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PAPER NO. 89-1577**

A Contingency Model
of the Adoption of the
Multidivisional Organization

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A Contingency Model of the Adoption of
the Multidivisional Organization

Joseph T. Mahoney, Assistant Professor
Department of Business Administration

A CONTINGENCY MODEL OF THE ADOPTION OF
THE MULTIDIVISIONAL ORGANIZATION

This paper examines the proposition that the multidivisional structure is determined by both power and efficiency imperatives. It is theorized that combining the coalitional power and information-processing perspectives of organizational choice improves predictive power. The theory is tested on 291 Fortune 500 firms. The results largely confirm theoretical expectations.

INTRODUCTION

A stream of research in strategic management has considered the adoption of the multidivisional (M-form) as an adaptive response to the problems of bounded rationality (an information-processing imperative) and opportunism of organizational members where control and auditing systems are inadequate to mitigate the agency problem of the separation of ownership and control (Chandler, 1962; Williamson, 1975). Another stream of research has considered organizational decisions from a coalitional power perspective (Cyert and March, 1963; Pfeffer and Salancik, 1978). While many researchers advocate the combining of efficiency and power frameworks (Goldberg, 1980; Jemison, 1981; Lindblom, 1977; Ulrich and Barney, 1984) there has been little empirical work (with the notable exception of Palmer, et. al. (1987)) that combines these theoretical perspectives.

From the efficiency perspective, the M-form has an information-processing advantage relative to the large functional enterprise. The functional form is subject to cumulative control loss and a transformation of strategic formulation. Loss of control results from serial reproduction loss as fragmentary or erroneous information moves up and instructions are inadequately operationalized as they move down the hierarchy. In addition

lower level managers may intentionally falsify information to their advantage (Williamson, 1970).

Strategy formulation may be altered as expansion of the functional form ultimately overwhelms the ability of the top level managers to provide corporate planning decisions and daily coordination of operations (Galbraith, 1973; Mintzberg, 1979). The M-form is viewed from the efficiency perspective as an institutional response to problems of interdependence, subgoal pursuit and confounding of strategic and operating decisions (Williamson, 1975).

In addition to efficiency explanations for the emergence of the multidivisional organization, an explanation based on the power of coalitions in the organization has been proposed (Pfeffer and Salancik, 1978). Palmer, et. al. (1987) argue that the conflict between top management and two types of external ownership interests, family and financial institutions, may influence the organizational choice.

Ultimately, the usefulness of these perspectives must be determined empirically. However, following Palmer, et. al. (1987), the model does not attend to the reductionist agenda of choosing one perspective over another. Rather, the paper maintains the general view that theoretical pluralism is a legitimate methodology which increases empirical content (Bowman, 1989; Jemison, 1981), and specifically suggests that the multidivisional organization may be best understood by incorporating economic, administrative and power perspectives (Bettis and Prahalad, 1983).

THE RESEARCH MODEL: A CONTINGENCY MODEL OF THE M-FORM

The multidivisional model tested is a contingency model for predicting the likelihood of the adoption of the multidivisional organization. The model analyzes the effects of firm size, firm strategy (diversification), environmental uncertainty and coalitional power (Palmer, et. al., 1987) on organizational choice.

A well-grounded theoretical perspective is that structure follows strategy (Chandler, 1962) and that in particular the multidivisional structure follows the strategy of diversification (Channon, 1973; Chenhall, 1979; Dyas & Thanheiser, 1976; Rumelt, 1974; Paven, 1976; Suzuki, 1980). The strategy of diversification --- whether motivated by a resource-based imperative (Penrose, 1959; Rubin, 1973; Wernerfelt, 1984); to obtain technological capability (Nelson and Winter, 1982; Teece, 1982); for financial reasons (Bowman, 1980; Jensen and Ruback, 1983; Song, 1983), for managerial reasons (Amihud and Lev, 1981; Mueller, 1969); to achieve synergies (Ansoff, 1965; Baumol, Panzar and Willig, 1982); to reduce dependencies (Pfeffer and Salancik, 1978); to reduce transaction costs (Williamson, 1985); to utilize slack capacity (Chandler, 1977); or to increase market power (Scherer, 1980) ---- leads to problems of accountability, control, and coordination.

A diversity of product lines tend to overload the decision process of centralized organizations (Galbraith, 1977). The reorganization from the functional to the M-form attenuates information overload problems. The M-form structure constitutes

a near-decomposable system to mitigate bounded rationality constraints (Simon, 1962). The total system of decisions are factored into "loosely coupled" subsystems (Weick, 1976).

An ideal multidivisional involves the following: (1) Identification of separate economic activities and in particular a separation of strategic and operating functions; (2) Constructing quasi-autonomous divisions where profitability is observable and measurable; (3) Monitoring the efficiency of each division by a specialized corporate staff; (4) Awarding incentives to promote profit-seeking behavior; (5) Allocating cash flows to high yield uses; (6) Performing strategic planning (Hill and Hoskisson, 1987; Williamson, 1975). Arguably, the most important function of the M-form are the creation of its own miniature capital market to achieve an efficient allocation of capital (Heflebower, 1960; Williamson, 1970), and the attenuation of bounded rationality and opportunistic behavior (Williamson, 1985).

The multidivisional form may also mitigate the agency problem of the separation of ownership from control (Berle and Means, 1932) since internal auditing and control systems installed by the M-form overcome problems of asymmetric information. Several studies support the M-form hypothesis that multidivisionals, by attenuating the "information impactedness" problem between corporate, business, and functional units, increase profitability (Armour and Teece, 1978; Burton and Obel, 1980, 1988; Hill, 1985; Hoskisson and Galbraith, 1985; Teece, 1981; Thompson, 1981). However, a few studies do not support

the M-form hypothesis (Cable and Dirrheimer, 1983; Cable and Yosuki, 1985; Harris, 1983), while others suggest a contingency theory for the advantages of the M-form (Hill, 1988; Hoskisson, 1987).

Hoskisson and Hitt (1987) suggest that even on theoretical grounds, the M-form does not completely solve the agency problem as the highly diversified multidivisional leads to a focus on short-term profitability (Hayes and Abernathy, 1980; Loescher, 1984). This latter group of studies questions whether the multidivisional is an unequivocally superior organizational form. If the contingency paradigm is correct (Galbraith, 1973; Thompson, 1967) then the M-form needs to be linked with the interactive effects of efficiency and power variables in predicting (and prescribing) organizational form.

Efficiency Perspective

From the Chandler-Williamson efficiency perspective, the model tests whether diversification increases the likelihood of the adoption of the M-form (H1). Also, geographic dispersion is expected to increase coordination and control problems, and consequently is predicted to increase the likelihood of the adoption of the M-form (H2). Grinyer, Yasai-Ardekani and Al-Bazzaz (1980) found this relationship positive and statistically significant. A model which tests the separate effects of diversification and geographic dispersion on organizational form must also take into account the impact of an increase in

diversification increasing the geographic dispersion of the enterprise (H3).

The generalizations of diversity - structure linkages must be qualified by consideration of size. Self-contained product divisions may be too small to have their own marketing, research, or production department. Williamson (1975) argues that increased size leads to the possibility of control loss within the centralized organization and is an important variable in determining organizational form. In contrast to Williamson's theoretical perspective, Stopford and Wells (1972) argue that absolute size by itself does not have a direct relationship with (divisionalized) structure, that it is diversity that induces divisionalization. Thus, the model needs to test the hypothesis that increased size induces the adoption of the M-form structure (H4) or whether an increase in size (capacity) leads to an increase in diversity and/or geographic dispersion which results in the M-form (Donaldson 1982, 1986) (H5). Grinyer and Yasai-Ardekani (1981) found that size exerts a direct causal influence towards adopting the M-form. However, Donaldson (1982) found that the association between size and the use of the M-form disappeared when industrial diversity is controlled in partial correlations. In both Donaldson's study and in our sample, only Fortune 500 firms are considered so that the importance of size may be under-estimated.

A major impediment to divisionalization is the existence of a common technical system that cannot be segmented. Chandler (1962) asserts a technological rationale for determining which industries one may find diversification and ultimately the

multidivisional form. Industries that did not accept the M-form structure were: [A] Copper and Nickel; [B] Steel; [C] Aluminum; and [D] Materials {firms in these industries we shall designate as **METMAT**}. Industries that only partially accepted the M-form: [A] Petroleum companies; [B] Processors of agricultural products {**PETAGR**}. Industries that widely accepted the M-form: [A] Electrical and Electronics; [B] Power machinery and Automobiles; [C] Chemicals (**ELMACHEM**).

An aluminum producer despite large sales, a diversity of customers and a variety of end products may be forced to retain a functional structure because it can only afford one smelter. Thus, it is not surprising to find that the aluminum, copper, nickel and steel industries have been among those which have been late to adopt the M-form (Chandler 1962). Technologies with low applications (steel, metal industries) imply that diversification will be low and consequently that the M-form will not be adopted (**H6**). Conversely, technologies with an abundance of applications (electronics, chemicals, power machinery) imply diversification and consequently the likelihood of the adoption of the M-form is expected to be much higher than petroleum and agricultural firms (**H7**).

Coalitional Power Perspective

In addition to the economic explanations for the emergence of the multidivisional form, an explanation based on the power of coalitions in the organization has been articulated by Cyert and

March (1963) and by Pfeffer and Salancik (1978). A conflict may develop between top management and two types of external ownership interests (families and financial institutions) which influences organizational choice. In particular the model considers whether family-dominated firms prefer centralized control of operations and have a direct negative effect on the likelihood that firms choose the M-form (H8). Also, it is hypothesized that family-dominated firms may resist diversification (which dilutes their ownership and control over the firm) and similarly may resist geographic dispersion (H9). Several case studies have observed that family-dominated firms tend to resist adoption of the M-form (Chandler (1962); Channon (1973); Pavan (1976)). Furthermore, Channon (1973) found that family-controlled companies proved to be less diversified than the non-family-controlled companies.

Palmer et al. (1987) hypothesized that bank-dominated firms will be slow to adopt the M-form because the M-form threatens the demand for the economy-wide investment information and expertise of the banks. Since banks are in competition with the large multidivisional ("a mini-bank"), the hypothesis is that bank domination will imply a direct negative effect on the M-form (H10). Also, to the extent that bank dominated firms are less diversified and less geographically dispersed, the indirect effects will also lead to a lower likelihood of the adoption of the M-form (H11).

Finally, concerning life-cycles of the organization, we test whether older firms due to structural inertia have a direct negative effect on the adoption of the M-form (Fligstein, 1985;

Hannan and Freeman, 1984) (H12). On the other hand, older firms may be larger and may pursue geographic dispersion and diversity which would lead to a positive effect (Chenhall, 1984) on the choice of the M-form (H13).

METHODS

A sample of 325 of the 500 largest U.S. industrials in 1965 were selected and classified along functional or multidivisional lines. Missing data reduced the sample to 291 in all analyses. The year 1965 was chosen because there were still a significant number of functional organizations remaining in the Fortune 500. Between 1966-1971, many of the remaining F-form structures became M-form organizations (Bhargava, 1972, Hoskisson, 1987). This surge in the diffusion process warrants closer scrutiny (Mahajan, Sharna, and Bettis, 1987). In the sample 194 firms (2/3) were classified as multidivisional and 97 firms (1/3) were classified as functional. Seven previous works were used to validate the classifications (Armour and Teece, 1978; Bhargava, 1972; Chandler, 1962; Harris, 1983; Palmer, et. al. (1987); Rumelt, 1974; Teece, 1981).

Of the 291 firms in the sample, 139 were classified by Palmer et. al. (1987) and 12 of the 139 (8.6%) were inconsistent with my classification. Of the 291 firms, 173 were classified by Rumelt and 10 of the 173 (5.8%) were inconsistent with my classification. Consistency of classification of organizational form made independently by several researchers increases validity and replicability.

Geographic dispersion is measured by three proxies: (1) The number of geographically separate plants; (2) The number of cities in which firm's plants operated; (3) The number of states in which firm's plants operated. Data on the location of each corporation's plants and on the industries in which they produced were obtained from the Fortune 500 Plant and Product Directory, 1966.

Due to the large sample size, I chose to utilize SIC-based measures of diversification, rather than Rumelt's classification scheme. Montgomery (1982) found that the 2-digit, 3-digit, and with one exception at the 4-digit level, SIC-based measures of diversification (such as the Berry-Herfindahl index) increase consistently with the strategy categories. Thus, there is a high degree of correspondence between the continuous and categorical measures. Montgomery noted that the Berry-Herfindahl measure is particularly well suited for large sample cross-sectional analysis. Diversification indices are simple, easy to compute, objective, and replicable.

Several SIC measures have been articulated in the literature. The proxy used by Palmer et. al. (1987) was a product count measure. The analyses here will consider both product count (Gort, 1962; Rhoades, 1973) and Berry (1975) measures of diversification.

A drawback of the product count measure is that undue weight is given to minor activities and the SIC classifications are somewhat arbitrary. Merely counting product lines exaggerates the overall significance of diversification since most firm's

product volume distributions are highly skewed, with a few product lines accounting for the bulk of sales or employment while numerous other lines are relatively small. A firm, 99% of whose sales were accounted for by a single 5-digit product is hardly diversified regardless of the number of 4-digit industries represented in by the remaining one percent.

The Berry index corresponds to the Hirschman-Herfindahl index:

$$B = 1 - \sum_{i=1}^N (P_i)^2$$

where P_i = ratio of the firm's output in the i^{th} industry to the

total output. This measure of diversification considers not only the **number** of industries in which a firm is active, but also the distribution of the firm's production activity among those industries. A firm with 99 percent of its output accounted for by a single 4-digit product is not diversified regardless of the number of 3-digit industries represented by the remaining one percent. On the other hand, a firm with its productive activity equally divided among four 3-digit industries is likely to be "diversified", even if no more than four 4-digit products are involved.

The index takes on a value of 0 for a specialized firm acting in a single industry and approaches unity when a firm produces equally in a large number of industries = $(1 - 1/N)$, where N = number of industries in which it is active. The index is comparatively insensitive to minor secondary activities. I maintain that this measure is in fact desirable for studying the effects of diversification on organizational change. The

empirical analysis considers the Berry-Herfindahl index across 2-digits, 3-digits and 4-digits. The average Berry index for 1965 across 2-digits for my 291 firm sample was .406, the average across 4-digits was .679.

The size of the Fortune 500 firm is measured by four alternative proxies: (1) Sales; (2) Assets; (3) Invested Capital; and (4) Employees. Corporate Age is measured by the number of years (in decades) between 1965 and the year the firm was incorporated. The year of incorporation was obtained from Moody's Handbook of Common Stocks. The primary industry in which each firm produced was obtained from the U.S. Bureau of the Census (1977).

Burch's (1972) study of the largest 500 U.S. industrial corporations in 1966 was used to measure dominance by family coalition. Three categories suggested by McEachern (1975) were used:

"Free of family influence" -- if no identifiable group of related people owned more than 4% of their stock;

"Family owned" (FOWN =1) -- if more than 4% of their stock was owned by group of related people, none of whom were inside board members, otherwise FOWN=0;

"Family owned and controlled" (FOAC =1) -- if more than 4% of their stock was owned by a group of related people, at least one of whom was an inside board member, otherwise FOAC=0.

The U.S. Congress House Committee on Banking and Currency, Pattman Subcommittee on Domestic Finance (1968) was used to measure dominance by bank coalition. This volume lists the amount of stock and number of board seats 49 large financial

institutions held in the largest 500 U.S. industrial corporations in 1966:

If no bank or combination of banks owned at least 5% of a firm's stock, it was considered "free of bank influence";

If more than 5% of a firm's stock was owned by a bank or group of banks, but none of the board seats were held by representatives of these institutions, the firm was considered "bank owned" (BOWN = 1; 0 otherwise);

If more than 5% of a firm's outstanding common and preferred stock (with partial or full voting rights) was owned by a bank or group of banks and one or more of its board seats was held by a representative of this bank or group of banks the firm was considered "bank owned and controlled" (BOAC =1; 0 otherwise);

A summary of the variables used in the study is given in Table 1. Table 2 gives details of the means, standard deviations, and correlations for all the variables. There is no apparent problem of multicollinearity, and the correlations give strong indications that the hypotheses generated earlier are on target.

Insert Tables 1 and 2 about here

A TEST OF THE MULTIDIVISIONAL THEORY

Hypotheses were tested by estimating a system of structural equations:

- (1) $MF = f [LNST, BDIV4, LNE MPL, METMAT, PETAGR, AGE, FOWN, FOAC, BOWN, BOAC]$
- (2) $LNST = f [BDIV4, LNE MPL, METMAT, PETAGR, AGE, FOWN, FOAC, BOWN, BOAC]$
- (3) $BDIV4 = f [LNE MPL, METMAT, PETAGR, AGE, FOWN, FOAC, BOWN, BOAC]$

The second and third equations are estimated using ordinary-least squares linear regression (Tables 4 and 5). Because of the binary dependent variable ($MF = 0$, or $MF = 1$), the logistic response function is used to represent the impact of the effects on the probability of becoming multidivisional in the first equation (Table 3). The logit model allows the use of categorical or discrete variables for both dependent and independent variables. Since the model contains qualitative independent variables, logistic regression is chosen over discriminant analysis (Press and Wilson, 1978).

$$\text{Letting } X_{1J}, X_{2J}, X_{3J}, \dots, X_{10J} = X_J$$

stand for the 10 factors described above for subject J, we have:

$$P(MF_J = 1 | X_J) = \exp \left(B_0 + \sum_{i=1}^{10} B_i X_{iJ} \right) / 1 + \exp \left(B_0 + \sum_{i=1}^{10} B_i X_{iJ} \right)$$

where $MF_J = \begin{cases} 0 & \text{if the enterprise is not multidivisional} \\ 1 & \text{if the enterprise is multidivisional} \end{cases}$

$P(MF_J = 1 | X_J)$ is the probability that a firm with company and market characteristics X_J uses a multidivisional structure.

Taking the natural logarithm of both sides of the equation yields the linear relation between the factors and the logit or log odds ratio:

$$\text{LN} \left[P(MF_J = 1 | X_J) / 1 - P(MF_J = 1 | X_J) \right] = B_0 + \sum_{i=1}^{10} B_i X_{iJ}$$

The coefficients were estimated by maximizing the likelihood function:

$$L(MF_J | X_J; B) = \prod_{J=1}^N P(MF_J = 1 | X_J)^{MF_J} * (1 - P(MF_J = 1 | X_J))^{1-MF_J}$$

where N = the 291 firms on which the data have been collected.

A noteworthy feature of this model is that even though the dependent variable is binary, the model's predictions are not. Rather, the model's predictions are estimates of the probability of taking on the value of 1 (rather than 0). Maximization of the likelihood function was accomplished with the Gauss-Newton nonlinear least squares method.

 Insert Tables 3, 4, and 5 about here

To test the hypothesis that the explanatory variables have no impact on the choice of probabilities P_i , that is, the

$$B_1 = B_2 = \dots B_{10} = 0$$

the test statistic is $-2 [\ln \hat{l}(\theta) - \ln \hat{l}(w)]$

where $\hat{l}(\theta)$ is the value of the likelihood function evaluated at the maximum likelihood estimates and $\hat{l}(w)$ is the maximum value of the likelihood function under the hypothesis that $B_1 = B_2 = B_{10} = 0$. If the hypothesis is true, then asymptotically, the test statistic has a chi-square distribution with

(K-1) degrees of freedom. From our logit regression, the value of the test statistic is $-2 (126.91 - 185.23) = 116.624$. The chi-square with 10 degrees of freedom at the one percent level of significance equals 25.188, so that we can reject the hypothesis that $B_1 = B_2 = \dots B_{10} = 0$. A related summary measure is the McFadden R^2 computed as $1 - \ln \hat{l}(\theta) / \ln \hat{l}(w)$ $= 1 - 126.91 / 185.23 = .31482$. This measure has value zero when $\tilde{B}_1 = \tilde{B}_2 = \dots \tilde{B}_{10} = 0$ and value 1 when the model is a perfect predictor. This measure is analogous to the coefficient of determination R^2 in linear regression models.

RESULTS

As Table 6 below shows, the results support the economic explanation of the M-form.

 Insert Table 6 about here

An increase in diversification, as measured by the Berry-Herfindahl 4-digit index, significantly increases the likelihood that the enterprises use the M-form in support of H1. The results were robust across the seven diversification measures used. The results were also robust using probit analysis.

Geographic dispersion, as measured by the log of the number of states in which the enterprise had plants, significantly

($p < .01$) increases the likelihood that the enterprises use the M-form, supporting H2. The results also hold when the log of cities or the log of plants were used as proxies for geographic dispersion. From the OLS regressions, diversification significantly increased geographic dispersion in support of H3.

While Palmer et al. (1987) found a slightly negative relationship between size (measured by the log of employees) and the likelihood of the enterprises adopting the multidivisional structure, in our study, an increase in size (LNEMPL) was positively associated with the M-form, but did not increase the likelihood of the M-form at a statistically significant level. This supports the Stopford and Wells (1972) argument that diversification, rather than size per se has an influence on organizational form. This conclusion from the data however is a tentative one. The result is not robust across size measures (Kimberly, 1976). When size is measured by the log of assets for example, while all other regression results hold, the size variable is positive and significant ($p < .10$), supporting H4.

That an increase in size leads to an increase in the likelihood of the M-form is suggested by Williamson (1975) and is consistent with the empirical results of Grinyer and Yasai-Ardekani (1981). Since the sample in the study is restricted to the Fortune 500, this significant result should apply a fortiori to a general enterprise population sample. Further empirical work is required to determine the influence of size on organizational form. The OLS equations indicate that increased size also induces increased diversification and increased

geographic dispersion in support of H5. This result was robust across size measures, dispersion measures and diversification measures.

Consistent with Chandler (1962), the industries associated with high capital requirements and low technically driven diversification were significantly less likely to adopt the M-form. The logit analysis indicates that the metals and materials firms were significantly ($p < .05$) less likely to adopt the M-form which supports Chandler (1962, Ch.7). The Palmer et al. (1987) study on the other hand, did not support Chandler's findings that the metals and materials firms were less likely to adopt the M-form. Besides using a Berry diversification measure and a larger sample size, the discrepancy between their results and ours is partly due to the discrepancy in the classification of M-form and F-form. For example, they classified such firms as Kennecott Copper Corp. and Republic Steel as multidivisional while several other independent researchers have classified them as functional.¹

The petroleum and agricultural firms ($p < .01$) were less likely to utilize the M-form than the enterprises whose primary industry was chemical, machinery, or electrical in support of H7. The petroleum and agricultural firms were also significantly less diversified but they were significantly more geographically dispersed than the chemical, electrical, and machinery firms.

1 This criticism of the Palmer et. al. (1987) study is not intended to be contentious. In fact, the author regards the paper as an exemplar of scholarly work, based on well-grounded theoretical and empirical work which is completely replicable. This paper in fact bears out the robustness of the model in terms of a different sample and alternative proxies for variables. The paper highlights those areas where caution in predictions need to be exercised.

The results also support the political coalition view of the firm (Pfeffer and Salancik, 1978). Those firms that were family dominated (FOWN, FOAC) were significantly ($P < .10$; $p < .01$) less likely to adopt the multidivisional structure in support of H8. The family-dominated firms FOWN also diversified significantly less ($p < .05$) in support of H9. Family coalitions resist diversification because it threatens their ownership and control. If diversification via acquisitions is financed by debt, the power of banks in firm's long-run decisions increase. If acquisitions are financed by issuing new stock, then the holding of family members are diluted and outside managers are required which reduces the power of family members. In contrast to the Palmer et al. (1987) study, our results indicate no effect of family-dominance (FOWN, FOAC) on geographic dispersion.

Bank-dominated firms (BOWN, BOAC) were less likely to adopt the M-form in support of H10. However, only the BOWN enterprises were significantly ($p < .10$) less likely to adopt the M-form. Palmer et al. (1987: 39) suggest a possible rationale for this result:

Banks may not discourage firms from adopting the M-form as vigorously when they own and control (as opposed to only own) them, because they are in a position to insure that the adoption of this form does not allow a firm to internalize the capital market. By placing representatives on the board (and perhaps the finance committee), banks may be able to control a firm's capital allocation process, when banks are only the dominant stockholders in a firm, they may not be able to exercise such influence on a regular basis.

Also, bank-owned and controlled firms were significantly ($p < .05$) less dispersed geographically. However, there was no effect of bank domination on diversification in contradiction to H11.

Little support was found for the organizational variant of the ecological approach. Although AGE was negatively associated with adoption of the M-form suggesting a structural inertia effect, the effect was not statistically significant in contradiction to H12. The age of the enterprise also had no effect on geographic dispersion. However, in contrast to Palmer, et. al. (1987), the results indicated that a firm's increase in age leads to a significant ($p < .05$) increase in diversification in support of H13.

DISCUSSION

This eclectic model considers traditional industrial economics variables (such as the Berry-Herfindahl index and the influence of the primary industry), and a coalitional view of the firm (Cyert & March, 1963; Pfeffer and Salancik, 1978), where family-dominance and bank dominance are important factors in explaining and predicting an enterprise's strategy and structure. The model significantly improves the explanation and prediction of organizational form.

Although some of the results were not consistent with Palmer, et. al. (1987), the overall conclusion is that the model proved quite robust to changes in sample and proxies, for this time period. A question to be addressed in future research is: How well does the model predict organizational form for later (or earlier) time periods? The model presented stands up quite well to the criteria of multiple connectedness and replicability. A well-grounded theoretical and empirical literature suggests

that the model is generalizable. Of course, this latter assertion must be backed with the hard currency of further empirical efforts.

Finally, it is submitted that the multidivisional paradigm illustrates the central premises of the paper: (1) a synthesis of efficiency and power perspectives is a viable research program; and (2) theoretical pluralism increases empirical content and should be valued by those concerned with progress in the emerging field of strategic management (Bowman, 1989, Huff, 1981).

TABLE 1

Summary of variables used in regressions presented

Variable	Description
MF	= 1 if firm is multidivisional = 0 if functional
LNST	Natural log of the number of states that the enterprise had plants (*)
BDIV4	Berry-Herfindahl 4-digit measure of diversification (**)
LNEMPL	Natural log of the number of employees of the enterprise (***)
METMAT	= 1 if enterprise's primary industry is in metals or materials = 0 otherwise
PETAGR	= 1 if enterprise's primary industry is in petroleum or agriculture = 0 otherwise
FOWN	Family-owned
FOAC	Family-owned and controlled (Defined in Methods section)
BOWN	Bank-owned
BOAC	Bank-owned and controlled (Defined in Methods section)
AGE	(1965- Year of Incorporation)/10

* = two other measures of geographic dispersion used

** = six other diversification measures used

*** = three other size measures used

TABLE 2

Means, Standard Deviations and Correlations

	Mean	SD	1	2	3	4	5	6	7	8	9	10
1 MF	.67	.47										
2 LNST	2.18	.81	.39									
3 BDIV4	.68	.24	.42	.41								
4 LNEMPL	9.83	.97	.32	.39	.31							
5 METMAT	.15	.35	-.12	.01	-.06	-.04						
6 PETAGR	.22	.41	-.25	.10	-.32	-.16	-.22					
7 AGE	5.78	2.26	.06	.19	.18	.21	.04	.05				
8 FOWN	.09	.29	-.09	.05	-.11	.03	.08	.01	-.02			
9 FOAC	.43	.50	-.25	-.15	-.09	-.23	-.01	.06	-.02	-.28		
10 BOWN	.09	.28	-.11	-.03	.01	.02	-.03	.03	-.06	.05	.10	
11 BOAC	.12	.35	-.06	-.09	.01	.09	.08	-.05	.01	-.07	-.01	-.13

Pearson product-moment correlations are used when both variables are continuous. Spearman rank-order correlations are used when at least one variable is categorical.

TABLE 3

Logit Regression Dependent Variable: MF

VARIABLE NAME	ESTIMATED COEFFICIENT	T-RATIO	
LNST	1.0158	4.1099	***
BDIV4	2.2345	2.9832	**
LNEMPL	0.3495	1.6469	
METMAT	-1.2479	-2.7125	**
PETAGR	-1.5206	-3.6192	***
AGE	-0.0812	-1.1025	
FOWN	-1.0136	-1.8899	*
FOAC	-1.0809	-3.1613	**
BOWN	-0.8892	-2.0608	*
BOAC	-0.6317	-1.1485	
Constant	-4.4476	-2.2536	

* =(p <.10) ** = (p <.05) *** = (p <.01)

Log Likelihood (0) = -185.23

Log Likelihood Function = -126.91

McFadden $R^2 = .31482$

Craig-Uhler $R^2 = .45859$

The number of correct predictions from the model was 233. The percentage of correct predictions then was 80.07 percent.

TABLE 4

OLS Regression	Dependent Variable	LNST		
Variable Name	Estimated Coefficient	T Ratio		
BDIV4	1.329	7.28	***	
LNEMPL	0.262	5.74	***	
METMAT	0.180	1.55		
PETAGR	0.543	5.22	***	
AGE	0.015	0.84		
FOWN	0.240	1.64		
FOAC	-0.093	-1.08		
BOWN	-0.143	-1.24		
BOAC	-0.365	-2.59	**	
Constant	-1.454			
F value	16.2			
R^2	.342			

* = (p < .10) ** = (p < .05) *** = (p < .01)

TABLE 5

OLS Regression	Dependent Variable	BDIV4	
Variable Name	Estimated Coefficient	T Ratio	
LNEMPL	.056	3.87	***
METMAT	-.067	-1.77	
PETAGR	-.157	-4.80	***
AGE	.015	2.50	***
FOWN	-.106	-2.23	**
FOAC	-.022	-0.80	
BOWN	.026	0.69	
BOAC	-.008	-0.18	
Constant	.103		
F value	8.67		
R^2	.198	* = (p < .10)	** = (p < .05) *** = (p < .01)

TABLE 6

MULTIDIVISIONAL MODEL

HYPOTHESIS	RESULT
H1: Diversification induces the adoption of the M-form	ACCEPT (p<.05)
H2: Geographic dispersion induces the adoption of the M-form	ACCEPT (p<.01)
H3: Diversification increases geographic dispersion	ACCEPT (p<.01)
H4: Increased size induces the adoption of the M-form	REJECT
H5: (a) Increased size leads to an increase in diversification	ACCEPT (p<.01)
(b) Increased size results in an increase in geographic dispersion	ACCEPT (p<.01)
H6: Technologies with low applications (Metals & Materials) will have low diversification & thus adoption of the M-form is less likely	ACCEPT (p<.05)
H7: Technologies with high applications such as electronics, chemicals & power machinery will adopt the M-form with a higher probability than petroleum and agricultural firms	ACCEPT (p<.01)
H8: Family-dominated firms prefer centralized control and will have a direct negative effect on the likelihood that firms choose the M-form	ACCEPT FOWN (p<.10) FOAC (p<.05)

- | | |
|-------------------------------------------------------------------------------------------------------------------|-----------------------------|
| H9: (a) Family-owned firms may resist diversification, which dilutes their ownership and control over the firm | ACCEPT
FOWN (p<.10) only |
| (b) Family-dominated firms resist geographic dispersion | REJECT
FOWN and FOAC |
| H10: Bank domination will have a direct negative effect on adoption of the M-form | ACCEPT
BOWN (p<.10) only |
| H11: (a) Bank- dominated firms are expected to be less diversified | REJECT
BOWN and BOAC |
| (b) Bank-dominated firms are expected to be less geographically dispersed | ACCEPT
BOAC (P<.10) only |
| H12: Older firms, due to structural inertia, are expected to have a negative effect on the adoption of the M-form | REJECT |
| H13: (a) Older firms may pursue greater geographic dispersion | REJECT |
| (b) Older firms are expected to have greater diversification | ACCEPT
(p<.05) |

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