The authors investigate the effects of the organizational structure used for marketing planning on the credibility and utilization of marketing plans. Data on 53 organizations were obtained from multiple respondents in the marketing areas of those organizations. The results indicate that a bureaucratized planning structure with formal rules and procedures and departmental specialization can enhance both plan credibility and utilization. However, high centralization of authority affected these variables negatively. The explanatory mechanisms suggested by these results are discussed and managerial implications presented.

**Effects of Organizational Structure of Marketing Planning on Credibility and Utilization of Plan Output**

The importance of planning in the marketing aspects of business strategy is gaining increasing recognition. Thus, the literature includes a growing number of articles and books on such topics as marketing strategy planning models (e.g., the portfolio approaches) and how-to checklists of planning systems designs (e.g., Hopkins 1972). In addition, a few studies have attempted to evaluate the bottom-line impact of (strategic) planning (e.g., Ansoff et al. 1970; Fulmer and Rue 1973, 1974; Herold 1972; Thure and House 1970; Wood and LaForge 1979).

The treatment of marketing planning, however, has not been consistent in domain and/or concept definition. The process has not been distinguished from other organizational processes and its basic mechanisms have not been explicated. Though empirical studies on any aspect of marketing planning are scarce, they are virtually nonexistent in the areas of execution, implementation, and control of the activities related to marketing planning. In other words, we do not have any evidence on the issue of how organizations should structure the workflow and tasks associated with marketing planning. This deficiency is serious because organizational structuring of the workflow is the primary mechanism available to the firm for implementing, executing, and controlling marketing planning activities (or any other activity; Hall 1977). Also, both academicians and practitioners support the related notion that the importance of these organizational issues has been underestimated (Ouchi 1979; Pascale and Athos 1981).

Our study addresses these organizational issues. It examines the effects of the structuring of planning-related activities on the perceived credibility of the output of those activities as well as on the utilization of plan output. We present a theoretical framework that encompasses the relevant processes and draw on prior research to specify certain hypotheses. After describing the sample design and data collection procedures, we discuss the results and their implications.

**ORGANIZATIONAL CONTEXT OF MARKETING PLANNING**

At a fundamental level, planning can be viewed as part of the adaptation process of an organization to its environment (Campbell 1965). In particular, planning is concerned with the manner in which the organization intends to cope with the future. Thus, the tasks associated with planning generally lead to the discovery of cause and effect relationships between organizational action and outcomes. They also attempt to predict the impact of environmental changes on the organization. The essence of planning is the determination of an organizational response repertoire. In the development of such a response...
repertoire, the marketing-related activities and tasks must be identified and distinguished from other activities and tasks in related domains.

It is apparent from casual observation that the nature and content of marketing planning vary widely among organizations. For instance, marketing inputs may be provided for overall corporate plans in some instances, whereas other marketing planning activities may consist of such tasks as developing a sales promotion plan. In fact, even the nature of a delineable “marketing plan” is variable, depending on the extent of integration of planning activities across functions within the organization. It may be difficult to distinguish distinct types of plans.

We propose that what must be modeled with respect to marketing planning is the role, function, and contribution of the marketing area in planning in the organization. The relevant domain for the model is the “marketing area” of an organization. On the basis of Kotler’s definition of marketing as “... programs designed to create, build and maintain mutually beneficial exchanges and relationships with target markets...” (1980, p. 22), the tasks clearly would encompass such departments or sections as “sales,” “advertising,” “customer service,” “product management,” and others.

Several implications of the preceding definition should be noted. First, it includes those activities used to generate marketing-related input to an overall plan. Second, it is not predicated on the presence of an actual document titled the “marketing plan.” Finally, it excludes those individuals or organizations external to the focal organization that may participate in marketing planning activities (e.g., an advertising agency). This exclusion is made on the grounds that an interorganizational level of analysis is required if these participants are to be included. Though such interorganizational coordination can be modeled (e.g., John and Reve 1982), the focus of our effort is on the intraorganizational issues; to mix the two levels of analysis is inappropriate.

To place our investigation in perspective, the overall process of marketing planning must be understood. Flow process representations constitute the major technique used to describe planning. The literature provides several such models of how to conduct planning (e.g., Boyd and Massy 1972; Dalrymple and Parsons 1980; Kotler 1980). Though the actual steps vary, there is a certain uniformity in their formulation and four broad stages can be identified: formulation, output, implementation, and control. Briefly, the formulation stage consists of the activities related to the production of the plan, whereas the next stage is the description of the result from these activities. Implementation is the manner in which the organization attempts to use the output, and the control stage is essentially a feedback process which allows for correction of deviation.

In spite of these flow process models, little is known about the specification of the theoretically relevant variables in each stage or about the relationships between them. Our investigation examines those variables that characterize the structural context of the formulation stage and their impact on the credibility of the resulting output. The consequential impact of these variables on plan utilization during the implementation stage is also developed.

The most important aspect of the organizational context of planning is the nature of the organizational structure present. Researchers have long considered structure to be a crucial determinant of organizational outcomes (e.g., Burns and Stalker 1971; Hall 1977; Moch and Morse 1977). Fundamentally, the reason is that the major set of controllable variables available to an organization pertain to the structural aspects of workflow coordination and task execution.

Independent Variables

The major variables that characterize organizational structure are formalization, centralization, and structural differentiation (e.g., Hall 1977). Previous studies have shown that structure is related to such variables as environmental uncertainty (Lawrence and Lorsch 1967), technology (Marsh and Mannari 1981), size (Child 1972), innovation (Moch and Morse 1977), and satisfaction (Aiken and Hage 1966). Recent studies in marketing have examined such relationships as the effect of environmental uncertainty on the structure of the buying center (Spekman and Stern 1979) and the impact of structure on utilization of marketing research (Deshpande and Zaltman 1982). The importance of these variables also can be seen in the how-to approaches in the planning literature that center on structural issues such as the optimal extent of decentralization, participation, and diversity of input necessary for good planning.

Because planning activities are only a subset of organizational activities, a question that arises is the level at which the structure is to be measured. Originally, researchers considered organizational structure at the level of the overall organization (e.g., Pugh et al. 1968), but the recent work suggests that, instead of a monolithic structure, different organizational structures are present within individual organizations. For instance, Duncan (1976) has shown that these different structures are present at different stages of the innovation process. Spekman and Stern (1979) also have used this notion of task-related subunit structure in their specification of buying center structure.

We take as the level of analysis those activities associated with marketing planning. Thus, the centralization, formalization, and structural differentiation variables are defined with respect to these activities. Their operationalizations follow.

Centralization. The construct of centralization reflects the hierarchical nature of organizations and is one of the fundamental attributes of an organization. Individual positions within organizations, in general, do not have similar duties with respect to activities and decisions. Decision-making authority and input tend to be concentrated in organizations with a pronounced hierarchical structure.
and to be more dispersed in other organizations. It is this degree of dispersion of input and authority that is measured by the centralization variable.

We define centralization as

the extent to which marketing-planning-related activities and decisions are concentrated within a few positions.

Following Duncan (1976) and Hage and Aiken (1967b), we can distinguish two dimensions of centralization. The locus of authority dimension defines the extent to which decisions about marketing planning activities are made by a relatively small group. The second dimension, participation, is defined as the extent to which marketing area personnel have input on the activities in question. Notice that though decision-making authority would be accompanied by high participation levels, the reverse is not true. Participation in marketing planning activities can be widespread when decision-making authority is concentrated.

Formalization. Formalization in plan formulation is to some extent an outcome of management style and leadership. It can be perceived as reflecting order and stability or inhibition and inefficiency. Formalization is described by Price (1972) as the degree to which the norms of a social system are explicit. Duncan (1976) defines it as the emphasis placed within the organization on following specific rules and procedures in one’s job. Reference to formality in the planning literature concerns procedures being complicated and inhibiting (Koontz and O’Donnell 1974), planning being a ritual that makes people impatient (Hopkins 1972), excess documentation (Mintzberg 1976), conformity in the format and approach for planning preparation (Hopkins 1972), and inadequate direct verbal interaction being required (Mintzberg 1976). Essentially, formalization in planning would be represented by such matters as adhering to a time schedule of process activities and planning jobs, the conduct of meetings with specifically defined memberships and agenda, documentation of activities, and the generation of planning documents.

We define formalization as

the emphasis placed on following specific rules and procedures in carrying out plan formulation, including documentation of planning activities and adherence to job descriptions.

Structural differentiation. This attribute represents differences between organizations in terms of the complexity or heterogeneity of the structure. According to Hall (1977), two major components of the construct are the division or specialization of roles (jobs) and their separation into organizational subunits. The spatial dispersion of jobs and subunits is the third major component of structural differentiation. At a fundamental level, these components involve two different aspects of heterogeneity. One aspect is the extent to which the technology of the organization is heterogeneous. Second, these components also describe the heterogeneity of bureaucratically defined elements (e.g., positions, departments). These considerations are seen clearly in previous operationalizations. For instance, Hage and Aiken (1970) defined structural differentiation in terms of the number of occupational specialties present and their degree of professionalism. The number of departments at a given lateral level also has been used as an operational indicator. This measure taps the bureaucratically imposed heterogeneity.

We define departmental specialization as

the extent to which the marketing area is divided into many organizationally distinct functions and subunits.

Spatial dispersion is defined as

the extent to which marketing area personnel are dispersed spatially. It measures the distance between marketing personnel as perceived by the individuals themselves.

Finally, diversity is defined as

the extent to which marketing area jobs within the organizations are heterogeneous with respect to skills, responsibilities, etc. Diversity measures the variety of skills and specialized knowledge present, and derives from the intrinsic variation in skills rather than bureaucratically imposed differences.

Dependent Variables

The dependent variables in the study are the perceptions of the credibility of the output of marketing planning and the utilization of that output. The dimensions of these variables are considerably more difficult to develop than the dimensions of organization structure because of the lack of any consensus in the literature.

Credibility. The concept of credibility includes several relevant characteristics of plan output. It is the perception of the quality of the generated output that is being measured here. On the basis of the available literature on the perceptions of plans, six distinct components of credibility were isolated.

The first dimension is defined as the extent to which marketing area personnel believe the output is realistic. The realism of the output has been emphasized by several researchers. For instance, Hopkins (1972) and Steiner and Miller (1977) have discussed the perception of unobtainable or unsuitable goals in plan documents. Impractical strategies also have been implicated by several researchers (e.g., Emshoff and Mitroff 1978; Hobbs and Heany 1977), and a general lack of fit to market conditions or divergence from actual management practice has been discussed by others (e.g., Harrison 1978; Sokolik 1978).

The second component, accuracy, is defined as the extent to which marketing area personnel believe the plan is based on good data input. Hopkins (1972) has described the importance of such perceptions about data accuracy. When good input data are not present, individuals consider the plan output to be the product of a
GIGO (garbage-in-garbage-out) process and perceive it to be of low quality.

The specificity dimension is defined as the extent to which marketing area personnel believe the plan output specifies goals and strategies in sufficient detail. Emshoff and Mitroff (1978) and Hopkins (1972) have discussed how the lack of focus in plan output leads to an inability to use the plan to guide organizational action. Such plans will then be viewed as being of poor quality.

The next dimension is the internal structure of plan output. The consistency of plan output is defined as the degree to which marketing area personnel believe the various goals and strategies specified in the plan fit together logically. For instance, there may be inconsistencies between various strategies included in the same plan (Emshoff and Mitroff 1978) or the tactical plans and corporate objectives may be in conflict (Shank, Niblock, and Sandalls 1973). Such inconsistencies result in a poor quality plan because of the implementation difficulties created.

The fifth component of plan credibility is the completeness of the plan, defined as the extent to which marketing area personnel believe critical market elements (e.g., pricing, product development, etc.) are missing in the plan output. The planning literature often has stressed that a high-quality plan should not exclude critical elements within its domain because of the interactions between the included and excluded elements. Thus, for instance, a marketing plan for a new product should consider the cross-impact on an existing product because of the need to manage the interdependencies between the two products.

The sixth and final component of credibility is the assumption validity of the plan, defined as the extent to which marketing area personnel believe the assumptions on which the plan is based are valid. Various researchers (e.g., Harrison 1978) have noted that if individuals believe the assumptions made are biased or otherwise invalid, the output will be perceived as being a low-quality plan. This component is related to the data accuracy issue except that the concern here is with the validity of assumptions rather than data. Together, the six dimensions capture the attitudinal perception of marketing personnel about the credibility of the plan output.

The other dependent variable examined in our study is plan utilization. In one sense, this construct can be understood simply to mean that the plan output is used. However, it must be defined more precisely because of the multiple meanings that can be attached. The literature on knowledge utilization (e.g., Weiss 1982) draws a useful distinction between "instrumental" utilization and "conceptual" utilization. Instrumental utilization refers to the situation in which knowledge (plan output) is used directly to guide behavior and make decisions; a plan is not an end in itself, but serves as an instrument to achieve other goals. In contrast, conceptual utilization refers to the situation in which the knowledge (plan output) is used to enlighten the receiver; the plan is seen to be of some value in itself apart from any instrumental use.

In the context of market planning, both types of utilization are likely to be practiced. However, we focus on instrumental utilization in the empirical study because firms generally view marketing planning as intended to guide behavior and make decisions.

We define utilization as the extent to which marketing personnel report that the marketing plan output is used directly to guide behavior and make decisions.

HYPOTHESIZED RELATIONSHIPS

Centralization. The essential element of this construct is the concentration of input and decision making in the relevant activities of marketing planning. Its relationship with credibility is expected to be negative because low levels of participation reduce the diversity (and quality) of input. This expectation is supported by empirical studies on innovativeness and program change (e.g., Hage and Aiken 1970). Additional support is provided by studies indicating that centralization increases the alienation of employees (Aiken and Hage 1966), which adversely affects the basic components of credibility (i.e., trustworthiness and expertise).

The consequential effect of centralization on utilization is less self-evident. Centralization might appear to enhance the utilization of plan outputs because of the reduced discretionary authority of lower level participants. We would expect greater compliance with organizationally mandated outcomes. However, a closer theoretical analysis suggests that the opposite is more plausible.

Centralization induces forced compliance only if task execution is observable and sanctions for deviations can be implemented easily. These conditions generally are not applicable in the planning area. First, most plan output consists of targets or goals rather than the specific sequences of behavior required to achieve them. Further, the time span of feedback is relatively long for planning-related activities. This factor makes the detection and correction of deviations difficult. In sum, information impactedness (Ouchi 1979) prevails and reduces the effectiveness of bureaucratic control. Under these circumstances, the alienation and dissatisfaction due to greater centralization (Aiken and Hage 1966; Rousseau 1978) result in lower rather than higher utilization of plan output.

Formalization. The impact of the specificity of rules and procedures is difficult to predict because of the contradictory relationships suggested by the literature. Within the planning-oriented literature, the consequential effects of formalization are generally viewed as negative (e.g., Hopkins 1972; Mintzberg 1976). The supporting rationale is that formalized structures tend to make planning into a ritual, produce inadequate interaction, and cause undesired conformity. This reasoning leads us to expect
a negative impact on perceptions of plan credibility. Empirical evidence is lacking; however, another stream of work has led to similar predictions. These studies examined employee reactions to organizational structure and generally found higher levels of formalization to be associated with negative reactions in terms of satisfaction, autonomy, and challenge (e.g., Aiken and Hage 1968; Pierce and Dunham 1978; Rousseau 1978). Because these reactions reduce perceived credibility, we would predict a negative relationship between formalization and credibility.

However, a positive relationship between formalization and plan output credibility can be predicted from other studies. It can be reasoned that a well-documented set of rules and procedures (i.e., formalization) for the activities connected with marketing planning conveys to employees a firm commitment by top management to the value and importance of those activities. This symbolic aspect of formalized information gathering and analysis is also stressed by March and Feldman’s (1981) analysis of information gathering and processing in organizations. According to those authors, information processing activities are important in two ways. In addition to collecting valuable knowledge (information processing as signal detection) about the environment, such activities convey a sense of the organization’s priorities and values (information processing as symbol). Previous research (e.g., Hage and Dewar 1973) has shown top management commitment to be an important determinant of organizational outcomes. Thus, if individuals believe that a particular set of activities are considered valuable and important to the top echelon, they will be motivated to participate fully in those activities and to execute them efficiently. This belief also leads to positive perceptions about the output from those activities. We therefore would predict a positive relationship between formalization and plan credibility.

In terms of utilization, the prediction of a positive impact of formalization is supported by two theoretical perspectives. First, the preceding discussion suggests higher utilization through the favorable impact of formalization on plan credibility. Clearly, individuals are more likely to use the plan if they view it as being credible.

Previous studies (e.g., Radnor and Neal 1971) also have shown a positive relationship between formalization and the implementation of innovative programs. Zaltman, Duncan, and Holbek (1973) argue that this relationship occurs because clear-cut rules and procedures facilitate the implementation (utilization) of organizational decisions. The implementation of innovative programs is conceptually close to the utilization of plan output because both situations involve future actions that may deviate from the present path. Thus, we would expect a positive impact on utilization of plan output.

Structural differentiation. This construct represents the manner in which the division of labor occurs within the organization. However, its constituent dimensions have differing relationships with the dependent variables because of the different causal processes involved.

1. The diversity of jobs measure is an indicator of the availability of specialized skills related to planning activities in the marketing area. The effect of job diversity on credibility can be expected to be positive because greater diversity of skills and knowledge should enhance the perceived validity of the input to the plan. It has been argued in the organizational innovation literature that increases in knowledge diversity will lead to increased acceptance of change in programs. Several empirical studies (Blau 1973; Hage and Aiken 1967; Heydebrand and Noell 1973; Moch and Morse 1977; Palumbo 1969) have supported this conclusion. If we adopt the notion that plan outputs provide guidelines for future courses of action (which invariably include changes from past actions), utilization should be enhanced when job diversity is greater.

2. The specialization component of structural differentiation measures the extent to which organizational roles and responsibilities are bureaucratically delineated and defined. Two contradictory expectations of its impact on credibility are plausible. We can argue that increased bureaucratization increases the alienation of employees (Hage 1980) which in turn diminishes the perceived credibility of organizational outcomes. We therefore would predict a negative relationship between specialization and plan credibility. However, it is also possible that a bureaucratic strategy involving a high degree of departmentalization and formalized procedures communicates a clear organizational commitment to the activities in question. Such commitment tends to enhance the value of those activities to employees, thus increasing the quality of the input. This argument depends on specialization as a bureaucratic structural device which supplements the formalization of rules and procedures for task execution. In terms of the effects of specialization on utilization, the clearer divisions of responsibility between individuals and between departments should facilitate the implementation of organizationally required outcomes such as using plan output (Dewar and Hage 1978). Thus, we would expect a positive relationship between specialization and utilization.

These expectations are at odds with the less theoretically oriented literature on planning. Generally, the belief has been that planning activities are conducted best within relatively informal organizational structures that have fewer departmental and job distinctions. However, no empirical evidence about this expectation is available.

3. The spatial dispersion variable can be expected to correlate negatively with plan credibility because of its deleterious effect on interaction and communication. A negative impact on utilization also can be expected because of the increased problems of controlling employees who are widely dispersed.

**RESEARCH DESIGN**

Organizational analysis presents some unique research design problems which warrant a discussion of the particular methods we used. Our basic research approach is a survey of respondents from a sample of organizations. The use of the survey questionnaire, the use of respondents, and the selection of the sample all represent distinct choices.

The use of a survey to measure organizational-level variables can be contrasted with the major alternative
method, the “institutional” approach. The survey approach involves constructing a questionnaire that operationalizes the variables by using multiple items. It has been used in a large number of previous studies (e.g., Hage and Aiken 1969; Rousseau 1978). In the institutional approach (e.g., Blau and Schoenner 1971; Pugh et al. 1968), archival documents such as organizational charts and operating manuals are used to construct measures.

We favored the survey approach because the institutional approach has been strongly criticized as producing unreliable measures (Siedler 1974). Also, previous research (e.g., Pennings 1973; Sathe 1978) has shown that institutional and survey measures of organizational structure variables show virtually no convergence. Sathe (1978) argued that this finding supports the notion that the perceived structure as measured by surveys is not the same as the formal structure as described by organizational chart-based measures. Because our study focuses on attitudinal beliefs about plan output and utilization, measuring how respondents perceive the organizational structure as it affects them is much more relevant than describing the structure in terms of an organizational chart. Such arguments have been advanced in previous marketing studies involving these structural variables (e.g., Deshpande and Zaltman 1982).

The survey questionnaire was administered to marketing area personnel within the sampled organizations. The marketing area and personnel in the company were identified by meeting with senior management. Subsequently, one individual was selected from each company to distribute questionnaires to a sample of marketing area personnel. In smaller companies, this step essentially involved a complete census of all marketing area personnel. In larger companies, the sample was stratified by departments and/or functional groups within marketing. The number of respondents varied across the organizations from as many as 30 in a large industrial chemical corporation to less than six in some small firms. On average, there were more than six respondents per organization. The responses to the questionnaires were averaged across individuals within organizations to produce organizational-level measures (Hage and Aiken 1969).

Our use of survey data to obtain aggregated measures can be contrasted with the more common practice in marketing studies of using survey questionnaires to obtain global measures from key informants (e.g., Etgar 1977; John and Reve 1982; Lusch 1976). These key informants can be distinguished from respondents in several ways. First, informant selection is not based on a criterion of representativeness. Rather, expertise and role occupancy are the criteria used. Also, very few informants (in relation to the size of the unit being reported upon) are deemed necessary; respondent samples tend to be larger. Typically, single informants have been used in the marketing literature.

We believed the respondent approach was more appropriate than use of key informants for several reasons. First, we were measuring the organizational structure of marketing planning activities rather than the overall organizational structure. Thus, any given individual would be subject to this structure only as part of his or her job. Because the level of inclusion varies among individuals, it is difficult for a key informant to report on the structure reliably, especially in organizations with less clearly defined planning activities. Previous research (e.g., Phillips 1981) has shown that informants can be unreliable when reporting on fluid and nonconcrete situations. Also, perceptual and attitudinal variables such as credibility are likely to be measured less reliably with key informants (John and Reve 1982). In sum, these considerations led us to favor the respondent approach in our study.

The last major design issue is the election of the sample. Our sample of organizations is described best as a purposive or judgmental sample. Because the domain of our model encompassed all organizations with a discernible marketing area, a random sample from such a population was clearly infeasible. As a fallback, a sample was chosen judgmentally such that sufficient variation with respect to the focal variables was present.

About 200 organizations, predominantly in the greater Boston and New York areas, were contacted initially. Exploratory interviews about marketing planning activities were conducted with various individuals in 30 of these organizations. This step provided impressionistic evidence about the variation that could be expected from the sample.

The questionnaire was distributed to 53 cooperating firms. A broad variety of firms of different sizes were included, with a strong representation of medium-size firms. The average number of employees per firm was about 400. Some organizations were divisions of larger corporations. The development of the survey instrument is described hereafter.

Instrument Development

To develop the questionnaire, we used a combination of items from previous studies and new items written for the study. Though some of the variables in the study (e.g., the organizational structure variables) had been measured in several previous efforts, their reliability was suspect (Dewar, Whetten, and Boje 1980) or the wording of item was inappropriate for our context. Nonprofit organizations were used in many previous studies (e.g., Aiken and Hage 1968) and modifications were found to be necessary. Finally, no scales were available for the dependent variables in the literature.

The actual approach we used follows closely Churchill’s (1979) suggestions for scale construction. Using the available scales and the data from the interviews in the exploratory study, we generated item pools for each variable. Table 1 describes the number of items generated per variable. These items were presented to a group of 18 judges consisting of academicians and industry personnel to establish content validity. Items included in the questionnaire were those judged to have content validity by at least 12 judges. Table 1 describes the number
of items remaining per variable after this stage. Appendix 1 is a sample of items used.

An initial draft of the questionnaire was pretested with a dozen respondents to verify the suitability of the 7-point Likert-type format and any ambiguity in wording. After a few minor changes, a final questionnaire was developed and distributed to the organizations.

Results and Analysis

Completed questionnaires were received from 292 individuals in the marketing areas of the 53 organizations. The data from seven firms are not included in the analysis because they provided three or fewer respondents. The final data sample thus consisted of 46 organizations.

Measure validity. Because the measures consist largely of new scales, we assessed the quality of each scale before examining the substantive hypotheses. The pool of items for each variable first was subjected to an internal consistency analysis. Item-total correlations and Cronbach’s alpha were estimated, and items were deleted if they detracted from the internal consistency of the scale. These estimates are shown in Table 2. Each trimmed item pool for each variable then was factor analyzed to verify that each scale was unidimensional as well as internally consistent. On the basis of the eigenvalue rule, i.e., \( \lambda > 1 \), only one factor was observed in each of the 11 sets analyzed.\(^1\) In sum, these results suggest that the scales obtained for each variable are both reliable and unidimensional.

We have some further evidence about the quality of the measures. Recall that our formalization, centralization, and structural differentiation scales measured the structure of the marketing planning system. To assess the discriminant validity of these scales, we included two published scales that measured corresponding variables for the overall organization structure. The scores from

\(^{1}\)The item pool for the spatial dispersion measure was not factor analyzed because of a paucity of items.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Code</th>
<th>Alpha</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centralization</td>
<td>CEN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Locus of authority</td>
<td>LOC</td>
<td>0.80</td>
<td>.68</td>
<td>.54</td>
<td>.65</td>
<td>.42</td>
<td>.68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Participation</td>
<td>PAR</td>
<td>0.87</td>
<td>.60</td>
<td>.70</td>
<td>.77</td>
<td>.77</td>
<td>.72</td>
<td>.74</td>
<td>.74</td>
</tr>
<tr>
<td>Structural differentiation</td>
<td>FOR</td>
<td>0.70</td>
<td>.60</td>
<td>.51</td>
<td>.49</td>
<td>.56</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Diversity</td>
<td>DIV</td>
<td>0.63</td>
<td>.25</td>
<td>.56</td>
<td>.45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Specialization</td>
<td>SPEC</td>
<td>0.73</td>
<td>.55</td>
<td>.40</td>
<td>.59</td>
<td>.57</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Dispersion</td>
<td>DIS</td>
<td>0.86</td>
<td>.75</td>
<td>.75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utilization</td>
<td>UT</td>
<td>0.71</td>
<td>.51</td>
<td>.64</td>
<td>.53</td>
<td>.32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Credibility</td>
<td>CRE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Realism</td>
<td>CRR</td>
<td>0.87</td>
<td>.67</td>
<td>.71</td>
<td>.66</td>
<td>.72</td>
<td>.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Accuracy</td>
<td>CRA</td>
<td>0.84</td>
<td>.77</td>
<td>.65</td>
<td>.66</td>
<td>.59</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Specificity</td>
<td>CRS</td>
<td>0.78</td>
<td>.64</td>
<td>.63</td>
<td>.39</td>
<td>.67</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Consistency</td>
<td>CRC</td>
<td>0.89</td>
<td>.72</td>
<td>.78</td>
<td>.86</td>
<td>.51</td>
<td>.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Completeness</td>
<td>CRP</td>
<td>0.87</td>
<td>.79</td>
<td>.67</td>
<td>.68</td>
<td>.77</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Assumption validity</td>
<td>CRV</td>
<td>0.89</td>
<td>.74</td>
<td>.74</td>
<td>.74</td>
<td>.82</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(\lambda > 1\)
Aiken and Hage’s (1968) scales for formalization and locus of authority were correlated with the corresponding measures for the planning structure. The correlation between the two formalization measures was 0.09 ($p = .252$) whereas the locus of authority measures correlated at a much higher level ($r = .62, p = .001$). Clearly, the formalization of the planning subsystem is discriminated well from overall formalization within the organization. However, the two locus of authority measures show considerable overlap between overall centralization of authority and planning-related centralization.

The correlations between the independent and dependent variables are reported in Table 3. The following results are organized by the independent variables.

**Centralization.** The first dimension of this construct, locus of authority, shows a significant, negative relationship with utilization ($r = -.55$). Likewise, its effects on the six credibility dimensions are significantly negative (correlations range from $-.49$ to $-.62$).

The other component of centralization, participation, shows strong effects on utilization and credibility. Increased participation significantly enhances utilization ($r = .68$) and credibility (correlations range from 0.58 to 0.68 across the six dimensions). Clearly, a more centralized bureaucratic structure for conducting marketing planning has deleterious effects on both credibility and utilization of the plan.

**Formalization.** This aspect of the structure has a strong impact on the dependent variables. A more formalized planning structure significantly increases utilization ($r = .61$). It also has a significant positive effect on credibility (correlations range from 0.28 to 0.58). Defining the operating rules and procedures for executing planning activities appears to have a positive rather than negative impact on credibility and utilization. This result is particularly interesting because of the conflicting expectations developed from previous research.

Structural differentiation. The first dimension of the structural differentiation construct, specialization, is related significantly to utilization ($r = .36$). Its effects on credibility are generally positive though the magnitudes vary across the six components. For instance, it significantly enhances the specificity ($r = .34$) and completeness of plan output ($r = .34$). However, its effects on realism ($r = .26$) and consistency ($r = .24$) are significant only at the 0.1 level. Finally, it has small positive effects on the accuracy ($r = .16$) and assumption validity ($r = .04$) dimensions, but these last two correlations are not statistically significant.

The spatial dispersion of marketing area personnel is not related significantly to utilization ($r = -.07$). Though it is correlated consistently in a negative direction with all of the credibility dimensions, it is related significantly only to perceptions of accuracy ($r = -.30$), completeness ($r = -.29$), and assumption validity ($r = -.30$) of plan output.

The third structural differentiation variable, job diversity, is not related significantly to utilization ($r = .04$). The correlations with the six credibility scales are also insignificant (correlations range from -.08 to -.19).

Complex models. To understand these bivariate results better, we fitted several multivariate models to the data. Basically, we were attempting to assess the simultaneous impact of the independent variables and to describe plausible structural paths.

The first model involved regressing the structural measures against the utilization variable. Table 4 reports the results of this analysis. Initially, all six independent variables were included. However, the diversity of jobs measure was dropped because of insignificant zero-order correlations and an insignificant regression coefficient. Also, the high multicollinearity between the two dimensions of centralization ($r = -.76$ between locus of authority and participation) led us to collapse the two scales.

---

2Unless otherwise stated, all statements about statistical significance are at the .05 level.

---

### Table 3

<table>
<thead>
<tr>
<th>Centralization</th>
<th>Utilization (UT)</th>
<th>Credibility</th>
<th>Assumption validity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locus of authority</td>
<td>Realism: -.55</td>
<td>Accuracy: -.49</td>
<td>Specificity: -.57</td>
</tr>
<tr>
<td>Participation</td>
<td>Realism: .68</td>
<td>Accuracy: .58</td>
<td>Specificity: .64</td>
</tr>
<tr>
<td>Formalization</td>
<td>Realism: .61</td>
<td>Accuracy: .49</td>
<td>Specificity: .46</td>
</tr>
</tbody>
</table>

<p>| Structural | Utilization (UT) | Credibility | Assumption validity |</p>
<table>
<thead>
<tr>
<th>differentiation</th>
<th>Realism</th>
<th>Accuracy</th>
<th>Specificity</th>
<th>Consistency</th>
<th>Completeness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specialization</td>
<td>Realism: .36</td>
<td>Accuracy: .26</td>
<td>Specificity: .16</td>
<td>Consistency: .34</td>
<td>Completeness: .24</td>
</tr>
<tr>
<td>Dispersion</td>
<td>Realism: -.14</td>
<td>Accuracy: -.23</td>
<td>Specificity: -.30</td>
<td>Consistency: -.14</td>
<td>Completeness: -.15</td>
</tr>
<tr>
<td>Diversity</td>
<td>Realism: .04</td>
<td>Accuracy: -.17</td>
<td>Specificity: -.19</td>
<td>Consistency: .08</td>
<td>Completeness: -.12</td>
</tr>
</tbody>
</table>

$n = 46$.

$r > .28$ is significant at $p = 0.05$.

$r > .24$ is significant at $p = 0.1$. 
into a composite measure (CEN). The participation scale was reverse coded before it was combined with the authority scale.

Table 4 indicates that the resulting four variables explain a considerable degree of variation ($R^2_{X4} = 0.6$) in utilization. The regression coefficients indicate a significant positive effect of formalization, a significant negative effect of centralization, and insignificant effects for the specialization and spatial dispersion variables. These results support the zero-order correlational analysis except for the specialization variable. Recall that specialization had a significant impact on utilization in the bivariate analysis. The collinearity between formalization and specialization ($r = .63$) appears to be responsible for this result. In fact, a joint test of insignificance for these two variables was rejected at the .05 level.

The second model estimated is a MIMIC model (Jöreskog 1973) that examines the joint impact of the four independent variables on the six dimensions of credibility. Figure 1 shows this model where the credibility measures are multiple indicators of a single latent credibility construct and the four independent variables are formalization, centralization, and two dimensions of structural differentiation (specialization and spatial dispersion). The $\beta$ coefficients reflect the impact of the causes whereas the $\lambda$ coefficients indicate the correspondence between the indicators and the latent variable. Finally, the $\epsilon$ measures show the amount of measurement error in the credibility measures. This model allows us to make stronger inferences about credibility given the multiple dependent dimensions present.

The model was estimated by means of the LISREL program (Jöreskog and Sörbom 1978) and the results are shown in Figure 1. The chi square goodness-of-fit criterion suggests a statistically significant discrepancy from the data ($\chi^2(29) = 71, p = .00$). However, the discrepancy between the model and the data is very small, as indicated by the low values of the residuals (average residual < .04). The Bentler and Bonett indices also suggest that a substantial portion of the variance in data is explained by the model relative to a null model of independent measures ($\rho = 0.86, \Delta = 0.86$). For these reasons, we accept the model as an adequate representation of the data.

The results indicate that 67% of the variance in the latent variable, credibility, is explained by the four independent variables. Formalization is seen to enhance credibility significantly ($\beta_1 = .251$, SE = .12). However, centralization significantly reduced credibility ($\beta_1 = -.51$, SE = .1). The specialization variable coefficient is positive but is statistically insignificant. Multicollinearity is apparently the reason for this result, judging from the correlation of the estimate of the $\beta$ coefficient for this variable with the $\beta$ coefficient for formalization ($r = -.589$). Finally, the results show that greater spatial dispersion reduces credibility significantly ($\beta_2 = -.20$, SE = .09). As with the utilization model, our results agree with the zero-order correlations, except for the specialization variable which was affected by multicollinearity with the formalization measure.

The final model fitted was an attempt to understand the joint causal impact on the two dependent variables. Essentially, we used a two-equation model that combined the previous models. The four independent variables affect both credibility and utilization in this formulation. Additionally, credibility and utilization are allowed to affect each other through correlated structural residuals. This correlational specification was favored over a directional causal impact because of the possibility that the causal relationship between credibility and utilization is bidirectional. Though a nonrecursive model could have disentangled the separate causal paths, the present stage of theory development in the area is in-
sufficient to enable us to specify the necessary links to exogenous variables to identify this system.

Figure 2 shows the results of the model described above. As previously, the chi square index indicates a statistically significant discrepancy (χ²(34) = 82, p = .00). The discrepancy is very small as indicated by the small size of the residual matrix entries (average residual <.035), and the Bentler and Bonett indices also suggest a reasonable fit (p = .85; Δ = .86).

The results show that the four independent variables explain 60 and 66% of the variation in utilization and credibility, respectively. The causal impact coefficients indicate a significant positive effect of formalization on both utilization and credibility (β₁₁ = .4, SE = .13; β₂₁ = .26, SE = .12) and a significant negative effect of centralization on these variables (β₃₂ = -.47, SE = .1; β₄₂ = -.51, SE = .10). For the two structural differentiation variables, the only significant relationship found shows that greater spatial dispersion reduces the credibility of plan output (β₂₃ = -.20, SE = .10). Finally, the credibility and utilization of output are related positively to each other as indicated by the significant structural residual (Ψ₁₂ = .24).

**DISCUSSION**

Our study examined the effects of organizational structuring of marketing planning activities on the resulting credibility and utilization of plan output. The discussion of the results is organized by the independent variables and we examine them in the context of previous research.

*Formalization.* The results show clearly that an increased degree of formalization significantly affected credibility and utilization. As the rules and procedures for executing marketing planning become better specified and organized, the credibility of the output is enhanced and utilization rates are higher. Recall that in the literature on planning (e.g., Hopkins 1972; Mintzberg 1976) highly formalized systems are regarded as undesirable because such structures are expected to make planning into a ritual and to produce inadequate interaction and undesired conformity. However, these expectations are not based on empirical findings. Our results suggest that these expectations are not tenable and provide support for the expectation developed from the organizational behavior literature about the positive effects of formalization.

Child (1972) has written that formalization and centralization are two fundamental strategies for structuring activities within organizations. Put simply, organizations can decide to write detailed rules and procedures to govern activities (i.e., formalization) so as to achieve organizational goals. Alternatively, they can choose to concentrate discretionary authority (i.e., centralization) so that subordinates’ activities can be appropriately directed. Although Child does not specify the conditions under which one approach is preferable to the other, the results clearly indicate the success of the formalization approach in the context of marketing planning activities.

Our results for the formalization variable also support the position that formalization can be beneficial because it signals a commitment by the organization to certain activities, thus conveying the importance and value of those activities. As Hage and Dewar (1973) have shown, this perception is an important factor that determines how much effort will be expended to execute the activities effectively. However, this signalling of commitment was not measured directly as an intervening variable.

*Centralization.* The results for this variable are unambiguous. As the structure of marketing planning becomes more centralized, the credibility of the output and level of utilization are diminished. Though common sense suggests that a highly centralized structure should increase utilization through enforced compliance, the results show the opposite effect. In spite of the lower discretionary authority of individuals in centralized organizations, utilization was decreased rather than increased.

These results support the predictions derived from the

---

**Figure 2**

**TWO-EQUATION SYSTEM**

---

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>Standard error</th>
</tr>
</thead>
<tbody>
<tr>
<td>β₁₁</td>
<td>.4</td>
<td>.13</td>
</tr>
<tr>
<td>β₁₂</td>
<td>.26</td>
<td>.12</td>
</tr>
<tr>
<td>β₂₁</td>
<td>.06</td>
<td>.12</td>
</tr>
<tr>
<td>β₂₂</td>
<td>.05</td>
<td>.11</td>
</tr>
<tr>
<td>β₂₃</td>
<td>-.09</td>
<td>.09</td>
</tr>
<tr>
<td>β₂₄</td>
<td>-.20</td>
<td>.09</td>
</tr>
<tr>
<td>β₃₂</td>
<td>-.47</td>
<td>.10</td>
</tr>
<tr>
<td>β₃₃</td>
<td>-.51</td>
<td>.10</td>
</tr>
<tr>
<td>γ₁</td>
<td>.40</td>
<td>.08</td>
</tr>
<tr>
<td>γ₂</td>
<td>.33</td>
<td>.08</td>
</tr>
<tr>
<td>μ₁₂</td>
<td>.26</td>
<td>.07</td>
</tr>
<tr>
<td>λ₁</td>
<td>.92*</td>
<td>.00</td>
</tr>
<tr>
<td>λ₂</td>
<td>.94</td>
<td>.08</td>
</tr>
<tr>
<td>λ₃</td>
<td>.88</td>
<td>.10</td>
</tr>
<tr>
<td>λ₄</td>
<td>.89</td>
<td>.10</td>
</tr>
<tr>
<td>λ₅</td>
<td>.89</td>
<td>.10</td>
</tr>
</tbody>
</table>

*The measurement model for CRE is identical to that shown in Figure 1.*

*Fixed parameter.

χ²(34) = 82.4, p = 0.00; ρ = 0.85; Δ = .86.
organizational research literature. Recall that researchers have found control of behavior via bureaucratic centralization to be less effective when tasks cannot be monitored and/or evaluated easily (Ouchi 1979). Because planning-related tasks fit these conditions, centralization is rendered ineffective. This situation does not predict a negative relationship with utilization; rather, it implies a lack of any positive relationship. However, the negative relationship found can be accounted for by negative attitudinal effects resulting from centralization (Rousseau 1978). Those negative attitudes will lower the degree of compliance with organizational activities such as those required in plan output (i.e., lower instrumental utilization).

Structural differentiation. Increased specialization enhanced credibility and utilization in the bivariate analysis, but these relationships became insignificant when the formalization measure was included in the multivariate analysis. In contrast, the diversity of jobs variable was not related in any analysis to either of the dependent variables. Finally, spatial dispersion reduced credibility of output but was essentially unrelated to utilization.

Together, these results suggest that the diversity of skills explanation is inadequate. According to that view, increased departmental specialization and diversity of marketing jobs represent an enhanced pool of specialized skills and knowledge available to the organization for formulating plans, and should thus enhance the credibility of the output. This expectation is not supported by our data. The insignificant effects of the diversity of jobs variable are particularly damaging because that variable corresponds most closely to the diversity of skills notion. The effects of the departmental specialization variable on credibility suggest another explanation.

Departmental specialization measures the degree to which marketing personnel are organized into subunits. Though it undoubtedly reflects the extent of specialization by function, it also reflects the extent of bureaucratization of the marketing area. As such, it can be expected to be related positively to another aspect of bureaucratization, viz. formalization. This expectation is supported by the data which show a high intercorrelation between these variables \( r = 0.63 \). If one considers the fact that formalization also is related significantly to enhanced credibility, a bureaucratically organized structure relying on both formalization and departmental specialization apparently can enhance credibility of planning output. However, these effects of specialization are somewhat speculative because of the collinearity between these variables. The explanatory mechanism responsible for this success is difficult to specify precisely because the intervening variables have not been measured directly. However, one plausible explanation is that clearly defined formal procedures and role specialization communicate a clear commitment by the organization to the activities in question, which enhances the credibility of the output from those activities.

The effects of specialization and formalization on utilization lend additional support to this bureaucratization explanation. Because control of behavior and conformity to organizational demands are the essence of a bureaucratic approach, formalization and departmental specialization clearly will facilitate the utilization of plans (Zaltman, Duncan, and Holbek 1973) as is indicated by the data.

**IMPLICATIONS AND CONCLUSIONS**

Our discussion tends to contradict the notion that planning-related activities are governed best by an informal organizational structure with a low degree of bureaucratization. However, it is important to note that a bureaucratic approach must be used selectively because of the undesirable consequences of certain aspects of such structures. For instance, proximity of the individuals involved in planning is found to enhance some components of credibility. It is reasonable to assume that this effect is due to the facilitation of communication. However, previous research (e.g., Hage 1974) has shown that highly bureaucratic structures can impede communication between organization members. The negative effects of greater centralization are even more important in this regard.

As we have shown, formalization (and departmental specialization) is a useful means of implementing a bureaucratic strategy of control of planning activities. Because these factors facilitate the output of highly credible plans, centralization seems to be an effective means of ensuring compliance. The empirical results, however, indicate that compliance would not be achieved. In fact, higher levels of centralization are associated with lower utilization rates. The explanation that supports this finding is the information impactedness argument advanced by Ouchi (1979) regarding the limitations of bureaucratic control. Because compliance with planning-related activities is not observed as easily as compliance in other areas, the correction of deviations via sanctions is difficult to implement. Thus, though centralization is a generally appropriate and widely used component of bureaucratic control in organizations (Child 1972), it is clearly inappropriate in the context of planning-related activities. It is important to widen the locus of authority of decision making and to encourage greater participation of lower level personnel in the marketing planning process.

We can combine the preceding conclusions to provide guidelines for the effective structuring of marketing planning activities. Formulation of marketing planning should be conducted in a structural context where clear rules and procedures are available and used to execute relevant activities. Additionally, the personnel involved in those activities should be separated organizationally into specialized subunits or departments to the extent feasible. Participation in planning-related activities should be as broad as possible to enhance input from lower level personnel. Further, decision-making authority should
be decentralized among the personnel involved in the process. To do so may lead to a matrix type of design where planning-related activities are structured differently from the other subunit activities. However, an ad hoc approach toward these activities where idiosyncratic procedures and an informal division of labor is used is inappropriate.

These normative implications should be viewed with caution as they are based on a single study of a relatively small sample of organizations. We note, however, that they concur with the anecdotal impressions gathered from the participants in the data collection stage. The sampled organizations clearly had varying degrees of success with their marketing planning efforts. A lack of success often was attributed to such factors as “it's really just a sideshow here” or “this is not really a very important part of the work here.” In other instances, participants suggested that plans were forced on them by management but they could easily sidestep a plan’s intent if they felt the need to do so. These statements lend support to our explanations advanced on a more scientific basis.

Our findings suggest some directions for future research. In this initial attempt to examine the consequences of the structural context of marketing planning, we did not measure directly the intervening variables responsible for the consequential effects. These variables should be examined in future research so that the explanatory mechanisms implicated in our study can be tested more stringently. For instance, the negative effects of centralization were presumed to be a consequence of the alienation of employees and the difficulty in utilizing sanctions because of limited observability of behavior. These variables should be measured and the presumed relationships tested directly.

The scope of our study should be broadened to investigate the possible interactions between the general organization structure and the planning-related structure. For instance, a highly formalized and departmentally specialized planning structure may be inappropriate in an organization with a very low level of bureaucratization. We hope these and other issues in this critical area will be addressed in future studies.

Appendix 1
EXAMPLES OF ITEMS USED TO OPERATIONALIZE CONSTRUCTS USED IN THE MODEL

<table>
<thead>
<tr>
<th>Measure</th>
<th>Illustrative Likert-scale items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locus of authority</td>
<td>We have little real authority in plan formulation activities. Important marketing planning</td>
</tr>
<tr>
<td></td>
<td>decisions are not made by us. Plan formulation activities are usually conducted without our</td>
</tr>
<tr>
<td></td>
<td>assistance. We are required to contribute to the formulation of strategies and/or budgets in</td>
</tr>
<tr>
<td></td>
<td>the plan. There is much conformity required in plan formulation. There are precise ways</td>
</tr>
<tr>
<td></td>
<td>outlined for the start, stages of compilation, and completion of the plan. Marketing in this</td>
</tr>
<tr>
<td></td>
<td>company includes many responsibility areas.</td>
</tr>
<tr>
<td>Formalization</td>
<td>Marketing in this company is highly departmentalized.</td>
</tr>
<tr>
<td>Specialization</td>
<td>Most jobs in the marketing area are very similar in nature. Jobs in the marketing area vary</td>
</tr>
<tr>
<td>Diversity</td>
<td>greatly in the types of activities they include.</td>
</tr>
<tr>
<td>Dispersion</td>
<td>Marketing people tend to be widely dispersed geographically.</td>
</tr>
<tr>
<td>Credibility</td>
<td>Marketing people are located close to each other.</td>
</tr>
<tr>
<td>Realism</td>
<td>Marketing planning is conducted with little regard for management practice.</td>
</tr>
<tr>
<td>Accuracy</td>
<td>The marketing plan is usually quite accurate.</td>
</tr>
<tr>
<td>Specificity</td>
<td>Markets are too broadly defined in the plan to give a basis for precise strategies.</td>
</tr>
<tr>
<td>Consistency</td>
<td>There are often conflicts or variations in the goals specified for the plan among marketing</td>
</tr>
<tr>
<td></td>
<td>sections or departments.</td>
</tr>
<tr>
<td>Completeness</td>
<td>Not all marketing sections or departments are accounted for in the plan.</td>
</tr>
<tr>
<td>Assumption validity</td>
<td>Assumptions about environmental conditions and markets on which the plan is based are</td>
</tr>
<tr>
<td></td>
<td>unrealistic. A key to effective management in this organization is to find ways around</td>
</tr>
<tr>
<td></td>
<td>requirements of the plan.</td>
</tr>
<tr>
<td>Utilization</td>
<td>In practice, we devise our own plans and use them rather than follow the requirements of any</td>
</tr>
<tr>
<td></td>
<td>company plan.</td>
</tr>
</tbody>
</table>

REFERENCES


---

**Multi-function statistics library**

- Powerful data manipulation and transformation utilities
- ASCII file structure for interface to other applications software
- Extensive computational library
- Available for CP/M, MS DOS (PC DOS), and CTOS (BTOS)

**Northwest Analytical, Inc.**

1532 SW Morrison St., Portland, Oregon 97205  503-224-7727