the unidimensional treatments of "planning" and "planning effectiveness" in previous research, analysis of their interrelationship has been done using simple correlational and regression techniques. However, the issue becomes complicated when both sets of variables are conceptualized in multidimensional terms as we argue they should. Thus, a major task is to refine the analytical schema for examing the interrelationships between planning system characteristics and planning effectiveness.

Overcoming the above limitations should take the research on planning system effectiveness a significant step forward. Thus, the purpose of this study is to redirect planning systems research by specifically addressing the above limitations. First, we develop multidimensional conceptualizations of planning and planning effectiveness. Then we explore the nature of their interrelationship within a multivariate framework. Given the controversial nature of prior empirical findings, this study turns away from the conventional approach of examining the question, "does planning pay?" and instead addresses the question, "what characteristics of a planning system are central for planning effectiveness, effectiveness being construed in a much broader sense than it has been so far?"

THEORETICAL FRAMEWORK

The theoretical framework developed here focuses on two aspects: (a) the salient dimensions of a planning system, and (b) different approaches to assessing its effectiveness. This section also addresses the choice of an appropriate analytical scheme for linking the two.

Planning System Dimensions

Many theoretical dimensions of planning systems have been suggested in the literature. From a synthesis of the conceptual literature we identified six dimensions that have received widespread discussion. Two of these pertain to the organizational context of planning, and the remaining four constitute the design dimensions of the system. The two contextual dimensions are: resources provided for strategic planning, and the level of organizational resistance to planning. Resources provided for planning can take tangible and intangible forms. Tangible indicators include such things as the existence of a separate planning staff, number of planners, facilities provided to them, etc., while intangible resources include the time spent by the CEO and other senior level line and staff managers in formal planning activities. Overall, the resources dimension reflects management's commitment to the concept of planning. Similarly, acceptance of the demands of planning by lower level of management is another contextual baseline condition for effectiveness in planning. It is not enough if planning is accepted by top management. For effective planning there should be no or little resistance to the notion of formal planning throughout the organization.

The four design dimensions include: the degree of external orientation of the system, the degree of internal orientation of the system, the level of functional coverage and integration achieved, and the extent of use of analytical tools and techniques. These four dimensions are largely

self-explanatory. If a formal planning process is to assist in strategy

development, as opposed to being a mere number crunching exercise, then it

must include mechanisms for performing the classical SWOT (i.e., strengths,

weaknesses, opportunities, threats) analysis in a meaningful and comprehensive

manner. The timely recognition of opportunities and threats requires a strong

external orientation, while responding to these opportunities and threats

requires realistic internal diagnostic assessments and integrative abilities

to balance the interfunctional conflicts that frequently limit an

organization's capacity for change. Since strategy development is a process

of solving ill structured problems, techniques that permit decision makers to

grapple with environmental turbulence and complexity have a definite role to

play in the design of a formal planning system. More detailed justifications

and theoretical support for these dimensions are developed elsewhere

(Ramanujam, Venkatraman and Camillus, 1986). A summary is provided in Table 1.

INSERT TABLE 1 ABOUT HERE

Planning Effectiveness

We conceptualize planning effectiveness in multidimensional terms using

three different, but related perspectives. First, adopting a goal-centered

approach to assessing organizational effectiveness (Cameron and Whetten,

1983), the extent of fulfillment of important planning objectives is

evaluated. This perspective reflects King's (1983) suggested approach to the

evaluation of planning and Steiner's notion of "measurement against purpose"

(1979, p. 307). Six commonly emphasized objectives of planning are used to

arrive at an aggregate notion of "objective fulfillment." These include,

predicting future trends, improving short term performance, improving long

term performance, evaluating alternatives based on more relevant information,

avoiding problem areas, and enhancing management development. The rationale

for selecting these six objectives is provided in a companion paper

(Ramanujam, Venkatraman and Camillus, 1986), and the detailed indicators are

discussed in the section on "measurement". While not claimed to be

exhaustive, the battery of objectives considered represents a balanced mix of

tangible and intangible objectives.

The second perspective is derived from Lorange's (1979) comment:

> "many of [the] measures [in prior studies] were based on
> some surrogate variable, when it probably would have been
> more relevant to measure effectiveness as a function of
> how well the formal planning systems' capabilities were
> able to meet the specific planning needs" (1979; p. 230,
> emphasis added).

We adapt Lorange's view of system-specific capabilities to develop a "generic

view" of the system's capability. We argue that the development of these

capabilities themselves can be viewed as an index of the system's

effectiveness. A generic capability that is required of every formal planning

is its ability to encourage both creativity and control (Camillus, 1975;

Shank, Niblock, and Sandalls, 1973), although their relative roles may vary

depending on the specific context. Examining the extent of improvement over

time in the creativity and control aspects of a system becomes a promising

approach to evaluate the system's potential for effectiveness gains.

It is to be noted that the system capability dimension as conceptualized

here focuses on the process of planning, while the objective fulfillment

dimension is primarily concerned with the specific end results normally

expected from a planning system. As such it is a complex construct tapping

the cumulative effects of past cycles of planning. It has been emphasized

that planning systems should evolve over time as contexts change (Lorange and

Vancil, 1980). A reactive planning process may be appropriate in a smaller organization but as the organization grows it may be necessary to adopt a more proactive approach. Emphasis on integration and control may be appropriate in some contexts whereas innovation and decentralization of the process may assume greater importance in other contexts. The system capability dimension was conceptualized as the company's current profile along aspects such as proactivity, flexibility, control, integration, autonomy, innovation and aptitude for change. Cumulative improvement along items tapping these aspects over several planning cycles was treated as a distinct dimension of effectiveness in this study.

We wish to particularly emphasize that we did not view creativity and control as opposed themes requiring a tradeoff of one against the other, but rather considered them both as requisite properties of an effective planning system.[1] We also emphasize that our view of system capability is somewhat distinct from that of Lenz (1980) who had proposed a concept of strategic capability encompassing three themes, namely, a knowledge-technique base, a capacity to generate and acquire resources, and general management technology. Lenz's (1980) discussion is primarily centered on questions of skills pertaining to strategy content areas, whereas we wanted to capture aspects of the planning process as it has changed over the recent past. Nevertheless, the discerning reader will notice some conceptual overlap before our system capability construct and Lenz's (1980) notion of strategic capability, particularly in regards to his first and third dimensions of capability.

The third perspective follows the tradition of earlier studies that sought to examine the role and impact of planning on organizational performance. Although any "causal" link between planning characteristics and organizational performance may be tenuous at best, there are strong arguments

that the "ultimate test of the system's effectiveness and justification for its existence is the impact it has on organizational performance" (Henry, 1979; p. 248). Four indicators of performance relative to competition were considered to reflect this perspective. Note that, although performance objectives were included in the objective fulfillment dimension, there is a fine distinction between achieving performance goals and being a high performance organization relative to the competition.

Conceptually these three perspectives represent distinct approaches to the evaluation problem. Our belief is that the use of these different perspectives would provide a more complete picture of the concept of planning effectiveness than would any one of them in isolation.

It was expected that all of the planning system characteristics except resistance would have a positive impact on each dimension of the system's effectiveness. It was also expected that resistance would impact each dimension of effectiveness in a negative manner. The focus of the study, however, was on exploring the existence of an overall relationship, in a multivariate sense, between the planning system characteristics and planning effectiveness dimensions. Thus, specific hypotheses testable within a bivariate framework were not of interest. Should an overall multivariate relationship be uncovered, of course, it would be appropriate to probe further for such hypothesized relationships.

Choice of Data Analytic Scheme

Given the task of examining the interrelationships between a set of planning system dimensions and a set of dimensions reflecting planning effectiveness, at least three alternative data analytic schemes could be employed. These are: (1) factor analyses of the two data sets of dimensions followed by a correlational analysis of the factors extracted; (2) separate

multiple regression analysis for each dimension of planning effectiveness; and (3) a canonical correlational approach. This study uses the third approach because we believe that it is more insightful and appropriate given our task of specifying and testing the interrelationships between these dimensions. The rationale for our choice is provided below.[2]

The possible use of factor analysis combined with correlational analysis involves separate factor analysis of the two set of deminsions, as a starting point and then a correlational analysis between the factors extracted to obtain a set of bi-variate correlations. The ability of these correlations to provide any significant insights is questioned by Wimmer:

> "independent factor analyses are fine if the researcher
> wants factors chosen independently of each other. It is
> not a good procedure if one wants to explain as much of
> one data set from the other " (1977; p. 212).

The second alternative of separate multiple regression analysis essentially neglects the possible overlap in the three perspectives underlying the development of the dimensions of planning effectiveness and the consequent interrelationship between them. Thus, in line with Kuylen and Verhallen's (1981) observation that "a composite criterion variate may better reflect reality than a single criterion variable in a separate regression analysis", we employ a canonical correlation analytical scheme. A schematic of the model is shown in Figure 1.

INSERT FIGURE 1 ABOUT HERE

RESEARCH METHOD

Data

Data for this study were collected by means of a detailed mail

questionnaire during the Spring and Summer of 1984. The target population included six hundred companies, randomly chosen principally from the Fortune 500 Manufacturing and Fortune 500 Service directories. Two hundred and seven companies responded, yielding a response rate of 34.5 percent, which is considerably higher than the response rates generally obtained in studies using a comparable population (Gaedeke & Tootelian, 1976). The characteristics of the sample are provided 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 (81.5%) constitute a dominant part of the sample. Since smaller firms do not usually undertake planning to any significant extent (Robinson and Pearce, 1984), the size bias is not very significant. A comparison of the responses of operating executives and planning executives as a group did not reveal evidence of any tendency on the part of planning executives, as a group, to overrate the value of planning (details of the univariate t-tests are availabe on request). However, since the data are from a single respondent from each organization, there is a possibility of response or function bias in the individual responses. Given that our respondents were carefully targeted senior-level managers, we are confident that this is not a significant limitation.

Measurements

The theoretical model of Figure 1 consists of nine dimensions -- six representing planning system characteristics and three reflecting planning effectiveness. Each dimension was operationalized using multiple indicators

aimed at tapping the underlying theoretical dimension. These indicators were "purified" by eliminating those items which were found on examination to be "outliers" to the underlying construct, following the measurement approach of Churchill (1979). Based on Nunnally (1978), internal consistency was assessed using coefficient alpha and item-to-total scale correlations. The Cronbach alpha values ranged from 0.540 to 0.871 and all the item-to-total correlations were positive and significant at p-levels better than 0.01. These assessments provide adequate support for the reliability of the measures employed. The details of the various indicators representing the dimension and the assessment of reliability (Cronbach alpha values) are provided in the Appendix.

Additional assessments to evaluate the quality of operationalizations were also undertaken. For the subjectively assessed relative competitive performance dimension, the constituent measures were correlated with corresponding objective external measures for a subset of the sample (n=86). The correlations ranged from 0.42 to 0.51, all statistically significant at p<.01. While the correlations are by no means high, they are in the expected direction and provide a modest measure of external validity for at least one of the three dimensions of planning effectiveness used in this study.

Table 3 presents descriptive statistics and zero order correlations among the dimensions. As was expected, each planning system characteristic except resistance is positively correlated with each of the effectiveness dimensions. With one exception, namely objective fulfillment with, external, all these correlations are statistically significant as well at a p level of 0.05 or better. Resistance is consistently negatively and significantly related to each effectiveness dimension. The absolute size of the eighteen significant correlations ranges from 0.26 to 0.72, with seven being greater than 0.50 and sixteen being greater than 0.30. In a sense, these results are entirely

consistent with the conceptual literature from which the dimensions were distilled. The presence of the expected bivariate relationships is certainly encouraging, but the main focus of this study is on the multivariate relationship between the planning system characteristics and the planning effectiveness dimensions. The results of the multivariate analysis are presented next.

INSERT TABLE 3 ABOUT HERE

Data Analysis and Results

Overview . The canonical correlation analyses were performed using the CANCORR program of the SPSS package (Nie, Hull, Jenkins, Steinbrenner and Bent, 1975). It is not the intent of this paper to provide a detailed exposition of the canonical correlation analysis methodology. Interested readers are referred to Anderson (1958), Cooley and Lohnes (1962), or Green (1978) for the mathematics underlying the technique, while simpler, intuitive, and applications-oriented treatments can be found in Nie et al (1975) and Hair et al (1979). Knapp (1982) has shown that canonical correlation analysis is the most general of the linear models in statistics and that commonly employed methods such as ANOVA, MANOVA, and discriminant analysis are special cases of canonical analysis.

Breifly, the method extracts linear combinations of a set of criterion variables and a set of predictor variables such that the linear composites (or canonical variates) are maximally correlated. A second pair of linear combinations is then extraced which is again maximally correlated subject to the condition that it is orthogonal to the first set. This process is repeated until the maximum possible number of orthogonal linear combination

pairs, which equals the number of variables in the smaller set, have all been extracted. In this study, with three effectiveness dimensions in the criterion set and six planning systems dimensions as the predictor set, three canonical functions (i.e., pairs of canonical variates) were extracted. Four statistics are important in interpreting the results of canonical analysis. These are canonical correlations, canonical loadings, canonical cross-loading and redundancy measures. Each is discussed below, with corresponding interpretations for the results of this study.

Summary Statistics of Canonical Analysis and Their Interpretations. As indicated earlier, three canonical functions were extracted. The statistical test for the null hypothesis of no relationship between the criterion and the predictor variable sets can be approximated as a chi-squared distribution (Thompson, 1984). The values of the correlations with corresponding chi-squared test statistics are shown in Table 4.

INSERT TABLE 4 ABOUT HERE

Table 4 shows that only the first canonical correlation is significant at the p<.01 level. While the absolute size of the canonical correlation for this function (0.847) is quite high, it must be recognized that a canonical correlation is merely one summary measure of the relationship between the planning system dimensions and the indicators of planning effectiveness. Some would rightly argue that it is an inflated measure of the underlying relationship since it is the purpose of canonical analysis to maximize the correlation between linear combinations of the two sets of the variables (Fornell, 1982). It is therefore necessary to examine in greater detail the nature of the canonical variates themselves, and the extent to which they

capture the information in the original variables of which they are composed. This is done by examining the additional statistics shown in Table 5.

INSERT TABLE 5 ABOUT HERE

Columns 1 and 2 in Table 5 show, respectively, the canonical weights (w), or the coefficients of each variable in the canonical variate for the criterion and predictor sets, and canonical loadings or structure correlations (L) which represent the correlation of the canonical variate (i.e., the linear combinations of the variables in each set weighted by their respective canonical weights) with each variable in their respective set. The L^2 values shown in column 3 are a measure of the variance which the observed variables share with the (unobserved) canonical variate, and are interpretable as being analogous to factor loadings in factor analysis. In Table 5, their values range from 0.36 to 0.93 (average: 0.61) for the dimensions in the criterion (i.e., effectiveness) set, and from 0.22 to 0.78 (average: 0.48) in the predictor (i.e., planning system dimensions) set. Column 4 shows the proportion of explained variance accounted by each variable in the criterion and predictor batteries. Finally, Column 5 shows the canonical cross loadings, or correlations of each variable in the criterion set with the canonical variate of the predictor set and vice versa. These cross loadings are believed to be a more direct measure of the relationships between the criterion and predictor dimensions.

No definitive guidelines exist as to what the magnitude of these various summary statistics should be in order to conclude that a strong relationship is in evidence. Lambert and Durand claim, that "for purposes of comparison loading values of 0.30 and above are sufficient for drawing inferences about

criterion-predictor relationships (1975, p. 474). On this basis, it can be noted that all the canonical loadings, as well as all the canonical cross loadings in this study are well in excess of this limit.

In summary, there is evidence of a strong multivariate relationship between the planning system dimensions and the planning effectiveness dimensions. The question that needs to be addressed next is the relative importance of the planning system dimensions in contributing to the observed canonical relationship.

The canonical weights W are sometimes regarded as being indicative of the relative "importance" of the variables, but this interpretation has been criticized as an inappropriate one, particularly in cases where the variables sets are multicollinear (Fornell, 1982). Canonical loadings are considered more meaningful as indices of relative importance in contributing to the observed canonical relationship. A comparision of the relative rankings of the variables based on their canonical weights and loadings does, in fact, show some perturbation of the ranks, although the top and bottom rankings are consistently assigned to the same variables in both the methods. Since loadings are believed to be more appropriate for comparison purposes, the weights will not be discussed further.

An examination of the canonical loadings in the predictor set shows that the most important influence on planning system effectiveness is resistance to planning, followed by resources provided for planning. In other words, both the contextual dimensions rank at the top as influences on planning effectiveness, resistance impacting effectiveness negatively (as would be expected) and resources affecting it positively. Among the design dimensions, techniques loads the most strongly, and is followed by external orientation and internal orientation. Functional coverage appears to be the least

important design dimension as far as planning effectiveness is concerned.

In addition, it is interesting to note that the magnitude of the cross loadings of the predictor set dimensions suggest the same importance ranking of the variables as the canonical loadings, the two summary measures thus reinforcing one another.

Before proceeding with a discussion of the implications of the above pattern of results, it is important to consider one further test of the practical (as opposed to the statistical) significance of the canonical correlation. This test is the so called redundancy analysis, discussed next.

Redundancy Analysis. In multiple regression, the coefficient of multiple determination, R^2, represents the proportion of variance in the dependent variable accounted for by the independent variables. In canonical correlation analysis, the square of the canonical correlation cannot be similarly interpreted. The methodology seeks to maximize the correlation between linear combinations of variables, and the resultant canonical correlation does not yield any information regarding the shared variance between the two sets of variables. Stewart and Love's (1968) redundancy index provides an indication of this shared variance and thus yields useful information regarding the practical significance of the canonical functions.

The redundancy index for each canonical function in each set of variables is computed by multiplying the squared canonical correlation for the respective function and the average value of the squared canonical loadings across the variables in that set. The average of the squared canonical loadings is a measure of the variance in the original variables extracted by the canonical variate, while the redundancy index is a measure of the variance in the criterion or predictor set explained by the canonical correlations between the two sets.

Table 6 shows the variance extracted and the redundancy indices for the first canonical function in the criterion and predictor sets. This function alone captures 61.1 percent of the variance in the original variables of the criterion set, and 48.0 percent of the variance in the original variables in the predictor set. The redundancy index of 43.8 is the shared variance between the first canonical variate and the variables in the predictor set. The shared variance between the first canonical variate and variables in the criterion set is 34.4 percent. Note the assymmetry in the redundancy indices, which is due to the differing number of variables in each set. Overall, the high values of the canonical correlations and redundancy indices, taken together suggest the presence of a strong multivariate relationship between the planning system dimensions and planning system effectiveness.

INSERT TABLE 6 ABOUT HERE

DISCUSSION

The analysis presented above includes two major themes. One is the notion of a multivariate index of planning system effectiveness that combines three conceptually distinct but empirically related perspectives. The second theme is the relative strength of influence of the six planning system dimensions on this multivariate index of effectiveness. We will now discuss these two themes in greater detail.

Multidimensional Conceptualization of Planning Effectiveness

Recent conceptual writings have called for a multivariate conceptualization of planning system effectiveness. But the literature offers no specific operational guidelines as to what these dimensions could be. We

adoped a conceptualization based on three different, but overlapping

perspectives, and our results can be employed to examine the degree of

"empirical support" for a multidimensional view of planning effectiveness.

The linear combination of the criterion set dimensions derived from the

canonical analysis can be considered to be an empirically based multivariate

measure of effectiveness. An examination of the loadings of the three

dimensions reflecting planning effectiveness in Table 5 indicates that the

multivariate measure incorporates contributions from all the three

perspectives and is not dominated by any one of the perspectives. This is an

interesting result and supports calls for multidimensional conceptualizations

of effectiveness in general (Steers, 1975), and planning effectiveness in

particular (King and Cleland, 1978; Steiner, 1979). While the use of weighted

multi-variate measures of effectiveness has been frequently advocated, no

satisfactory weighting schemes have been proposed. The loadings yielded by

canonical analysis are an empirical solution to the weighting problem.

Systems capability with a loading of 0.963 figures most prominently in

the multivariate index of effectiveness and explains over 50 percent of the

variance in effectiveness (Column 4, Table 5). This seems to strongly support

Lorange's (1979) view that system capability should be viewed as the primary

reference point for evaluating planning effectivess. The second important

dimension of effectiveness turns out to be the degree of objective

fulfillment, with a loading of 0.550 and accounting for about 30 percent of

the variance. Relative performance ranked third and contributes about 19

percent to explained variance. The relatively low level of variance explained

by the performance index is perhaps a vindication of the position of some

authors that financial performance is but one and perhaps not a key indicator

of a system's effectiveness and that more "direct" assessments of a systems

benefits and effects are more appropriate (Greenley, 1983; King, 1983).

In contrast, early studies of planning effectiveness relied almost exclusively on financial performance as the gauge of a planning system's worth. Our study is in support of the current view that the benefits of planning are more of a process nature, which may be a necessary but not a sufficient condition for improving performance. The main implication of this result is that there are significant benefits in adopting all the three perspectives to conceptualize a broader, and multi-dimensional view of planning effectiveness.

Key Determinants of Planning System Effectiveness

The second objective of this research was to examine the relative role and importance of the six planning system dimensions as influences on planning effectiveness. By using the multivariate index of planning effectiveness and the canonical loadings in the predictor set (Table 5, Column 2), we can attempt to provide some insights into this question.

The two organizational context dimensions, resistance and resources, emerged as the most important contributors to planning effectiveness, with each contributing roughly 26 percent to the explained variance. The negative sign of the resistance dimension is consistent with expectations (Steiner, 1979) and prior research (e.g., Lenz and Lyles, 1981; Lyles and Lenz, 1982; Steiner and Schollhammer, 1975). There can be no effective planning in an atmosphere of resistance and half-hearted commitment or no commitment to planning. Securing the involvement of the line as well as staff management and the chief executive officer's commitment to planning were some of the indicators comprising these two dimensions. Thus, it appears that attempts to enhance planning effectiveness should begin with a focus on the organizational context within which planning takes place. Securing the commitment of

operating managers, and ensuring an appropriate level of allocation of
planning resources seem to be more important than "fine-tuning" the systems
design dimensions. Some earlier writings have emphasized the importance of a
planning climate and a planning culture (e.g., Hall, 1977; King and Cleland,
1978). Our study reechos the importance of these "softer" organizational
issues in planning.

The four systems design dimensions -- techniques, external, internal and
functions, in that order of importance, -- together account for the remaining
48 percent of the variance. The dominance of techniques as a key design
characteristic is surprising in that it seems to counter the recent attacks
against the technique orientation in management (Hayes and Abernathy, 1980;
Kiechel, 1982; Peters and Waterman, 1982), but the importance accorded to
external is entirely consistent with normative strategic management theory
where attention to the external environment is stressed as a very important
aspect of strategic planning.

In a recent study of organizational effectiveness in higher education
institutions, Cameron (1986b) found an external orientation to be an important
predictor of effectiveness and our results are in line with that finding. The
same study also found an excessive internal orientation to be a distinguishing
feature of less effective organizations. Again, our results would appear to
support this finding. The relative weakness of function's influence on
effectiveness came as a surprise since the increasing trend toward delegation
of planning to the line organization (Business Week, 1984) would be expected
to result in a greater need for functional involvement, coordination, and
integration. Perhaps such integration is being facilitated in most
organizations as a result of greater participation in planning and better
training and education of line management for planning so that functional

coverage has simply become more automatic and less of an issue today. The high average score and low standard deviation on the functions dimension (Table 3) is supportive of this conjectural interpretation. More research is needed, however, for throwing additional light on this surprising result.

Extensions

Several avenues for extending the research on strategic planning systems are opened up by this study. The identification of important dimensions reflecting a broadened concept of planning should provide an impetus to further efforts at reconceptualizing planning in more realistic terms than the unidimensional treatments common in the previous empirical research literature. Similarly, the identification of three perspectives for conceptualizing planning effectiveness and results supporting such a multi-dimensional treatment argue against the use of narrow conceptualizations of planning effectiveness in future research. Our attempt at presenting a parsimonious representation of planning and planning effectiveness needs to replicated, extended, and refined before the role and importance of the identified dimensions can be generalized further.

Our study established that the organizational context dimensions are the dominant influences on a planning system's effectiveness. However, we did not examine the relative importance of these dimensions of planning across different contexts -- such as "large" versus "small" firms, or "mature" versus "recent" systems, etc. Before accepting the "universal role" of these dimensions, the stability (or the contextual nature) of our results should be subjected to critical examination. A useful line of inquiry would be to examine such relationships in more narrowly defined contexts so that we can

move towards systematically accumulating research findings and eventually
developing contingency-based "principles" of effective strategic planning, as
emphasized by researchers such as Schendel (1977).

From a methodological point of view, the study demonstrated the use of a
canonical correlation approach to depict the interrelated nature of the
relationships between planning system dimensions and planning effectiveness.
Bivariate correlations provide insights relating two variables in an
"isolated" context, which may not be very meaningful. In contrast, this type
of analysis permits the evaluation of relative influences. We hope that other
strategy researchers will at least evaluate the feasibility of adopting this
technique since many issues in strategy research involve a complex set of
multiple independent and multiple dependent variables.

Although this study overcame some of the limitations of the previous
research in this area, it suffers from some of its own and these should be
noted. First, the study relies on data from a single respondent from each
participating firm. This was a result of a conscious tradeoff between overall
sample size and number of respondents per firm. Nevertheless, future
extensions should collect data from a number of different functions and
hierarchical levels within the organization so as to assure representativeness
of the data. Second, the data are cross-sectional in nature, and cover a
heterogeneous mix of firms. Replications in subsets of the sample and over
time are needed to enhance the generalizability of the findings reported here.
Third, strict tests of external validity of the effectiveness measures could
not be accomplished because of definitional problems surrounding terms like
"industry" and "competitors." We had to be content with somewhat crude checks

of data integrity in this study. Refinements to overcome possible common method bias in the subjective effectiveness assessments should be undertaken in future studies.

CONCLUSIONS

Using six planning systems dimensions and three related perspectives on planning effectiveness as the predictor and criterion sets respectively, we attempted to identify the key influences on planning effectiveness within a canonical analysis framework. The attractiveness of the canonical correlation approach lies in its multivariate (and integrated) treatment of the effectiveness and predictor dimensions. The empirically derived multivariate effectiveness measure was found to be interpretable in line with the extant conceptualizations of planning system effectiveness.

By way of substantive results, a favorable organizational context which fully supports the planning philosophy was found to be the most critical impact on planning effectiveness. Among the design dimensions, use of techniques and external orientation seem to play key roles in determining the effectiveness of planning, while internal orientation and functional coverage emerged as much weaker influences.

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TABLE 1
A SUMMARY OF THE SIX SIGNIFICANT DIMENSIONS OF
STRATEGIC PLANNING SYSTEMS

Dimensions	Description	Key Supporting Literature
Use of planning techniques (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 (INTERNAL)	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 (EXTERNAL)	The level of emphasis given to monitoring environmental trends	Aguilar (1965) Fahey & King (1977) Keegan (1974) Kefalas & Schoderbek (1973) Thomas (1980)
Functional coverage and integration (FUNCTIONS)	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 (1982) Lorange (1980) Snow & Hrebiniak (1980)
Resources provided to the planning function (RESOURCES)	The degree of organizational commitment to planning as expressed in the number of the planners, level of involvement of top management in planning, etc.	King & Cleland (1978) Steiner (1979)
Resistance to Planning. (RESISTANCE)	The level of organizational resistance to planning.	Lenz & Lyles (1981) Lyles & Lenz (1982) Steiner (1979) Steiner & Schollhammer (1975) Schultz & Slevin (1976)

TABLE 2
SAMPLE CHARACTERISTICS*

	Full Sample (n=207)	Study Sample** (n=91)
1. Sales of the Responding Unit		
Less than $250 million	17.4	23.5
$251 million – $1 billion	21.8	19.1
Over $1 billion	60.9	57.3
2. Primary Business Category		
Consumer goods	19.2	15.6
Capital goods	18.7	21.1
Raw or semi-finished materials	12.8	13.3
Components for finished goods	8.9	12.2
Service sector	40.4	37.8
3. Organizational Level of Response		
Corporate Level	81.5	82.4
Business Unit	18.5	17.6
4. Title/Responsibility of Respondent		
Planning	68.5	66.3
Line function	31.5	33.7
5. Maturity of the System (year planning began)		
Before 1960	6.2	7.1
During 1961–1975	36.7	39.3
After 1976	55.2	53.6

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*   All figures are percentages; Non-responses have been excluded.

** A reduced sample was used for the analysis because of missing data
    problems. A case was exluded if it had even one missing value. Based on
    chi-squared tests, the reduced sample was found not to be statistically
    significant along any of the above dimensions. Thus, thre is no evidence
    of the introduction of any bias because of the loss of cases with missing
    data.

TABLE 3
DESCRIPTIVE STATISTICS AND CORRELATIONS*

No.	Dimension	Mean	Sd	1	2	3	4	5	6	7	8	9
1.	TECHNIQUES	3.12	.51	1.00								
2.	INTERNAL	3.35	.62	0.36	1.00							
3.	EXTERNAL	3.59	.51	0.14	0.25	1.00						
4.	FUNCTIONS	3.60	.38	0.21	0.39	0.51	1.00					
5.	RESOURCES	3.55	.78	0.57	0.36	0.40	0.39	1.00				
6.	RESISTANCE	1.73	.68	-0.54	-0.26	-0.41	-0.31	-0.76	1.00			
7.	CAPABILITY	3.62	.65	0.60	0.50	0.46	0.38	0.68	-0.72	1.00		
8.	OBJECTIVES	3.46	.61	0.56	0.33	0.16	0.26	0.56	-0.58	0.62	1.00	
9.	RELATIVE PERF.	3.50	.90	0.34	0.35	0.32	0.34	0.46	-0.31	0.42	0.35	1.00

*All correlations above 0.17 are significant at p < 0.05.

TABLE 4

RESULTS OF CANONICAL CORRELATIONS

Function	Canonical Correlation	Root or Eigen Value	Chi-Square	df	Significance
1	0.847	0.717	125.36	18	0.000
2	0.358	0.128	17.98	10	0.055
3	0.267	0.071	6.30	4	0.178

TABLE 5

RELATIONSHIPS BETWEEN CANONICAL FUNCTIONS
AND ORIGINAL VARIABLES

Variables	Canonical Relationships Function 1*				Canonical Cross Loadings
	W	L	L^2	%	
	(1)	(2)	(3)	(4)	(5)
Criterion Set					
Improvement in System Capability	0.767	0.963	0.927	50.60	0.821
Degree of Objective Fulfillment	0.223	0.742	0.550	30.02	0.639
Relative Competitive Performance	0.158	0.596	0.355	19.38	0.466
			1.832	100.00	
Predictor Set					
Use of techniques	0.289	0.731	0.534	18.54	0.635
External orientation	0.271	0.588	0.345	11.98	0.515
Internal orientation	0.149	0.508	0.258	8.96	0.447
Functional coverage	0.027	0.464	0.215	7.47	0.410
Resources provided for planning	0.204	0.867	0.752	26.11	0.721
Resistance to planning	-0.412	-0.881	0.776	25.94	-0.724
			2.880	100.00	

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* Recall that only the first canonical function was statistically
   significant at a p-level better than .01.

TABLE 6

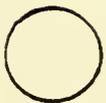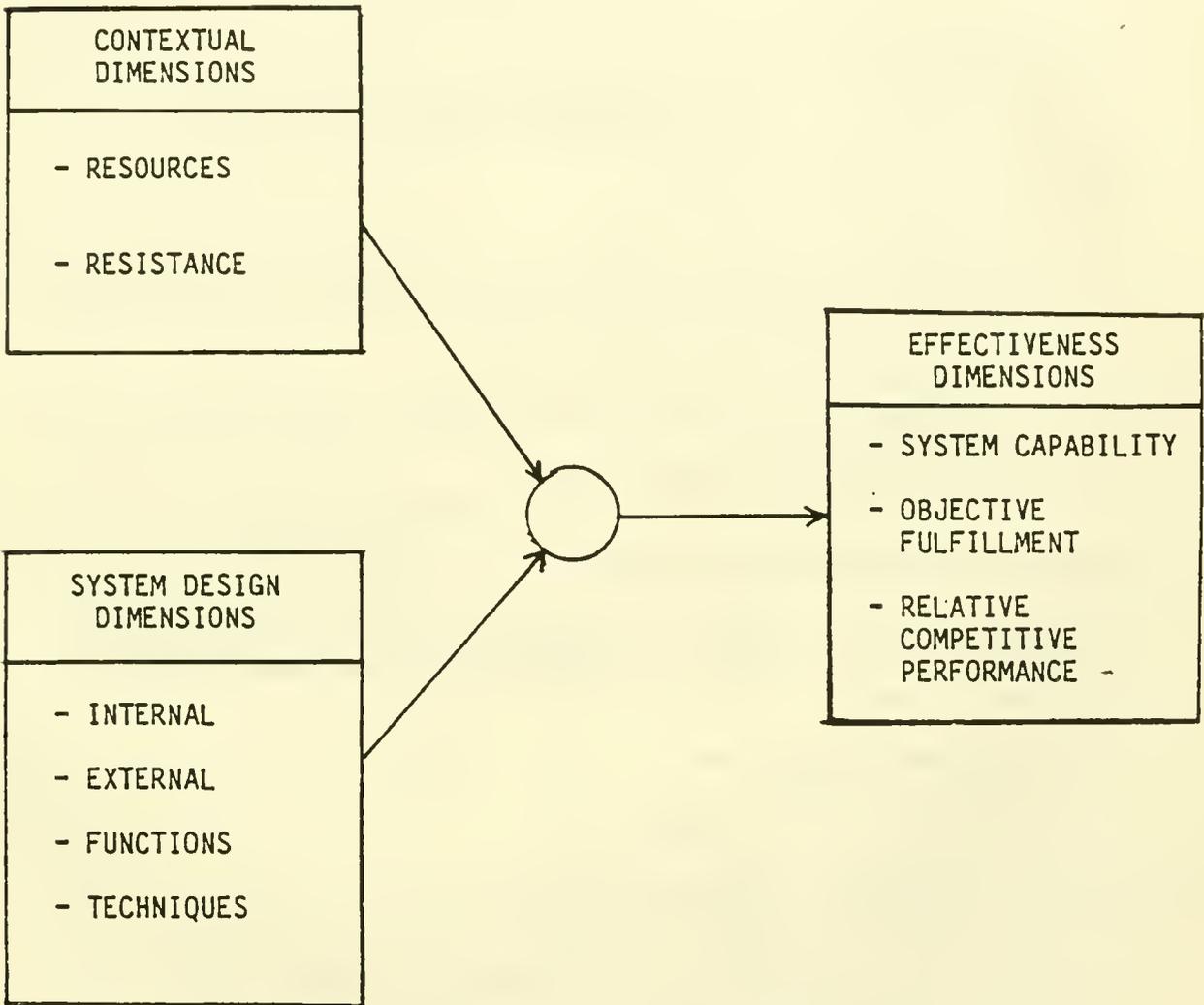REDUNDANCY ANALYSIS

Canonical Function	Root	Variance extracted	Redundancy
		Criterion Set	
1	0.717	0.611	0.438
		Predictor Set	
1	0.717	0.480	0.344

FIGURE 1

A SCHEMATIC MODEL OF THE RELATIONSHIP
BETWEEN PLANNING SYSTEM DIMENSIONS AND
PLANNING EFFECTIVENESS


```
┌─────────────────────┐
│ CONTEXTUAL          │
│ DIMENSIONS          │
├─────────────────────┤
│ - RESOURCES         │
│                     │
│ - RESISTANCE        │
└─────────────────────┘
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┌─────────────────────┐
│ SYSTEM DESIGN       │
│ DIMENSIONS          │
├─────────────────────┤
│ - INTERNAL          │
│                     │
│ - EXTERNAL          │
│                     │
│ - FUNCTIONS         │
│                     │
│ - TECHNIQUES        │
└─────────────────────┘
```

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┌─────────────────────┐
│ EFFECTIVENESS       │
│ DIMENSIONS          │
├─────────────────────┤
│ - SYSTEM CAPABILITY │
│                     │
│ - OBJECTIVE         │
│   FULFILLMENT       │
│                     │
│ - RELATIVE          │
│   COMPETITIVE       │
│   PERFORMANCE -     │
└─────────────────────┘
```

Implies a complex interaction.

38

APPENDIX

Operationalization of the Constructs Used[3]

PLANNING SYSTEM DIMENSIONS

1. RESOURCES PROVIDED TO THE PLANNING FUNCTION (0.597)

   Operationalized by using 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 officer in strategic planning
   (iii) Involvement of staff managers in strategic planning
   (iv) Resources provided for strategic planning

2. RESISTANCE TO PLANINNG (0.614)

   Operationalized by using a five-point interval scale ranging from
   significant decrease to significant increase on the following items:

   (i) Overall emphasis on strategic planning[4]
   (ii) Involvement of line managers in strategic planning[4]
   (iii) Acceptance of the outputs of the strategic planning exercise by
         top management[4]
   (iv) Resistance to planning in general
   (v) Threats to the continuation of strategic planning

3. ATTENTION TO INTERNAL FACETS (0.540)

   Operationalized by using a five-point interval scale ranging from
   significantly less emphasis to significantly more emphasis on the
   following items:

   (i) Internal capabilities
   (ii) Past performance
   (iii) Reasons for past failures

4. ATTENTION TO EXTERNAL FACETS (0.613)

   Operationalized by using a five-point interval scale ranging from
   significantly less emphasis to significantly more emphasis on the
   following items:

   (i) General economic and business conditions
   (ii) Regulatory issues
   (iii) World-wide competitive trends
   (iv) Supplier trends
   (v) Customer/end user preferences
   (vi) Technological trends

APPENDIX, continued

5. FUNCTIONAL COVERAGE (0.772)

Operationalized by using a five-point interval scale ranging from
significantly less emphasis to significantly more emphasis on 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
 (vii) Computers and MIS

6. USE OF TECHNIQUES (0.834)

Operationalized by using a five-point interval scale ranging from
significantly decrease to significantly increase in use on the
following items:

   (i) Portfolio (e.g., BCG) approaches
  (ii) PIMS models
 (iii) Financial models
  (iv) Zero-based budgeting
   (v) Value-based planning
  (vi) Project management techniques (e.g., PERT/CPM)
 (vii) Stakeholder analysis
(viii) Scenarios/Delphi techniques
  (ix) Forecasting and trend analysis

PLANNING EFFECTIVENESS DIMENSIONS

1. SYSTEM CAPABILITY (0.871)[5]

Operationalized by using a five-point interval scale ranging from
much improvement to much deterioration on 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) As a means for generating new ideas
 (vii) Ability to communicate top management's expectations down the line
(viii) As a tool for management control
  (ix) As a means of fostering organizational learning
   (x) Ability to communicate line management's concerns to top management
 (xii) As a basis for enhancing innovation

APPENDIX, continued

In addition, the following item, scaled from strongly disagree to strongly agree was included:

(xiii) Today's system emphasizes creativity among managers more than our previous system

2. OBJECTIVE FULFILLMENT (0.748)

Operationalized by using a five-point interval scale ranging from entirely unfulfilled to entirely fulfilled on the following items:

(i) Improvement in short-term performance
(ii) Improvement in long-term performance
(iii) Predicting future trends
(iv) Evaluating alternatives based on more relevant information
(v) Avoiding problem areas
(vi) Enhancing management development

3. RELATIVE COMPETITIVE PERFORMANCE (0.953)

Operationalized by using a five-point interval scale ranging from much worse to much better on the following items:

(i) Sales growth
(ii) Earnings growth
(iii) Market share change
(iv) Return on investment (ROI)

NOTES

[1]While this may seem paradoxical, there is increasing support for the notion that effectiveness consists of managing the tensions created by such opposed orientations. A corollary of this idea is that more effective organizations will tend to score higher on both dimensions. In an interesting review of the literature on organizational effectivenss, Cameron (1986a) has stressed the need to take into account such paradoxes in studies of organizational effectiveness.

[2]The ensuing discussion may convey the impression that the first two approaches were summarily dismissed from consideration. This was not the case. Factor analysis of the planning systems dimensions was, in fact, undertaken but did not yield interpretable factors that were consistent with prior theoretical expectations, presumably because the dimensions were themselves aggregated composites of individual variables that failed to yield a clear, theoretically defensible factor structure. The performance dimension included only four variables and no further factor analysis was deemed necessary. The analysis was terminated at this point because of the lack of promising factors to proceed with.

Similarly, separate regression analyses of the planning system dimensions on each effectiveness dimension were also performed. Multicollinearity in the data led to unstable beta weights for some of the variables in some of the runs. Again, the nature of the data called in question the suitability of this method of analysis.

The presence of modest multicollinearity further reinforced the choice of canonical correlation analysis because of its relative robustness over regression analysis in the face of correlated variables.

Details of all these analyses are available upon request.

[3]Figures in parentheses are the reliability coefficients (Cronbach's alpha) for the respective constructs.

[4]Reverse coded to indicate resistance.

[5]Items (i), (ii), (iii), (vi), (ix), (xii), and (xiii) tap the creativity aspects of the system, while the remaining items reflect the control orientation of the system. Originally, the creativity and control items were treated as separate subscales, but were found to be highly and positively correlated. Tests of a measurement model using LISREL further confirmed that the two subscales should be merged since they appeared to tap a single complex dimension. This dimension appears to measure what Peters and Waterman (1982) have referred to as "simultaneous loose-tight properties."