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Environment -- Strategy Coalignment: An Empirical Test of Its Performance Implications

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Summary

The positive performance impact of a coalignment between a business' environment and its strategy is an important theoretical proposition in strategic management. In spite of its importance, and intuitive appeal, the extent of empirical support is equivocal and riddled with problems of conceptualizing and testing for coalignment. This paper evaluates alternate approaches to testing such a proposition and argues in favor of specifying coalignment as 'profile deviation,' namely that coalignment is the degree to which strategic resource deployments adhere to an 'ideal profile' for a given environment. Subsequently, this proposition is tested across eight distinct environments in two different samples across two time-periods drawn from the PIMS database. Results -- which were generally robust across the two periods -- strongly support the proposition of a positive performance impact of environment--strategy coalignment. Implications and research directions are developed.

INTRODUCTION

Coalignment (also termed as consistency, contingency, or fit) is emerging as an important organizing concept in organizational research (Aldrich, 1979; Fry and Smith, 1987; Van de Ven and Drazin, 1985), including strategic management (e.g., Miles and Snow, 1978; Venkatraman and Camillus, 1984). In simple terms, the proposition is that the 'fit' between strategy and its context -- whether it is the external environment (Anderson and Zeithaml, 1984; Bourgeois, 1980; Hambrick, in press; Hofer, 1975; Hitt, Ireland, and Stadter, 1982; Jauch, Osborn, and Glueck, 1980; Prescott, 1986) or organizational characteristics, such as structure (Chandler, 1962; Rumelt, 1974), administrative systems (Lorange and Vancil, 1977; Galbraith and Nathanson, 1978), and managerial characteristics (e.g., Gupta and Govindarajan, 1984) -- has significant positive implications for performance.

Within this general perspective, this paper is concerned with the performance impacts of environment--strategy coalignment. Specifically, it addresses a theoretical question: "Does a business that aligns its strategic resource deployments to the specific requirements of its environmental context (i.e., achieve an acceptable level of environment--strategy coalignment) perform significantly better than a business unit that does not achieve the requisite match?" While framing this question may appear to be relatively simple, the empirical testing is complex given serious theoretical (i.e., conceptualization of the specific form of coalignment) and methodological (i.e., statistical tests of coalignment) problems.

This study seeks to overcome some of the conceptual and methodological limitations of extant research on this topic, and conduct a strong, rigorous test of the performance impacts of environment--strategy coalignment through: (a) an explicit statement of the theoretical conceptualization of the coalignment between environment and strategy; (b) operationalize coalignment such that there is adequate correspondence between the conceptualization and its statistical tests; and (c) conduct empirical tests in two different samples to test the proposition as well as assess its robustness. Towards this end, we begin by discussing the relative benefits and limitations of the two dominant approaches (reductionistic and holistic) to the conceptualizations of coalignment, and adopt the holistic perspective which reflects its multivariate manifestation. Subsequently, we employ the holistic approach in testing the performance impact of environment--strategy coalignment in two samples of business units, across two time-periods, drawn from the PIMS database.

THEORETICAL PERSPECTIVES

The general requirement of coalignment between environment and strategy is understood implicitly (Andrews, 1980; Bourgeois, 1980; Porter, 1980; Scherer, 1980; Miles and Snow, 1978; Snow and Miles, 1983) rather than in explicit functional forms. Thus, theoreticians postulate environment--strategy relationships using phrases such as: 'matched with,' 'contingent upon,' and 'congruent with' or more simply, 'aligned,' 'fit' and 'congruence,' without necessarily providing precise guidelines for translating such statements into the operational domain of empirical research and statistical tests. Consequently, strategy researchers performing empirical tests of the impact of environment--strategy coalignment choose an available (often convenient) functional form and perform statistical tests without examining the validity of the underlying assumptions. Since different conceptualizations imply different theoretical meanings and require the use of specific statistical testing schemes, a general lack of correspondence between the conceptualization of coalignment and its empirical tests is a serious weakness in strategy research (Venkatraman, 1987).

An additional issue pertains to the conceptualizations and measurements of the constituent elements to be coaligned, namely environment, and strategy. This is because the specification of these concepts influences the choice of the testing scheme. For instance, if both the environment and strategy are viewed as categories, then coalignment can be specified as 'matching' and tested within a matching paradigm (Gillett, 1985), which may be inappropriate if environments and strategies are specified using a set of underlying dimensions, each measured along interval scales. In this study, we recognize the diversity that exists in the conceptualizations of environment (Lenz and Engledow, 1986) and strategy (Ginsberg, 1984; Hambrick, 1980), and that these diverse viewpoints can not be reconciled within this study (nor anywhere else). However, we ensure that our specifications of environment and strategy are consistent with our specification of coalignment and corresponding statistical testing of its impact on a criterion variable.

Our conceptualization of environment is based on Porter's (1980) generic environments, which serves to isolate distinct relatively homogeneous contexts for testing the proposition of performance impacts of environment--strategy coalignment. A similar approach is followed in conceptualizing strategy, where we view it as a <u>pattern</u> of key strategic resource deployments (Mintzberg, 1978) and accordingly, select a set of variables that reflect key strategic resource deployments.

Previous research on environment--strategy coalignment can be categorized into: (a) the 'reductionistic' perspective; and (b) the 'holistic' perspective. The former typically views environment and/or strategy in terms of one or few dimensions, with coalignment conceptualized in terms of the set of their bivariate alignments. In other words, the dominant research practice has been to disaggregate environment and strategy into their constituent dimensions to examine the performance impact of pairwise interactions or alignments. In contrast, the latter retains the holistic nature of coalignment between environment and strategy in examining its overall effectiveness on performance. Table 1 compares the two perspectives, and the ensuing discussion focuses on each of these two perspectives.

INSERT TABLE 1 ABOUT HERE

The Reductionistic Perspective of Coalignment

The reductionistic perspective of coalignment is based on a central assumption that the coalignment between two constructs (such as environment and strategy) can be understood in terms of pairwise coalignment among the individual variables that represent the two constructs. Within this perspective some researchers have focused on certain specific characteristics of environment and strategy to assess the implications of coalignment. For example, Anderson and Zeithaml (1984) tested Hofer's proposition of the performance effects resulting from the alignment of business strategy to the stage of the product life cycle; and Hambrick, MacMillan and Day (1982), tested the performance implications of differentially developing strategy to the requirements of the market share and growth positions. The research questions underlying these studies reflect what Miller calls the "atomistic hypotheses... concerning the linear association among small sets of variables" (1981; pp. 1-2). Indeed, a greater proportion of strategy research studies have focused on the relationships among certain environmental attributes, strategy characteristics, and performance (Ginsberg and Venkatraman, 1985).

Testing Approach. In the reductionistic tradition, coalignment is typically specified as the interaction among the constituent variables. Tests of the effects are attempted using analysis of variance, or multiple regressions with the inclusion of interaction terms. Such testing schemes decompose the system of relationships between environment and strategy into distinct components of coalignment that are independent of one another. Let us consider the study of Jauch, Osborn, and Glueck (1980), which examined the financial implications of the environment -- strategy connection. In their study, coalignment was modeled as the interactive effects of eight strategic decision categories and nine environmental challenges. More specifically, coalignment was operationalized as a set of 72 interaction components in a multiple regression equation systems. Since "none of the 72 possible interactions were significant at the 0.05 level ..." (1980; p. 55), they rejected the proposition of performance impacts of environment -- strategy coalignment.

While their failure to support the theoretical proposition is an interesting empirical result that has important bearings on theory building, one should examine the statistical criteria used to test for coalignment. Suppose they had obtained a finite set of significant interactions (a number between 1 and 72), could they have argued for performance implications of environment--strategy coalignment? and more importantly, what guides this choice? Thus, a key issue is the lack of explicit criteria underlying the statistical tests in such disaggregations.

Prescott (1986), using a different data set, namely the PIMS data base, reported that his set of 72 interaction terms (in this case, eight environmental categories and nine strategic variables) did not add significantly to the predictive power of the baseline regression equation of strategy on performance. Subsequently, he examined the specific nature of the role of environment on the strategy -- performance relationship, using Arnold's (1982) distinction between the form and strength of moderation, and concluded that the environment served as a homologizer which moderates the strength, but not the form of the strategy -- performance relationships.

Interpretations. What are the interpretations and conclusions from these two separate studies -- employing radically different databases? If these results convincingly establish that environment--strategy coalignment has no significant performance impacts, then they have serious implications for reassessing many theoretical perspectives in strategy research. An alternate interpretation is that the reductionistic perspective is limited in its ability to reflect the true form of coalignment, and that the statistical tests of moderated regression are inadequate for assessing the impact of coalignment.

It is premature to conclude the former given that the results could conceivably be affected by the choice of testing method. The use of reductionistic analyses presumes that any individual bivariate interaction between a component of environment and a component of strategy will be strong enough to emerge as a statistically significant effect on performance (Alexander, 1964) -- which is a questionable assumption. Given that business strategy is best conceptualized as a multitude of interrelated resource allocation decisions, any individual component is merely a part of the overall package. Therefore, individual bivariate interactions may be either suppressed by or amplified by other interactions (Joyce, Slocum, and von

Glinow, 1982), and even an array of independent interactions fail to capture the complex nature of coalignment.

Thus, it is important to pose a more fundamental question -- Is it theoretically meaningful to test for coalignment by disaggregating strategy--environment relationships into sets of bivariate interactions? An alternate version of this question is: How appropriate is one (or, even a set of) interaction term(s) in capturing the conceptualization of environment--strategy coalignment? The importance of such questions is best illustrated by Van de Ven and Drazin (1985), who noted that most "researchers find it hard to conceptualize fit as anything other than 'interaction' among pairs of individual variables. The use of this approach is so theoretically and phenomenologically pleasing that it has become part of our language and rhetoric." (1985; p.344). Much of strategy research subscribes at least implicitly to this view, and two interrelated explanations can perhaps be offered, namely: (a) narrow conceptualization of the research problem in terms of one or two concepts, under ceteris paribus conditions (Ginsberg and Venkatraman, 1985; and Miller, 1981); and (b) the pervasive use of simple linear models such as the analysis of variance and multiple regression analysis (with interaction terms) as the dominant analytical techniques for statistical tests.

When environment and strategy are represented using an array of variables, the use of a set of pairwise interactions to capture coalignment reflects an error of 'logical typing' (Bateson, 1979). This is because, theoretically, any relationship between the individual interaction components and a criterion variable is meaningless given that the sum of individual components do not represent the whole. Hence, one can argue that a specification of coalignment using a multiplar model (namely, multiplying individual strategy variables with individual environmental variable) does not operationalize the theory of coalignment. Indeed, a careful review of the theoretical literature on environment--strategy coalignment indicates that the proponents of this view (Andrews, 1980; Bourgeois, 1980; Miles and Snow, 1978; Porter, 1980; Scherer, 1980) invoke the notion of coalignment metaphorically, and are hardly precise in specifying the functional form as joint, multiplicative effects of strategy and environment. While conceptual arguments have been offered for aligning strategies to the environmental context for improved performance, it is the empirical researcher who has translated such conceptualizations into a set of disaggregated multiplicative equations. Consequently, the non-existent multiplicative effects reported by Jauch et.al (1980) and Prescott (1986), for example, are neither surprising nor indicative of the underlying proposition of the performance impacts of environment--strategy coalignment.

The Holistic Perspective of Coalignment

This perspective is based on a central premise that it is important to retain the holistic (i.e. global, systematic, gestalt) nature of environment-strategy coalignment. This follows Van de Ven's (1979) articulation of fit as: "that characteristics of environmental niches and organizational forms (that) must be joined together in a particular configuration to achieve completeness in a description of a social system -- like pieces of a puzzle must be put together in certain ways to obtain a complete image" (p.323). Thus, tests of performance effects of coalignment should reflect the simultaneous and holistic pattern of interlinkages between strategy and environment.

Along similar lines, recognizing the inappropriateness of disaggregation, several researchers have called for a movement towards a multivariate, or systemic examination. Miller labels it as a "new contingency approach" that "seeks to look simultaneously at a large number of variables that collectively define a meaningful and coherent slice of (organizational) reality" (1981; p.8). This perspective is reflected by Hambrick (1984), who elaborated on a set of important conceptual and methodological issues for developing strategy taxonomies; Snow and Miles (1983), who proposed a general theory of organizations using several 'overlays'; Miller and Friesen's (1984) strategic archetypes; and Day, DeSarbo, and Oliva's (1987) proposal on the use of 'strategy maps' to represent the combinatory effects of strategy within a particular competitive environment.

Testing Approach. The underlying logic and rationale for adopting a holistic, multivariate specification of coalignment cannot be questioned, but a limiting factor is the lack of appropriate operationalization schemes for systematically testing the existence and effect of coalignment. The common analytic approaches within this perspective are: cluster analysis (Hambrick, 1984) or q-factor analysis (Miller and Friesen, 1984). These exploratory approaches result in empirically-related multivariate interconnections interpreted through the language of the researchers. While these techniques move the analysis beyond bivariate reductionism, they still provide only implicit notions of coalignment rather than explicit specification and testing of a particular conceptualization of coalignment (Venkatraman, 1987). The main difficulty lies in the lack of a systematic scheme to calibrate the differences in the degrees of fit among the underlying variables across the clusters.

An alternative to the inductive, cluster-analytic route is the deductive, pattern-analytic approach (Van de Ven and Drazin, 1985) that serves as a more direct test of the central proposition in this study -- namely, that the degree of adherence in strategic resource deployments to the specific requirements of the environment will be significantly related to performance. Its attractiveness lies in its capacity to recognize the multivariate deviation in the pattern of a business unit's resource allocation profile from an `ideal' profile. Thus, if coalignment can be specified in terms of adherence to a specified profile, then pattern analysis provides a direct test. The basic thesis is that if a profile of strategic dimensions can be obtained for a set of high performing units (within an environment) then any deviations from this profile imply negative performance.

This scheme is fundamentally dependent on the development and justification of the `ideal' profile, which can be derived either theoretically or empirically (Ferry, 1979). The test for the performance impacts of coalignment is provided by the correlation between the degree of deviation from the `ideal' profile and performance. A negative, and (statistically) significant correlation provides a systematic test of the proposition for this perspective.

We propose to adopt the holistic perspective operationalized through pattern analytic approach to test the performance impacts of environment--strategy coalignment for the following reasons:

(a) this scheme retains the holistic, systemic nature of the environment--strategy coalignment and thus, avoids the error of logical typing; yet, it overcomes the subjectivity that underlies the interpretation of clusters in terms of the language of coalignment;

(b) this scheme is flexible in terms of varying the theoretical conceptualization of coalignment; for instance, the relative importance of the constituent strategy dimensions can be incorporated into the measure of coalignment based on theoretical and empirical reasoning; and

(c) a multivariate (interval-level) measure of coalignment is obtained that can be used to examine relationships with a variety of criterion measures, which differs from cluster-analytic approach that treats coalignment in categorical (or, at best ordinal) terms.

Specific Conceptualization of the Research Question

Thus, the central research question of 'environment--strategy coalignment' and its performance impacts can be conceptualized as follows: For any given business unit, if one can specify the requirements of strategic resource deployments for effectiveness (based on its specific environmental context), then a deviation from this pattern of resource allocation represents a misalignment between environment and strategy; this misalignment should be significantly and negatively related to performance criteria.

Testing this specific conceptualization involves (a) the identification of distinct, homogeneous environments; (b) the specification of 'ideal' resource deployments for each environment; and (c) testing the performance effects of environment--strategy coalignment. The tests and results are described in the next sections.

METHODS

Data

The Profit Impact of Marketing Strategy (PIMS) research database was selected for this study. The choice is guided by the consideration that it contains relevant data on a variety of environmental, strategic, and performance variables for over 2000 individual strategic business units (SBUs). A variety of strategy research questions have been examined using this database (Buzzell and Gale, 1987; Ramanujam and Venkatraman, 1984), but its limitations are to be recognized (Anderson and Paine, 1978; Scherer, 1980). Over the years, several examinations of the data quality (Phillips, and Buzzell, 1982; Phillips, Chang, and Buzzell, 1983; and Marshall, 1987) provide support for the contention that the overall quality and reliability of the data is adequate for research purposes.

Constructs and their Operationalizations

Environments. As mentioned earlier, an eight-environmental typology interpretable in terms of Porter's generic environments was used to represent the environments. Such a categorization has been previously operationalized within the PIMS database for strategy research (Prescott, 1986; Prescott, Kohli, and Venkatraman, 1986). The typology was developed through cluster and discriminant analysis of seventeen environmental variables, and interpreted as: global exporting, fragmented, stable, fragmented with auxiliary services, emerging, mature, global importing, and declining environments. Detailed steps of the development of these environments as well as a comparative profile of the seventeen variables across the environments are provided in Appendix I.

Strategy. Consistent with the conceptualization of strategy in this study as a pattern of strategic resource deployments in key areas, seventeen variables were selected. Our view is that the scores along these seventeen variables collectively define and describe strategy, although their relative role may vary across environments. In other words, some strategy variables such as the degree of vertical integration or relative price may be critical in some environments and not in others. Thus, in developing a profile of effective strategy within an environmental context, only a relevant subset is considered as described later. The variable selection is consistent with previous strategy research using this database (Buzzell and Gale, 1987; Hambrick, 1983; Prescott, 1983), and are representative of the four strategy dimensions identified by Hambrick (1983). Table 2 lists the variables in the context of presenting the regression results.

A major limitation in operationalizing strategy as a vector of variables is the assumption of equal importance, which is difficult to justify. Given that strategy involves the deployment of resources consistent with the strategic choice of the management, it is unlikely that a set of variables will be equally important. Indeed, an effective pattern of resource deployments require differential emphasis to the underlying dimensions of strategy based on the environmental context. In order to overcome this limitation, we develop and employ differential weights for the seventeen variables such that strategy is operationalized as a vector of scores reflecting the relative (differential) roles of the seventeen variables within each of the environments. The details of arriving at the weights are described later.

Performance. Conceptualization and operationalization of performance is a thorny issue in strategy research (Venkatraman and Ramanujam, 1986). In this study, an efficiency view of performance is adopted as reflected in the return on investment (ROI) of the business unit. It is a widely used measure of business performance (Hofer, 1983), and is strongly correlated with other relevant performance measures such as return on sales (r=0.85) within this database (Buzzell and Gale, 1987).

Environment--Strategy Coalignment. As discussed earlier, coalignment is conceptualized in terms of the degree of adherence to an 'ideal' profile specified for a given environment[1]. The implication is that a unit deviation from such an ideal profile reflects a unit of misalignment, and should have corresponding negative relationships with performance. The measure of coalignment is derived as a weighted euclidean distance of a business unit from the environment-specific ideal profile. The analytical steps for the development of a multivariate measure of coalignment builds on Van de Ven and Drazin (1985), but has been adapted to (a) consider only those variables that are critical (significantly related to ROI) for a given environment; and (b) reflect the differential weights of the strategy variables both within and across the environments. Figure 1 is a schematic representation of the steps involved in the construction of the multivariate coalignment measure and the assessment of its performance impacts in this study.

INSERT FIGURE 1 ABOUT HERE

ANALYSIS AND RESULTS

Overview

The study was conducted in two phases across two time-periods with a view to assess the stability and robustness of the findings. The first phase used data for the four-year period, 1976-1979 and the second phase used the data for the four-year period, 1980-1983. In both phases, the average values across four years were used to reduce the effect of any non-recurring influences. The sample domain for the first phase was a total of 1638 SBUs, while the second phase had a sample domain of 821 SBUs. The decline in the number of SBUs in the second phase was a reflection of the general trend in the decline in the number of businesses participating in the data base relative to previous years.

Phase One

<u>Step I: Identification of Significant Strategy Variables</u>. As mentioned earlier, it is important to identify the subset of the seventeen variables that are important for a given environment. For this purpose, within each environment, separate OLS regressions are estimated with the seventeen strategy variables as the predictors, and ROI as the criterion. Table 2 summarizes the results of the nine regression equations (one for each of the eight environments and one for the total sample).

INSERT TABLE 2 ABOUT HERE

As summarized in Table 2, the strategy variables account for a minimum of 42% variance in performance across the environments (the level of explained variance ranges from a low of 42% to a high of 60%). Further, it is important to note that the directionality of the impact of the individual strategy variables on performance is unchanged across the environments (except for vertical integration). Additionally, not all the variables are equally critical in all environments. It is beyond the scope of this paper to narratively describe the patterns of effective resource deployments across each of the environments, but we strongly encourage the readers to discern key trends based on the results summarized in Table 2. For this study, the results of Table 3 are important to the extent that they indicate the general profile of effective strategies in each environment with relative importance of the significant variables.

<u>Step II: Identification of the Calibration Sample and the Study Sample</u>. The calibration sample is required to develop the profile of 'ideal' resource deployments in an environment. For this purpose, within each environment, the business units are ranked in terms of their ROI values and the top 10%

of the businesses are selected for the calibration sample. The remaining 90% could conceivably be used as the study sample for each environment. But, if the distribution of the criterion variable, ROI, is non-normal, removal of the top 10% could bias the subsequent analysis of performance impacts of coalignment. Specifically, if it is negatively-skewed, it biases the results in favor of the hypothesis (Type I error); if it is positively-skewed, it biases the results against the hypothesis (Type II error). Even if ROI is normally distributed, it is necessary to remove the bottom 10% (along the ROI scale) to arrive at an unbiased sample domain for testing the coalignment proposition. Thus, the study sample is the total sample (in a given environment) less the top 10% (i.e., calibration sample) as well as the bottom 10% (removed to reduce the bias in restricting the range)[2].

Step III: Development of the Ideal Profile. Within the calibration sample, the standardized mean scores along the significant ($p < .05$) strategy variables (based on the results of step 1) are calculated to specify the ideal profile. Thus, the 'ideal' profile is a vector of standardized scores along a set of significant strategy variables.

Step IV: Construction of the Measure of Coalignment. Coalignment is operationalized as a weighted euclidean distance from the ideal profile along those variables considered significant within an environment. This is an indication of the degree of misalignment between the strategies of each business unit in the study sample in comparison to the strategies of the high performing business units within the same environment. This measure, more propriately conceptualized as misalignment (rather than as coalignment) is termed as MISALIGN, and is calculated as follows:

$$\text{MISALIGN} = \sum_{j=i}^{n} (b_j(X_{sj} - \overline{X}_{cj}))^2$$

where, X_{sj} = the score for the business unit in the study sample for the j^{th} variable;

$\bar{X}_{cj}$ = the mean score for the calibration sample along the j^{th} variable;

b_j = standardized beta weight of the OLS regression equation for the j^{th} variable in the environment; and

j = 1,n where n is the number of strategy variables that are significantly related to ROI in that environment.

Step V: Assessment of Performance Impact of Coalignment. This involves testing the significance of the zero-order correlations between MISALIGN and performance for each of the environments in the study sample. The coalignment proposition is supported if the correlation coefficient is negative, and statistically significantly different from zero. While this serves as a necessary condition, it is not sufficient to convincingly argue that the results imply a strong relationship between coalignment and performance.

This is mainly because the power of this test is unknown. Let us compare this analysis to discriminant analysis, where the power of the discriminant function is reflected by its ability to discriminate among specific groups developed using a set of discriminating variables. For this purpose, the classification accuracy of a set of discriminating variables is compared to a baseline 'chance' model (Morrison, 1969). Some comparison of this form is necessary to provide at least preliminary support for the power of the pattern-analysis test. In other words, what is the likelihood of obtaining a statistically significant negative correlation, when MISALIGN is calculated as deviation from a random profile as opposed to the profile of the high-performing organizations?

To address this question, we should demonstrate that this correlation coefficient is significantly higher than a coefficient between performance and a measure of coalignment calculated as a deviation from any random (i.e., chance) profile. For this purpose, a baseline measure of coalignment (termed as BASELINE) was developed using those variables that were not significantly related to performance in each environment (see step I) -- reflecting a model where resource deployments focus on non-critical areas.

Specifically, our expectation was that (a) the deviation along those variables not critically related to performance would have no significant effect on performance, namely the relationship between ROI and BASELINE would be not different from zero; (b) the correlation between MISALIGN and ROI (r_1) would be significantly stronger than the correlation between BASELINE and ROI (r_2). In this context, it is important to note that the original set of seventeen strategy variables were chosen not only due to their theoretical relevance and importance but also because they were individually correlated with ROI. Thus, the BASELINE measure developed here was a stringent one. It is stringent because a strictly random set of strategy variables from the PIMS database (excluding the seventeen variables) would have had lower correlations with ROI, resulting in a stronger likelihood of accepting our proposition.

Table 3 summarizes the results of the correlational analysis between (a) MISALIGN and performance (r_1) and (b) BASELINE and performance (r_2) for each of the eight environments and the total sample domain in the study sample. It also reports the results of a test for the difference in the magnitude of the correlation coefficients between (r_1) and (r_2)[3].

INSERT TABLE 3 ABOUT HERE

Phase Two

The use of a different sample domain (using a different time period within the PIMS database) serves to enhance the confidence that can be placed on the results. This phase involved the use of 899 businesses drawn for the period -- 1980-1983. If the analysis and results are to be directly comparable, it is necessary to ensure that the characteristics and the number of environments be basically the same, although a business unit may shift from one environment to another either due to strategic actions or environmental changes. Thus, the set of discriminant functions developed in phase one (refer step 5 in Appendix I) was used to assign a business to a particular environment in phase two.

The discriminant functions assign a probability estimate for each business indicating the likelihood that the business belong to a particular environmental group. 78 business units were dropped from further consideration because their probability of being classified into any particular environment was less than .50. Of the 821 remaining business units, the average likelihood probability of being assigned to a particular environment was .88. These 821 business units served as the sample domain.

A comparison of the environmental characteristics for the 1980-1983 sample (Table A-1 in the Appendix) with the 1976-1979 sample (Table A-2 in the Appendix) indicated four significant changes. The two most fundamental changes over the two time periods were (a) a strong decrease in real market growth coupled with (b) a sharp rise in the total share instability of the businesses within the sample. The other two changes were less pronounced -- decrease in industry exports, and a decline in minimum capacity investment required for a business. These changes have face validity given the general economic trend during the 1980-1983 period. While these changes are important in their own right, they do not influence the tests of coalignment which is the focus of this study.

The analysis in phase two followed the same four steps as in phase one, except that two of the environments -- global exporting and global importing -- had sample sizes of 18 and 19, which are inadequate for the analysis, and were therefore excluded. Hence, the analysis and results in this phase pertain to six environments and the total sample.

Table 4 summarizes the results of the seven regression equations. The level of R^2 was approximately the same across the environments. While there is an overall consistency in the sign of the beta weights for the variables across the two time-periods, there are several interesting shifts in their levels of significance. While space constraints prevent us from dwelling on these regression results, we urge interested readers to compare and contrast the similarities and differences across the time-periods by superimposing the results summarized in Tables 2 and 4. However, in the discussions section, we explore some of the possibilities and implications of these results. Table 5 summarizes the results of the coalignment tests for this phase.

INSERT TABLES 4 AND 5 ABOUT HERE

DISCUSSION

Performance Impacts of Coalignment

Phase One. Three important patterns emerge from Table 3. First, as shown in column (1), the relationship between MISALIGN and performance (r_1) is negative and statistically significant as expected in all the environments, and in the total sample. The values of (r_1) range from a lower value of (-) 0.29 to a high of (-) 0.49 indicating strong and consistent results across the environments. The implication is that the deviation from an empirically determined environment-specific 'ideal' profile of strategic resource deployments has negative implications for performance. Thus, it provides a necessary (but not sufficient) test of the impact of environment-strategy coalignment on performance.

The second pattern relates to the results using the baseline model. It is interesting and important to note that not all the correlations between BASELINE and performance are close to zero as expected. As shown in column (2), in two environments, the values of (r_1) are negative, and significantly different from zero, implying that deviation from a random profile could have a negative (and significant effect) on performance. The ability of a baseline model to perform as well as the theoretical model in two environments further bolsters the need for the use of a baseline model for assessing the predictive power of the test, and test for the superiority of the specified 'ideal' profile over the baseline profile. This is achieved by comparing the correlation coefficient using 'ideal' profile and the coefficient using the 'baseline' profile.

The third important pattern relates to the test for the difference in the magnitude of the two correlations (r_1) and (r_2). Eight out of the nine t-tests are significant, and in the hypothesized direction. It is particularly interesting and important that in the two environments where (r_2) also emerged as significant and negative, the difference between (r_1) and (r_2) is significant and in the hypothesized direction, thus supporting the performance impacts of coalignment.

The three patterns taken together provide strong support for the central research question in this study. However, the generalizability of the results has not yet been established. In other words, the external validity of these results to a different sample domain is not known. Ideally, external validity requires that the proposition be tested in a database other than the PIMS database. However, some preliminary support for external validity can be provided by replicating the analysis in a different time period within the same data base as it would test the robustness of the results. For this purpose, we assess the pattern of results from phase two.

Phase Two. Since the aim is to compare the results across the two phases, we focus on the same three patterns as in phase one.

First, the correlation coefficient between MISALIGN and ROI (r_1) is negative and statistically significant in six out of seven cases (except the fragmented environment). While the lack of any performance effects within the fragmented environment cannot be dismissed, it is more important to note that the results are as expected in six of the seven cases. Specifically, the significant values ranged from a low of (-) 0.28 to a high of (-) 0.63 indicating strong and consistent results as in the first phase. Second, none of the correlation coefficients between BASELINE and ROI (r_2) are significantly different from zero at p-values less than .01, while two are marginally significant at p-levels better than .05. This is generally in line with the results obtained in phase one. Third, the pattern of t-tests for the differences in the magnitude of correlations between (r_1) and (r_2) are not as strong as in phase one (possibly due to the smaller sample size in this phase, which influences the t-test of differences). In four of the seven tests, including the overall sample (n=654), the t-tests are as expected, thus providing general support for the stability of results across the phases.

Collectively, the results of the second phase provide strong support for the generalizability of the results obtained in the first phase. Indeed, results from both phases taken together strongly support the theoretical proposition of performance impact of environment--strategy coalignment.

Implications for Strategy Research

The general notion of coalignment is a central anchor for strategic management research (Andrews, 1980; Miles and Snow, 1978; Venkatraman and Camillus, 1984). Its use in theory construction is limited unless considerable attention is provided to link the articulation of the theoretical position with appropriate operationalization schemes (Venkatraman, 1987). Specifically, in researching the effects of environment--strategy coalignment, two important issues emerge -- (a) the problems surrounding the conceptualization and operationalization of environments and strategy; and (b) the development of an appropriate analytical scheme (given the specific conceptualizations of environment and strategy) for systematically measuring the degree of coalignment and its impact on performance.

The contribution of this paper is in its linkage of the above two issues. It developed a conceptualization of environment--strategy coalignment as deviations in ideal patterns of strategic resource deployments and provided strong empirical support for the general proposition. In adopting this particular perspective, we strongly argued that the use of a multiplicative model for testing environment--strategy coalignment is weak, given the lack of theoretical meaning to the interaction term(s) as well as the possibility of committing an error of 'logical typing.'

Although the performance implications of environment--strategy coalignment is an intuitively appealing and generally-accepted axiom, we are not aware of a study that has provided consistent and systematic empirical support for this proposition. For instance, Hofer (1975) argued for strategy--product life cycle alignment that has received some empirical support (e.g., Anderson and Zeithaml, 1984; Harrigan, 1980; Thorelli and Burnett, 1981); and Schendel and Patton (1978) argued for and empirically demonstrated the need to align strategic resource deployments to the specific requirements of the strategic group within the brewing industry. However, no study, in our opinion, adopted broader conceptualizations of environment and strategy, as well as developed appropriate schemes to operationalize coalignment in assessing the implications of coalignment. Thus, this paper provides empirical support for an important unquestioned axiom in strategy research. At a theoretical level, it reinforces the importance of 'domain navigation' (namely, developing business strategies given a specific 'domain definition') in strategic management research.

More general implications for strategy research include the need to be more precise in articulating the nature of 'fit' and ensuring that there is adequate correspondence between the verbal domain and the operational domain of empirical research and statistical tests. The absence of such correspondence weakens the link between theory-building and theory-testing and contributes to methodological invalidity.

Limitations

A major limitation is that the study reflects what Venkatraman and Camillus (1984) call 'external fit' -- namely, the formulation of strategy in alignment with the environmental context. Given that an effective strategic management involves both formulation and implementation, it would have been desirable to consider a broader set of variables that reflect organizational context and implementation issues. However, the limitation is due to the availability of data in the PIMS program. Reflecting an industrial organization economics and marketing perspectives of competitive strategy, this database has not yet been enlarged to contain relevant organizational variables. This would have enabled one to test Thompson's (1967) view of administrative coalignment as well as Miles and Snow's (1978) view of strategic adaptation of concurrently and consistently solving three problem domains. We hope that future research would be predicated on systematic empirical tests of important untested theoretical propositions that are rooted in the concept of coalignment.

Pattern-Analytic Approach: Methodological Extensions

As we move away from bivariate fit under ceteris paribus conditions towards conceptualizing and operationalizing fit in its multivariate, holistic manifestation, pattern-analytic approach will have its appeal beyond the specific theme of 'environment--strategy' coalignment. This analytic scheme is intuitively appealing, but it is important to recognize that its statistical power is unknown, which weakens the interpretations and conclusions that can be derived. In order to partially overcome this limitation, we explicitly developed a baseline model for comparison. Its use enhances the confidence that can be placed on the results by discounting a plausible rival explanation of a random model. Indeed, based on our results, we strongly urge that users of this method in the future employ an appropriate baseline model with a formal test of the superiority of their chosen profile, as done here. It is clear that in the absence of a most logically defensible baseline model, the power of this approach to testing for the impact of coalignment is considerably weakened.

Effective Strategies -- Cross-Sectional Versus Longitudinal Approaches

The analysis conducted across the two time-periods raised a parenthetical issue pertaining to the oft-voiced concern regarding the use of cross-sectional versus longitudinal approaches to isolating effective strategies. Specifically, it relates to the differences observed in the importance of various strategy variables across the two time periods (Tables 2 and 4). A close examination reveals several changes in the pattern of significant variables within the environments. While they do not undermine the validity of this study (that rests on the stability of results of performance impacts of coalignment in different cross-sectional samples), they highlight specific implications for strategy research using this database. More broadly, it raises issues relating to the role of multi time-period analysis as well as longitudinal approaches to the assessment of coalignment. Towards this end, we offer some speculative reasons for the observed differences in the pattern of strategy-performance relationships over time.

First, if we characterize the 1976-1979 period as a 'normal' economic period, then the 1980-1983 period is relatively more 'recessionary.' It is highly likely that the key determinants of success changes across the economic periods. This is consistent with the observations made by Ravenscraft and Scherer (1982) that a systematic modeling of the lag structure between R&D and return was complicated by the different economic periods. At a first glance, one may be tempted to call the reliability of the database into question. But such a conclusion is premature. Indeed, our regression results suggest the need to replicate and reexamine many of the strategy findings that have emerged from this database using a different time-frame reflecting a different economic period.

Second, it could be that the sample in phase two is different from the sample in phase one. But, there seems to be no strong evidence to support this view, except in the fragmented and stable environments -- which exhibited the largest number of changes. In both these environments, concentration levels rose and market growth rates fell during the 1980-1983 period. In addition, the stable environment experienced a drop in total share instability, which ran counter to the overall trend during this period. However, given the strong discriminant analysis results, the possibility appears to be low.

Third, there is a possibility of changes in strategies and/or environment, resulting in transitionary states even during a four year period. For example, Prescott (1986a) reported that only 128 of a sample of 702 business units could be classified into the same category of generic strategy and environment over a six-year period. This implies a general movement across environments as well as shift in strategies.

These results indicate the need to explore longitudinal designs that permit modeling environment--strategy coalignment along a 'dynamic' mode. While such schemes are not presently available, it is clear that a major challenge and an area of opportunity is for the development of appropriate analytical schemes that permit an evaluation of the theory of coalignment over time.

CONCLUSIONS

This paper addressed the performance impacts of coalignment between environment and strategy using two different samples drawn from the PIMS database. While this is a central issue, the extant research is limited by virtue of inappropriate operationalizations of coalignment. In this paper, we employed a systemic approach to the conceptualization of coalignment as the degree of adherence to an ideal profile of strategic resource deployments within a particular environment. The results of the tests carried out here strongly support the thesis that the attainment of an appropriate match between environment and strategy has systematic implications for performance.

Notes

1. This research study is based on an assumption that there is only one ideal profile of resource deployments within a given environment. This does not imply that there is only one successful strategy. Different combinations of resource deployment patterns employing this study's operationalizations of fit can be equally successful or unsuccessful. Our assumption is necessary for empirical reasons given the relatively small size of the calibration sample within a given environment. Future studies that focus on some of the larger environments within this database may be able to pursue the route of specifying multiple ideal profiles consistent with the theory of generic strategies (or, equifinality). Indeed, it is a useful line of future inquiry.

2. We thank one of the journal reviewers for bringing this issue to our attention.

3. This is a test for the difference in the dependent correlation (Bruning and Kintz, 1987; p.228).

REFERENCES

Aldrich, H. Organizations and Environments, Englewood Cliffs, NJ: Prentice-Hall, Inc., 1979.

Alexander, C. Notes on the Synthesis of Form, Boston, Mass.: Harvard, 1979.

Anderson, C. and Paine, F.T. ` PIMS -- a reexamination', Academy of Management Review, 3, 1978, pp. 602-612.

Anderson, C., and Zeithaml, C. ` Stage of product life cycle, business strategy and business performance'. Academy of Management Journal, 27, 1984, pp. 5-24.

Andrews, K.R. The Concept of Corporate Strategy, Homewood, Ill.: 1980.

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

Bateson, G. Mind and Nature, New York, NY: E. P. Dutton, 1979.

Bourgeois, L.J. III. `Strategy and environment: A conceptual integration', Academy of Management Review, 1980, 5, pp. 25-39.

Bruning, J.L., and Kintz, B.L. Computational Handbook of Statistics, Glenview, Ill.: Scott, Foresman, and Co. 1987.

Buzzell, R.D., and Gale, B.T. The PIMS Principles, New York: The Free Press, 1987.

Chandler, A.D. Strategy and Structure, Cambridge, Mass.: MIT Press, 1962.

Day, D.L., W.S. DeSarbo, and Oliva, T. `Strategy maps: A spatial representation of intra-industry competitive strategy', Management Science, 1987, 33(12), in press.

Fry, L.W., and Smith, D. A. `Congruence, contingency, and theory building', Academy of Management Review, 1987, 12, pp. 117-132.

Galbraith, J.R., and Nathanson, D. Strategy Implementation: The Role of Structure and Process, New York, NY: West Publishing, 1978.

Gillett, R. `The matching paradigm: An exact test procedure', Psychological Bulletin, 97, 1985, pp. 106-108.

Ginsberg, A. `Operationalizing organizational strategy: Toward an integrative framework', Academy of Management Review, 1984, 9, pp. 548-557.

Ginsberg, A., and Venkatraman, N. `Contingency perspectives on organizational strategy: A critical review of the empirical research', Academy of Management Review, 1984, 10, pp. 421-434.

Gupta. A. K. and Govindarajan, V. `Business unit strategy, managerial characteristics, and business unit effectiveness at strategy implementation', Academy of Management Journal, 1984, 27, pp. 25-41.

Hambrick, D.C. `Operationalizing the concept of business-level strategy in research', Academy of Management Review, 1980, 5, pp. 567-576.

Hambrick, D. C. `Strategies for mature industrial-product businesses: A taxonomical approach'. In John H. Grant (Ed.), Strategic Management Frontiers. JAI Press, forthcoming.

Hambrick, D. C. `Taxonomic approaches to studying strategy: Some conceptual and methodological issues', Journal of Management, 10, 1984, pp. 27-42.

Hambrick, D. C. `An empirical typology of mature industrial product environments', Academy of Management Journal, 26, 1983, pp. 213-230.

Hambrick, D. C., MacMillan, I. G., and Day, D. L. `Strategic attributes and performance in the BCG matrix -- a PIMS-based analysis of industrial product businesses', Academy of Management Journal, 25, 1982, pp. 510-531.

Harrigan, K.R. Strategies for Declining Businesses, Lexington, Mass.: Lexington Books, 1980.

Hitt, M. A., Ireland, R. D., and Stadter, G. `Functional importance and company performance: Moderating effects of grand strategy and industry type', Strategic Management Journal, 3, 1982, pp. 315-330.

Hofer, C. W. `Toward a contingency theory of business strategy', The Academy of Management Journal, 1975, 18, pp. 784-810.

Hofer, C.W. ROVA: A New Measure for Assessing Organizational Performance. In Robert Lamb (Ed.) Advances in Strategic Management. Greenwich, CT.: JAI Press, Vol 2, 1983, pp. 43-56.

Jauch, L. R., Osborn, R. W., and Glueck, W. F. `Short-term financial success in large business organizations: The environment-strategy connection', Strategic Management Journal, 1, 1980, pp. 49-63.

Joyce, W., Slocum, J. and Von Glinow, M. `Person-situation interaction: Competing models of fit', Journal of Occupational Behavior, 3, 1982, pp. 265-280.

Lenz, R.T., and Engledow, J. L. `Environmental analysis units and strategic decision-making: A field study of selected leading edge corporations'. Strategic Management Journal, 7, 1986, pp. 69-89.

Lorange, P. and Vancil, R.F. Strategic Planning Systems, Englewood Cliffs, NJ: Prentice-Hall, 1977.

MacMillan, I. C., Hambrick, D. C., and Day, D. L. `The product portfolio and profitability - A PIMS-based Analysis of industrial-product businesses', Academy of Management Journal, 25, 1982, pp. 733-755.

Marshall, C.T. PIMS and FTC line of business data: A comparison. Unpublished doctoral dissertation. Harvard University, 1987.

Miles, R. E., and Snow, C. C. Organizational strategy, structure, and process, New York: McGraw-Hill, 1978.

Miller, D. `Toward new contingency approach: The search for organizational gestalts', Journal of Management Studies, 18, 1981, pp. 1-26.

Miller, D., and Friesen, P. H. Organizations: A Quantum View, New Jersey: Prentice-Hall, 1984.

Mintzberg, H. `Patterns in strategy formation', Management Science, 24, 1978, pp. 934-948.

Morrison, D. G. `On the interpretation of discriminant analysis', Journal of Marketing Research, 6, 1969, pp. 156-163.

Phillips, L. W., and Buzzell, R. D. An examination of the reliability of PIMS's competitive strategy measures. Stanford University: Working Paper, 1982.

Phillips, L. W., Chang, D. R., and Buzzell, R. D. `Product quality, cost position and business performance: A test of some key hypotheses', Journal of Marketing, 47, 1983, pp. 26-43.

Porter, M. E. Competitive Strategy, New York: The Free Press, 1980.

Prescott, J. E. Competitive environments, strategy types, and business performance: An empirical analysis. Unpublished doctoral dissertation. Pennsylvania State University, 1983.

Prescott, J. E. `Environments as moderators of the relationship between strategy and performance', Academy of Management Journal, 29, 1986, pp. 329-346.

Prescott, J. E. Strategic adjustment: A longitudinal analysis. Paper presented at the 46th Annual Meetings, Academy of Management Meetings, 1986.

Prescott, J. E., Kohli, A. J., and Venkatraman, N. `The market-share-profitability relationship: An empirical assessment of major assertions and contradictions', Strategic Management Journal, 7, 1986, pp. 377-394.

Ramanujam, V. and Venkatraman, N. `An inventory and critique of strategy research using the PIMS data base', Academy of Management Review, 9, 1984, pp. 138-152.

Ravenscraft, D., and Scherer, F. M. `The lag structure of returns to research and development', Applied Economics, 14, 1982, pp. 603-620.

Rumelt, R. Strategy, Structure, and Economic Performance. Cambridge, Mass.: Harvard University Press, 1974.

Schendel, D.E., and Patton, G. R. `A simultaneous equation model of corporate strategy', Management Science, 24, 1978, pp. 1611-1621.

Scherer, F. M. Industrial Market Structure and Economic Performance, Chicago: Rand McNally, 1980.

Snow, C. C. and Miles, R. E. `The role of strategy in the development of a general theory of organizations'. In Lamb (ed.), Advances in Strategic Management, Greenwich, Connecticut: JAI Press, Inc., Vol. 2, 1983, pp. 231-159.

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

Thorelli, H.B., and Burnett, S. C. `The nature of product life cycles for industrial goods businesses', Journal of Marketing, 45(4), 1981, pp. 97-108.

Van de Ven, A.H. `Review of Howard E. Aldrich's Organization and Environments', Administrative Science Quarterly, 24, 1979, pp. 320-325.

Van de Ven, A., and Drazin, R. `The concept of fit in contingency theory'. In L. L. Cummings and B. M. Staw (eds.) Research in Organizational Behavior, New York: JAI Press, Vol. 7, 1985, pp. 333-365.

Venkatraman, N. `The concept of "fit" in strategy research: Towards verbal and statistical congruence', Academy of Management Proceedings, 1987, pp. 51-55.

Venkatraman, N., and Camillus, J. C. `Exploring the concept of "fit" in strategy research', Academy of Management Review, 9, 1984, pp. 513-525.

Venkatraman, N., and Ramanujam, V. `Measurement of business performance in strategy research: A comparison of approaches', Academy of Management Review, 11, 1986, pp. 801-814.

Appendix 1

Development of Environments

The empirical development of eight environments is based on seventeen market structure characteristics. It is based on cluster analysis and discriminant analysis, and interpreted in terms of Porter (1980). The detailed steps are outlined below.

Step 1: Selection of 17 environmental variables based on theory and previous research (Scherer, 1980) and lack of multicollinearity.

Step 2: Random selection of 311 business units.

Step 3: Cluster analysis of the 311 business units (Ward's method).

Step 4: Choice of number of subgroups; the criteria were: (a) examination of sharp changes in error sum of squares when the number of clusters is changed, and (b) visual inspection of the dendogram.

Step 5: Cross-validation through discriminant analysis and the increase in sample size to 1638 business units.

Step 6: Chow test ($F = 3.48$, 8,502, $p < 0.01$) for the equality of a full set of regression coefficient for the 16 conduct variables across the eight groups. Thus, not appropriate to pool the environments.

Step 7: Development of profiles for each subgroup based on both natural and standardized means scores of the 17 environmental variables.

Step 8: Interpretation of the subgroups in terms of Porter's (1980) typology of generic industries.

The accompanying Tables contains the values of each of the seventeen variables for the eight environments for the two phases. Table A1 for Phase one and Table A2 for Phase two.

Table A-1. A Summary of the Eight Competitive Environments 1976-1979

Environmental variables	Total sample mean	Global exporting	Fragmented standard products	Stable non-fragmented	Fragmented with auxiliary services	Emerging	Mature	Global importing	Declining
	Competitive Environment								
Industry concentration	56.61	64.17	44.40*	58.74	45.38*	58.40	68.11*	74.35*	60.35
Life cycle stage	2.81	2.58*	2.89	2.68	2.91	2.45*	2.91	2.81	3.05*
Total share instability	12.85	13.93	13.23	10.25*	11.59	18.18*	12.72	12.79	14.03
Long-term industry growth	9.08	12.34*	8.81	7.99	7.54	13.71*	12.54*	11.43*	7.21
Industry exports	7.31	30.53*	3.63*	4.67	9.09	4.80	6.61	6.05	4.82
Industry imports	4.80	5.04	4.53	2.22	5.23	3.18	4.05	30.71*	3.82
Material cost growth	9.32	9.40	6.66	10.16	7.54	6.79	19.65*	9.69	8.56
Wage rate growth	8.59	7.85	8.28	7.38	7.59	9.04	16.89*	9.32	8.00
Minimum capacity investment	17.86	23.23	11.08	15.77	16.20	14.25	25.54	16.41	21.82
Real market growth	4.26	10.40*	2.04	3.65	1.32	18.90*	0.23	4.64	0.79
Industry value added/employees	25.85	25.85	24.10	26.57	21.28	23.48	28.02	24.13	31.75*
Percentage of employees unionized	42.42	33.44	38.01	46.25	33.38	26.75*	57.95*	51.57	52.92
End-user fragmentation	20.85	20.17	36.22*	10.04*	29.68*	23.04	19.56	21.98	20.68
Purchase frequency end-users	3.37	3.73	4.46*	2.56*	4.54*	4.07*	3.00	3.57	2.44*
Frequency of product changes	3.71	3.68	1.53*	3.84	3.82	3.65	3.88	3.84	3.92
Development time new product	2.86	2.72	2.39	2.25*	2.89	2.38*	2.73	3.24	3.98*
Importance of auxiliary services to end-users	1.03	1.54*	0.77	1.01	1.46*	1.32	0.87	1.06	0.41*

NOTE: Entries in the cells indicate the values along each environmental variable for each environment.
* Significantly different $p < 0.01$ from mean.

Table A-2. A Summary of the Competitive Environment 1980-1983

Environmental variables	Total sample mean	Global exporting	Fragmented standard products	Stable non-fragmented	Fragmented with auxiliary services	Emerging	Mature	Global importing	Declining
	Competitive Environment								
Industry concentration	58.25	60.11	53.77	61.18	49.00	57.51	65.53	67.53	59.79
Life cycle stage	2.90	2.83	3.00	2.84	3.03	2.60	2.87	3.05	3.01
Total share instability	23.09	16.39	20.97	8.80	11.52	64.47	17.16	30.84	22.57
Long-term industry growth	8.80	9.71	10.30	8.55	7.71	9.93	9.53	8.23	8.44
Industry exports	6.81	25.37	3.89	6.51	8.29	6.04	6.96	6.40	5.86
Industry imports	4.76	3.17	5.56	3.98	4.24	4.15	4.61	29.53	4.15
Material cost growth	8.59	7.38	8.87	8.98	7.15	8.14	11.80	7.41	8.36
Wage rate growth	9.48	8.09	9.50	8.17	8.27	9.41	17.19	9.23	8.83
Minimum capacity investment	15.19	12.89	17.16	14.80	13.14	11.19	20.23	12.84	17.07
Real market growth	1.29	7.44	1.82	0.14	-2.30	13.28	0.22	1.34	-0.79
Industry value added/employees	26.95	24.18	23.03	26.38	23.57	26.88	25.60	29.48	29.66
Percentage of employees unionized	44.34	21.89	38.96	52.07	31.03	27.79	62.39	40.32	52.30
End-user fragmentation	21.79	18.11	32.00	10.67	31.35	23.30	20.48	21.05	21.34
Purchase frequency end-users	3.18	3.56	4.25	2.67	4.72	3.91	2.71	3.05	2.35
Frequency of product changes	3.68	3.72	1.50	3.87	3.65	3.67	3.89	3.84	3.89
Development time new product	2.97	3.00	1.98	2.27	2.68	2.42	3.03	3.37	4.00
Importance of auxiliary services to end-users	0.88	1.17	0.77	1.00	1.41	1.02	0.80	1.00	0.49
n	821	18	44	150	133	117	76	19	264

NOTE: Entries in the cells indicate the values along each environmental variable for each environment.
* Significantly different $p < 0.01$ from mean.

Figure 1
Schematic Representation of the Construction of Multivariate Coalignment Measure

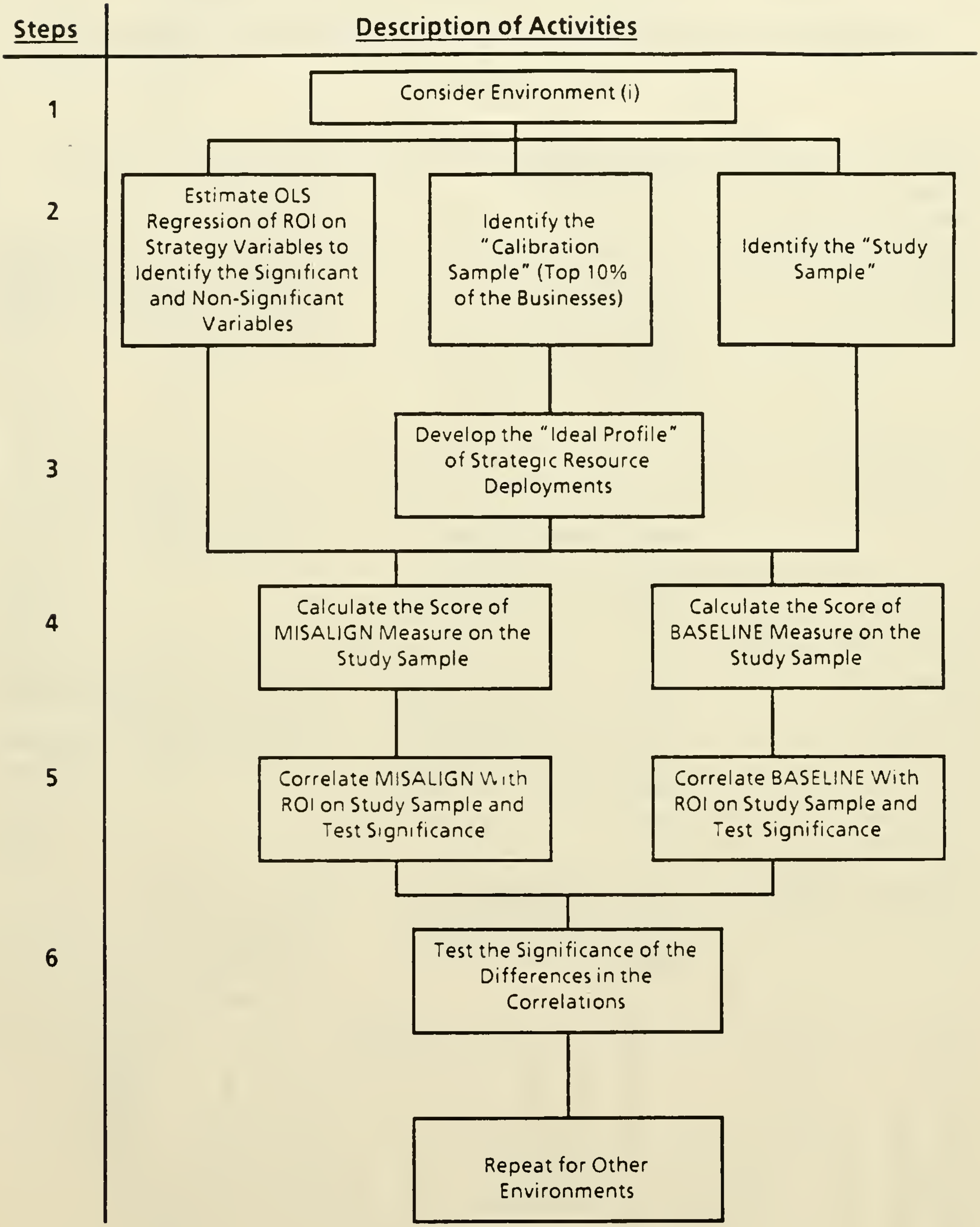

Table 1. A Comparison of Reductionistic and Holistic Perspectives of Coalignment Between Environment and Strategy

CHARACTERISTICS	REDUCTIONISTIC PERSPECTIVE	HOLISTIC PERSPECTIVE
Dominant Approach to Specification of Fit	Fit between few characteristics of environment (e.g., life cycle) and few characteristics strategy (e.g., key resource allocation areas).	A systematic, holistic specification of coalignment between several strategy characteristics.
Strengths	Ability to isolate precise precise theoretically-specified coalignment effects; systematic replications could yield cumulative knowledge.	Ability to retain the holistic complex nature of coalignment.
Weaknesses	Specification erros due invoking *ceteris paribus* conditions; inability to isolate conflicting contingencies: -- logical typing error.	Difficult to generalize to other variants of conceptualizing environment, strategy, and coalignment.
Analytical Methods	Multiple regression analysis with interaction terms; ANOVA; subgroup analysis.	Cluster analysis; pattern-analysis (i.e., profile-deviation), second-order factor analysis; canonical correlation analysis.

Table 2. Strategy Variables Significantly Related to ROI for Each Competitive Environment -- Phase I (1976-1979)

Strategy Variables / Competitive Environments	Exporting	Fragmented	Stable	Auxiliary Services	Emerging	Mature	Importing	Declining	Total Sample
Receivables/Revenue	.04	.13	.01	.01	.20**	.01	.09	.16**	.08**
Total Inventory/Revenue	-.01	.04	-.08*	-.13**	-.13*	-.16**	-.12	-.05	-.06**
Investment Intensity	-.45**	-.56**	-.39**	-33**	-.40**	-.26**	.60**	-.33*	-.38**
Vertical Int. - Backwards	.12	-.17	.00	.04	.02	-.19**	.22*	.11**	.04*
Vertical Int. - Forwards	-.04	.12	-.09**	.08*	-.07	.05	.18*	.02	.01
Capacity Utilization	.17	.32**	.11**	.10**	.11*	.10	.08	.16**	.13**
Employee Productivity	.33**	.14	.22**	.02	.12*	.16**	.04	.26**	.18**
Relative Compensation	-.12	-.02	.02	-.12**	.07	.04	-.22*	.01	-.02
% Purchased 3 Suppliers	.00	-.07	.05	.01	-.04	-.06	.10	.06	.02
Relative Product Breadth	.05	-.03	-.03	.00	.04	-.11	-.12	.08*	.02
Relative Product Quality	.18*	.17*	.12**	.16**	.18**	.12*	.32**	.02	.13**
Relative Price	-.04	-.01	.05	-.03	.03*	-.17*	-.05	.04	.03
Relative Direct Cost	-.11	-.21*	-.17**	-.30**	-.20**	-.30**	-.20*	-.18**	-.13**
Manufacturing/Revenue	-.22**	-.05	-.17**	-.30**	-.20**	-.30**	-.20*	-.18**	-.21**
Total R&D/Revenue	-.11	-.10	.01	.01	-.15**	-.05	-.11	.05	-.01
Marketing/Revenue	-.08	-.10	-.13**	-.18**	-.24**	-.10	-.11	-.15**	-.17**
Relative Market Share	.06	.11	.10**	.21**	.06	.22**	.01	.17**	.13**
Adjusted R^2	.60	.51	.44	.49	.48	.57	.59	.42	.42
Sample Size	93	88	402	376	167	127	62	323	1638

* $p < .05$ ** $p < .01$

Table 3

The Relationship Between Coalignment

Measures and Performance

Phase 1 (1980-1983)

Environment	Study Sample n[a]	Correlation Coefficient of Performance With MISALIGN (1)	BASELINE (2)	t-test[@] for difference (1) & (2)
Global Exporting	75	(-) 0.40**	(-) 0.19	1.64**
Fragmented	70	(-) 0.29*	(-) 0.13	1.06
Stable	324	(-) 0.34**	(-) 0.17	2.67**
Aux Services	300	(-) 0.43**	(-) 0.07	5.37**
Emerging	134	(-) 0.49**	(-) 0.06	5.36**
Mature	101	(-) 0.42**	(-) 0.12	2.42**
Global Importing	62	(-) 0.44**	(-) 0.31**	2.66**
Declining	260	(-) 0.33**	(-) 0.21*	1.64*
Full Sample	1305	(-) 0.36**	(-) 0.07	8.57**

* $p < .05$
**$p < .01$

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[a]Sample size is reduced by 20% (top 10% for calibration purposes and bottom 10% to counterbalance the sample).

[b]These calculations are based under the condition that the two relevant correlations are dependent on the correlation coefficient between

Table 4. Strategy Variables Significantly Related to ROI for Each Competitive Environment -- Phase II (1980-1983)

Strategy Variables \ Competitive Environments	Fragmented	Stable	Auxiliary Services	Emerging	Mature	Declining	Total Sample
Receivables/Revenue	.06	.01	-.05	.02	-.11	.04	.03
Total Inventory/Revenue	.12	.12	-.10	-.08	.19*	-.01	-.01
Investment Intensity	-.21	-.45**	-.42**	-.43**	-.49**	-.47**	-.50**
Vertical Int. - Backwards	-.14	-.16**	.14*	-.01	-.13	.05	.01
Vertical Int. - Forwards	-.42*	-.02	-.03	-.01	-.11	-.04	-.05*
Capacity Utilization	.02	.04	.11	.12*	-.08	-.05	.04
Employee Productivity	.08	.25**	.18*	.38**	.12	.31**	.26**
Relative Compensation	.17	.09	-.12	-.01	.23**	.06	.03
% Purchased 3 Suppliers	.07	.15**	-.01	-.02	-.03	-.01	.01
Relative Product Breadth	.01	.10	-.08	-.03	-.04	-.07	-.04
Relative Product Quality	.11	.07	.22**	.24**	.12	.04	.12**
Relative Price	-.52**	.20**	-.04	.14	-.11	.06	.06*
Relative Direct Cost	.06	-.26**	-.04	.06	-.39**	-.14**	-.11**
Manufacturing/Revenue	-.05	-.11	-.26**	-.10	-.17**	-.28**	-.20**
Total R&D/Revenue	-.19	.22**	-.04	-.02	-.08	.05	.03
Marketing/Revenue	-.18	-.18**	-.16*	-.50**	-.37**	-.18**	-.23**
Relative Market Share	.53**	.02	.12	.05	.27**	.19**	.18**
Adjusted R^2	.66	.46	.47	.55	.71	.48	.42
Sample Size	44	150	133	117	76	264	821

* $p < .05$
** $p < .01$

Table 5

The Relationship Between Coalignment

Measures and Performance

Phase 2 (1980-1983)

Environment	Study Sample n[a]	Correlation Coefficient of Performance With MISALIGN (1)	BASELINE (2)	t-test[b] for difference (1) & (2)
Global Exporting	18	na	na	----
Fragmented	36	(-) 0.01	(-) 0.12	0.50
Stable	120	(-) 0.32**	(-) 0.01	2.73**
Aux Services	106	(-) 0.28**	(-) 0.22*	0.56
Emerging	93	(-) 0.31**	(-) 0.22*	1.00
Mature	60	(-) 0.63**	(-) 0.17	3.42**
Global Importing	19	na	na	----
Declining	210	(-) 0.39**	(+) 0.06	4.93**
Full Sample	654	(-) 0.39**	(-) 0.05	6.98**

* $p < .05$
**$p < .01$

@Sample size is reduced by 20% (top 10% for calibration purposes and bottom 10% to counterbalance the sample).

[b]These calculations are based under the condition that the two relevant correlations are dependent on the correlation coefficient between MISALIGN and BASELINE (see Bruning and Kintz, 1987; p.228).