

# Environmental Heterogeneity, Strategy-Making, Structure And Small Business Performance: A Path Analytic Model

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## Abstract

*A causal model of relationships among environmental heterogeneity, proactivity in strategy-making, structural integration, and economic performance was developed and tested using data from 100 small firms. Our analysis supported some of the research propositions, and a number of indirect relationships. Conclusions and practical implications are discussed.*

## Introduction

The significance of small business to the U.S. economy is generally acknowledged by academicians and practitioners. In a recent work, for instance, Robinson and Pearce (1984), in response to the question, "Why is it important to undertake strategic planning research in predominantly small and growing firms?", indicated that the importance of small and growing firms comes from an understanding of their collective impact on the economy. In further addressing the importance of small business to the United States, Robinson and Pearce (1984) suggested that small businesses or businesses with less than \$17 million in annual sales, dominate the retailing, service, and construction industry sectors.

Although much has been written about the management of small firms, there is a paucity of empirical research in the area. A number of scholars have, however, empirically examined the relationship of locus of control to strategy, environment and structure (Miller, Kets de Vries, and Toulouse, 1982); the impact of chief executive personality on corporate strategy and structure (Miller and Toulouse, 1986a); the impact of strategy, structure, and chief executive personality on performance (Miller and Toulouse, 1986b), in a small business context. With the exception of a recent study by Miller, Droge, and Toulouse (1988) examining the relationships between chief executive officer (CEO) personality, environment, structure, strategy process, and strategy context in a causal model, there have been no studies to date that have examined these constructs simultaneously in a causal model.

A major purpose of the present study is to extend the

work of Miller and his associates (1982, 1986a, 1986b, and 1988) by exploring the relationships between environment, strategy, and structure among a different group of small firms in a different region of North America. A second purpose is to add the performance construct to a causal model examining these organizational and environmental attributes.

A review of the relevant literature and the various propositions to be tested will now follow.

## Theoretical Background and Propositions

### *Environment, Strategy, and Performance*

A number of researchers have examined and supported a linkage between environment and strategy in industrial organization economics (Yip, 1982; Harrigan, 1982; Rumelt, 1982; Prescott, 1983), in organization theory (Jauch, Osborn, and Glueck, 1980; Zeithaml, Anderson, and Paine, 1981), and in marketing (Anderson and Zeithaml, 1984; Thorelli and Burnet, 1981). However, as Miles and Snow (1978) have demonstrated, it is possible for firms in a particular environment to follow many different strategies. We expect firms in heterogeneous environments to employ proactive strategies. Intuitive modes of strategy-making will not suffice as more dimensions must be taken into account in order to accurately interpret the challenges and opportunities facing the firm (Miller and Friesen, 1983; Steiner, 1969). Hence:

*Proposition 1:* Environmental heterogeneity will be

positively related to strategy.

The linkage of strategy to performance is a central tenet of the structuralist paradigm. Indeed, as Kim and Lim (1988) observe, the logic relating environment to strategy, and strategy to performance is compelling. A number of researchers have empirically examined and supported the linkage between strategy and performance (Lieberson and O'Connor, 1972; Rumelt, 1977; Beard and Dess, 1979, 1981; Sheperd, 1972; Gale, 1972, 1974; Schoeffler et al., 1974; Buzzell, Gale, and Sultan, 1975). We, therefore, expect strategy to directly impact performance.

*Proposition 2:* Strategy will have a direct positive impact on performance.

#### *Environment, Structure, and Performance*

The linkage between an organization's structure and its environment is one of the most widely investigated in the study of organizations. These studies typically have hypothesized and supported a positive relationship between environment and structure (e.g., Burns and Stalker, 1961; Thompson, 1967; Lawrence and Lorsch, 1967). In the study reported here, it is expected that firms will employ structural integration devices to cope with complexity in the environment. In other words, in the face of variations among a firm's markets, we expect more participative and consultative management.

*Proposition 3:* Environmental heterogeneity will be positively related to structural integration.

Dalton et al. (1980) in an exhaustive review concluded that the literature on structure-performance relationship is among the most vexing and ambiguous in the field of management and organizational behavior. They pointed out that positive, inverse, curvilinear, and zero relationships have been found by different researchers.

In the study undertaken here, we expect the use of consultative and participative management to enhance performance in an environment characterized by variations in competitive tactics, customer tastes, product lines, and channels of distribution (Miller, 1987).

*Proposition 4:* Structural integration will be positively related to performance.

#### *Strategy and Structure*

Beginning with early work by Chandler (1962),

researchers have investigated and supported a linkage between strategy and structure (e.g., Rumelt, 1974; Miles and Snow, 1978; Lenz, 1981).

In a recent study examining the relationship between strategy-making and structure, Miller (1987) found that proactive decision making prompted the establishment of committees and task forces to ensure that a multiplicity of viewpoints came together to reduce the hazards of bold ventures.

*Proposition 5:* Proactiveness of decisions will be positively related to structural integration.

#### **Summary**

Figure 1 depicts the model examined in this research. It is presented in the form of a path analytic diagram, and it captures the linkages discussed in the preceding sections of this paper.

The exogenous variable (Environmental heterogeneity) is expected to have a positive direct effect on proactivity; it is also expected to have a positive direct effect on structural integration (Propositions 1 and 3). The links among the endogenous variables are as follows: proactiveness is expected to have positive, and direct, effects on structural integration and performance (Propositions 5 and 2). Structural integration is expected to have a positive direct relationship with performance (Proposition 4).

#### **Methods**

##### *Sample and Procedure*

A field study was undertaken involving interviews with 100 CEOs from the Memphis Tennessee Metropolitan area. The SBA's current set of small business size standards was followed, in restricting the population of interest in this study to firms with 5 to 100 employees and less than \$17 million in sales. The firms ranged in size from sales of \$50,000 to a little over \$6,000,000. Means sales were \$481,084.77 with a standard deviation of \$447,447.02. The average number of employees was 30. Firms were in such varied industries as retailing, manufacturing, transportation, construction, and services. No standard industrial classification group represented more than 5% of the sample. The broad representation of types of businesses in the sample gives the research findings a reasonably high degree of generalizability. All responses to the questionnaire were obtained through personal interviews, allowing the interviewer to explain any potentially

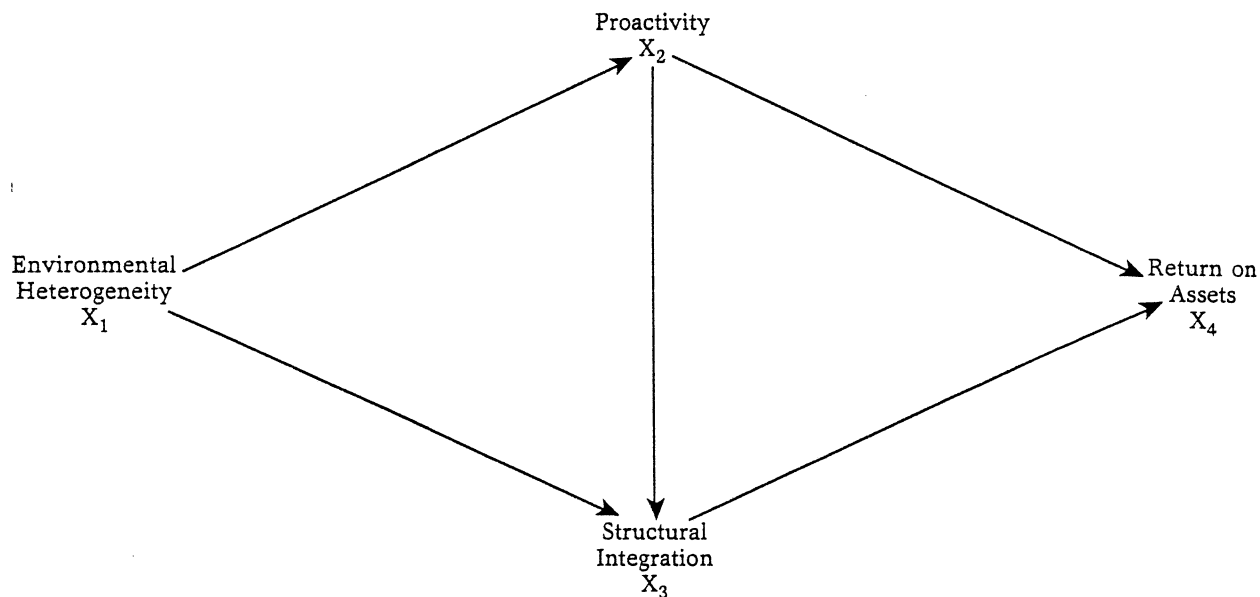


Figure 1. Path diagram

vague items, and minimize and problem of missing data (Miller et al., 1982).

Contact letters were sent to 480 randomly selected firms requesting cooperation in the research. Contact was then made with the selected CEOs to determine if the firm met both criteria (number of employees and dollar sales volume). A pretest of the questionnaire was done on three firms to ascertain that there were no vague items. Data on these three firms were not used in the analysis.

One hundred and ten CEOs agreed on the follow-up telephone calls to be interviewed. Ten questionnaires were considered unusable, giving the study an adjusted response rate of 20.8%. Ninety-six percent of the CEOs in the final sample were men, and all interviewees had been in their present positions for at least eight years.

An important limitation to our findings is the use of cross-sectional data. The lack of longitudinal data implies that the temporal ordering of variables cannot be clearly established. An important direction future research might follow would be to test a model with longitudinal data.

#### *Variables and Measurements*

The environmental heterogeneity, strategy-making, and structural integration variables used in this study were originated by Miller (1983, 1987, 1988), Miller and Droge (1986), and Khandwalla (1977).

*Environmental heterogeneity.* This variable concerns the differences in competitive tactics, customer tastes, product lines, and channels of distribution across the firm's respective markets (Miller and Friesen, 1983). It was measured with a four-item questionnaire. These items had high internal consistency in the present sample ( $\alpha = .70$ ). Each item was measured on a 7-point scale with 1 indicating about the same, and 7 indicating varies a great deal.

*Proactiveness.* This variable reflects the levels of reactivity or proactiveness of decisions (Miller, 1987). This strategy-making dimension indicates decision makers acting on, rather than reacting to, different situations. Proactiveness was measured by two items ( $\alpha = .69$ ). Each item was measured on a scale, with 1 indicating a tendency to follow competitors, and 7 indicating a tendency to be ahead of competitors.

*Structural integration.* This variable reflects the extent to which firms used integrative mechanisms to assure compatibility among decisions in one area with those in other areas, and the extent to which participative, cross-functional discussions characterized decision making at top levels (Miller, 1988; Miller and Droge, 1986). Six of the eight items used to assess structural integration were measured on a scale ranging from 1, used rarely, to 7, used frequently. The last two items were scaled from 1 (each department makes decisions more or less on its own, without regard to other departments), to 7 (there is a great deal of departmental interaction on most decisions); and 1 (often there is a

lack of complementarity between decisions made in one department and those in another), to 7 (decisions of the different departments tend to be mutually reinforcing). These items also had high internal consistency in the present sample ( $\alpha = .63$ ). The reliability values for the environmental heterogeneity, proactiveness, and structural integration indicators were above the lower limits of acceptability, generally considered to be around .50 to .60 (Nunnally, 1978).

*Performance.* The performance indicator in this study was return on assets, measured in terms of a 3-year average (1983, 1984, and 1987), and spanning a 5-year period (1983 through 1987). The main reason for using an accounting return as a measure of performance is that financial indicators are the most useful measures of organizational performance at the macro-organizational level (Van de Ven and Ferry, 1980). Furthermore, managers and external analysts often use return on (net) assets as a measure of the effectiveness and efficiency of top management (Grant, Jammine, and Thomas, 1988).

### Analysis

LISREL VI (Joreskog and Sorbom, 1986) was used to test the recursive path-analytic model. An essential aspect of path analysis is the construction and testing of a hypothesized model of reality based on the state of current theory in the particular area being investigated (Bedeian and Armenakis, 1981).

In the research model tested here, environmental heterogeneity (X1) is an exogenous variable; proactivity (X2), structural integration (X3) and return on assets (X4) are endogenous variables.

### Results

Table 1 presents the correlations, means, and standard deviations for all the variables, and Figure 2 contains the results of the path analysis.

As can be seen in Figure 2, of the six propositions that constituted the research model, the paths leading from proactivity to structural integration, and structural integration to performance were significant, with critical ratios above 2. LISREL VI (Joreskog and Sorbom, 1986) provides standard errors for the estimates of parameters, and a critical ratio (estimate/standard error) greater than 2 is normally taken to be significantly different from zero (Joreskog and Sorbom, 1986). None of the paths emanating directly from environmental heterogeneity were significant.

### Discussion and Implications

The results with respect to the data used in the present study indicated that environmental heterogeneity did not have significant direct relationships with the endogenous constructs of proactivity, structural integration, and return on assets.

On the basis of the structuralist paradigm, it was expected that there would be direct and positive relationships between environmental heterogeneity and strategy, and strategy and performance. Furthermore, based on economic tradition, a direct and positive relationship was expected between environmental heterogeneity and performance. As indicated earlier, the industrial organization economics deterministic model was not supported in the study, reported here. As Bourgeois (1984) argues, the inherent reductionism of a deterministic model eliminates much of the richness that characterizes the strategic management process, by relegating management to a reactive adaptive prison.

Interestingly, when the aforementioned linkages are examined from a strategic choice perspective, the results reach significance. In other words, when the effects are decomposed into their indirect components, they become significant.

As Sobel (1987) suggested, ignoring indirect effects can yield a misleading impression of the causal process under investigation, since direct effects and indirect effects tap different (though related) aspects of the process.

A number of researchers (e.g., Child, 1972; Montanari, 1978; Bobbitt and Ford, 1980) question the directness of the linkage between environment and structure. The argument advanced by these researchers is that strategic decision making has to come between environment and structure. Research by Downey, Hellriegel, and Slocum (1977) on effects of individual characteristics on perceptions of environmental uncertainty also suggested an environment/strategy/structure view. As Bobbitt and Ford (1980) point out, decision makers facing heterogeneous environments may elect to involve other members of the organization in an attempt to deal with complexity.

In the study reported here, the direct path from environment to structure was not significant, however, the indirect path through strategy was significant. In other words, proactive decision makers faced with heterogeneous environments employed structural integration. The indirect effects are calculated as a simple multiplicative measure of the magnitude of sequential

Table 1  
The Input Correlation Matrix

Variables	Means <sup>a</sup>	S.d. <sup>b</sup>	PROA	STRUCINT	ROA	HET
PROA	8.43	3.39	1.000			
STRUCINT	25.99	11.80	.622***	1.000		
ROA	0.50	0.43	.177	-.064	1.000	
HET	14.67	4.48	.299**	.365***	-.026	1.000

<sup>a</sup> were not included in the correlations input for LISREL

<sup>b</sup> same as above (a)

\*  $p < .05$

\*\*  $p < .01$

\*\*\*  $p < .001$

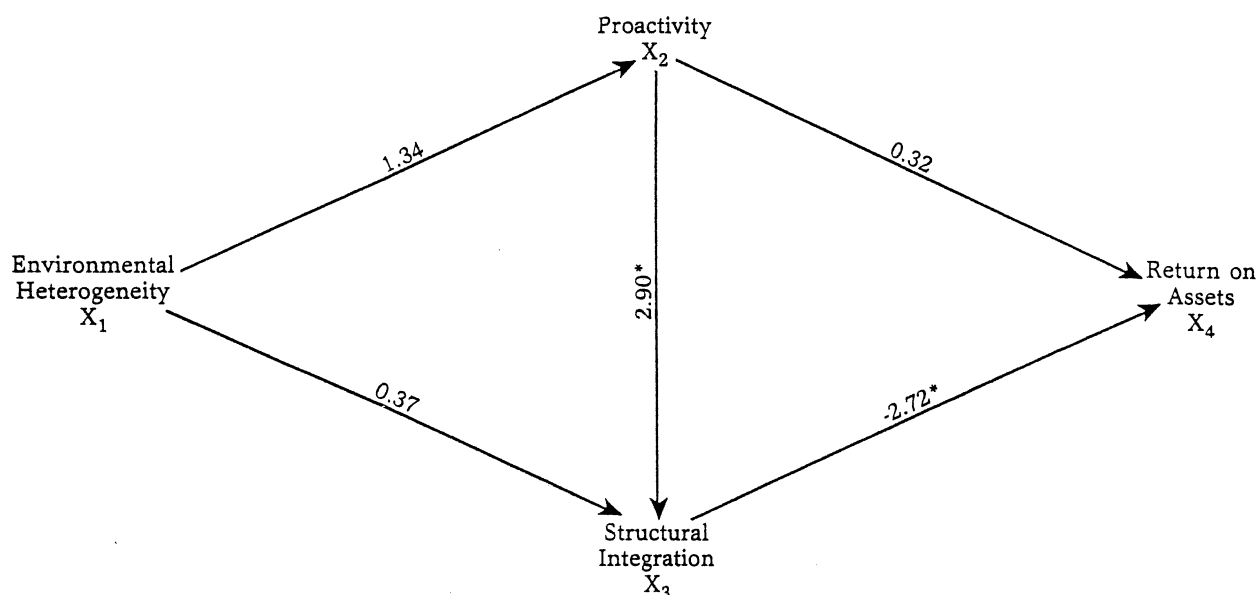


Figure 2. Results of Path Analysis

\* t-Value greater than or equal to 2.0

direct effects (Deshpande and Zaltman, 1982).

As indicated earlier, the direct path from environmental heterogeneity to performance was not significant, the indirect path through proactivity and structural integration however, was significant. The finding of a reversal in the posited relationship between structural integration and performance suggests that, among the firms studied, the fewer structural integration devices employed, the higher the performance.

The results also indicated a significant positive path from proactivity to structural integration; providing some support to earlier studies by Chandler (1962), Rumelt (1974), and Miller and his associates (1982, 1986, 1988). The proactivity to performance linkage was not significant. However, the indirect path through structural integration was significant.

## Conclusions

The results overall suggest that in a heterogeneous environment characterized by differences in competitive tactics, customer tastes, product lines, and channels of distribution, small business firms pursuing proactive strategies will employ structural integration devices to mitigate their risks. However, a heavy reliance on structural integration devices where managers are few and in frequent contact, and informal collaboration might suffice (Miller, Droge, and Toulouse, 1988) will have a negative impact on performance.

## References

1. Anderson, C. R., and Zeithaml, C. P., "Stage of the Product Life Cycle, Business Strategy, and Business Performance," *Academy of Management Journal*, Vol. 27, pp. 5-24, 1984.
2. Beard, D. W., and Dess, G. G., "Industry Profitability and Firm Performance: A Preliminary Analysis of the Business Portfolio Question," *Academy of Management Proceeding*, pp. 123-127, 1979.
3. Beard, D. W., and Dess, G. G., "Corporate Level Strategy, Business Level Strategy, and Firm Performance," *Academy of Management Journal*, Vol. 24, pp. 663-688, 1981.
4. Bedeian, A. G., and Armenakis, A. A., "A Path-analytic Study of the Consequences of Role Conflict and Ambiguity," *Academy of Management Journal*, Vol. 24, pp. 417-424, 1981.
5. Bobbitt, H. R., and Ford, J. D., "Decision-maker Choice as a Determinant of Organizational Structure," *Academy of Management Review*, Vol. 5, pp. 13-23, 1980.
6. Bourgeois, L. J., III, "Strategic Management and Determinism," *Academy of Management Review*, Vol. 9, pp. 586-596, 1984.
7. Burns, T., and Stalker, S., *The Management of Innovation*, Tavistock, London, 1961.
8. Buzzell, R., Gale, G., and Sultan, R., "Market Share--A Key to Profitability," *Harvard Business Review*, Vol. 53, pp. 97-107, 1975.
9. Chandler, A. D., *Strategy and Structure*, MIT Press, Cambridge, MA, 1962.
10. Child, J., "Organizational Structure, Environment and Performance: *The Role of Strategic Choice*," *Sociology*, Vol. 6, pp. 2-22, 1972.
11. Dalton, D., Todor, W., Spendolini, M., Fielding, G., and Porter, R., "Organization Structure and Performance: A Critical Review," *Academy of Management Review*, Vol. 5, pp. 49-64, 1980.
12. Deshpande, R., and Zaltman, G., "Factors Affecting the Use of Market Research Information: A Path Analysis," *Journal of Marketing Research*, Vol. 19, pp. 14-31, 1982.
13. Downey, H. K., Hellriegel, D., and Slocum, J. W., Jr., "Individual Characteristics as Sources of Perceived Uncertainty Variability," *Human Relations*, Vol. 30, pp. 161-174, 1977.
14. Gale, B., "Market Share and Rate of Return," *Review of Economics and Statistics*, Vol. 54, pp. 412-423, 1972.
15. Gale, B., Impact of Strategic Position Relative to Rivals on Business Profitability, Unpublished working paper, Harvard Graduate School of Business Administration, Boston, 1974.
16. Grant, R. M., Jammine, A. P., and Thomas, H., "Diversity, Diversification, and Profitability Among British Manufacturing Companies, 1972-1984," *Academy of Management Journal*, Vol. 31, pp. 771-801, 1988.
17. Harrigan, K. R., "Exit Decisions in Mature Industries," *Academy of Management Journal*, Vol. 25, pp. 707-732, 1982.
18. Jauch, L. R., Osborn, R. N., and Glueck, "Short-term Financial Success in Large Business Organizations," *Strategic Management Journal*, Vol. 1, pp. 49-63, 1980.
19. Joreskog, K. G., and Sorbom, D., *LISREL: Analysis of Linear Structural Relationships by the Method of Maximum Likelihood*, Mooresville, Scientific Software, Inc., 1986.
20. Khandwalla, P. N., *The Design of Organizations*, Harcourt Brace Jovanovich, 1977.
21. Kim, L., and Lim, Y., "Environment, Generic Strategies and Performance in a Rapidly Developing Country: A Taxonomic Approach," *Academy of Management Journal*, Vol. 31, pp. 802-827, 1988.
22. Lawrence, P., and Lorsch, J., *Organization and Environment*, Division of Research, Harvard University, Boston, 1967.
23. Lenz, R. T., "Determinants of Organizational Performance: An Interdisciplinary Review," *Strategic Management Journal*, Vol. 2, pp. 131-154, 1981.
24. Lieberman, S., and O'Connor, J., "Leadership and Organizational Performance: A Study of Large

- Corporations," *American Social Review*, Vol. 37, pp. 117, 130, 1977.
25. Miles, R., and Snow, C., *Organizational Strategy, Structure and Process*, McGraw-Hill, New York, 1978.
  26. Miller, D., "The Correlates of Entrepreneurship in Three Types of Firms," *Management Science*, Vol. 29, pp. 770-791, 1983.
  27. Miller, D., "Strategy Making and Structure: Analysis and Implications for Performance," *Academy of Management Journal*, Vol. 30, pp. 7-32, 1987.
  28. Miller, D., "Relating Porter's Business Strategies to Environment and Structure: Analysis and Performance Implications," *Academy of Management Journal*, Vol. 31, pp. 280-308, 1988.
  29. Miller, D., and Droge, C., "Psychological and Traditional Determinants of Structure," *Administrative Science Quarterly*, Vol. 31, pp. 539-560, 1986.
  30. Miller, D., Droge, D., and Toulouse, J., "Strategic Process and Content as Mediators Between Organizational Context and Structure," *Academy of Management Journal*, Vol. 31, pp. 544- 569, 1988.
  31. Miller, D., and Friesen, P., "Strategy-making and Environment: The Third Link," *Strategic Management Journal*, Vol. 4, pp. 221-235, 1983.
  32. Miller, D., Kets de Vries, M., and Toulouse, J., "Top Executive Locus of Control and Its Relationship to Strategy-making, Structure and Environment," *Academy of Management Journal*, Vol. 25, pp. 237-253, 1982.
  33. Miller, D., and Toulouse, J., "Chief Executive Personality and Corporate Strategy and Structure in Small Firms," *Management Science*, Vol. 32, pp. 1289-1409, 1986a.
  34. Miller, D., and Toulouse, J., "Strategy, Structure, CEO Personality, and Performance," *American Journal of Small Business*, Vol. 10, pp. 47-62, 1986b.
  35. Montanari, J. R., "Managerial Discretions: An Expanded Model of Organization Choice," *Academy of Management Review*, Vol. 3, pp. 231-241, 1978.
  36. Nunnally, J., *Psychometric Theory*, McGraw-Hill, New York, 1978.
  37. Prescott, J. E., *Competitive Environments, Strategic Types, and Business Performance: An Empirical Analysis*, Unpublished doctoral dissertation, Pennsylvania State University, University Park.
  38. Robinson, R. B., Jr., and Pearce, J. A., II, "Research Thrusts in Small Firm Strategic Planning," *Academy of Management Review*, Vol. 9, pp. 128-137, 1984.
  39. Rumelt, R., *Strategy, Structure, and Economic Performance*, Harvard University Press, Cambridge, MA, 1974.
  40. Rumelt, R., *Diversity and Profitability*, Unpublished paper presented at the annual meeting of the western division, *Academy of Management*, Sun Valley, ID, 1977.
  41. Rumelt, R., "Diversification Strategy and Profitability," *Strategic Management Journal*, Vol. 3, pp. 359-369, 1982.
  42. Schoeffler, S., Buzzell, R., and Heany, D., "Impact of Strategic Planning on Profit Performance," *Harvard Business Review*, Vol. 52, pp. 137-145, 1974.
  43. Sheperd, W. G., "The Elements of Market Structure," *Review of Economics and Statistics*, Vol. 54, pp. 25-37, 1972.
  44. Sobel, M. E., "Direct and Indirect Effects in Linear Structural Equation Models," *Sociological Methods and Research*, Vol. 16, pp. 155-176, 1987.
  45. Steiner, G., *Top Management Planning*, Macmillan, New York, 1969.
  46. Thompson, J. D., *Organizations in Action*, McGraw-Hill, New York, 1967.
  47. Thorelli, H. B., and Burnet, S. C., "The Nature of Product Life Cycles for Industrial Goods Businesses," *Journal of Marketing*, Vol. 45, pp. 97-108, 1981.
  48. Van de Ven, A. H., and Ferry, D., *Measuring and Assessing Organizations*, Wiley Interscience, New York, 1980.
  49. Yip, A. S., "Diversification Entry: Internal Development Versus Acquisition," *Strategic Management Journal*, Vol. 3, pp. 331-345, 1982.
  50. Zeithaml, C. P., Anderson, C. R., and Paine, F. T., "An Empirical Re-examination of Selected PIMS Findings," *Academy of Management Proceedings*, pp. 12-16, 1981.