

The Impact Of Organizational Capacity And Material Capacity On Stock Price Performance

Dr. L. Marie Bacot, Department of Management, University of New Orleans

Dr. Tarun K. Mukherjee, Department of Finance, University of New Orleans

Dr. Sandra J. Hartman, Department of Management, University of New Orleans

Dr. Olof H. Lundberg, Department of Management, University of New Orleans

Abstract

Chakravarthy (1982) contends that a firm's adaptive ability depends upon its material capacity and its organizational capacity and that its adaptive fit. This study identifies the material and organizational capacities of 18 publicly-held corporations and relates each firm's state of adaptation and adaptive fit to a measure of its stock price performance. A significant relationship is found between state of adaptation and stock price performance.

Introduction

A relationship should exist between strategic moves by a firm's management and the way the market rewards or penalizes those moves in terms of stock price. Rappaport (1981), Branch and Gale (1983), and Strebel (1983) have shown how strategic decisions may be linked to stock price performance. In establishing such a linkage, they demonstrate the value of strategy formulation to better exploit a firm's material resources.

Traditionally, relationships between strategy and stock price have been considered by the finance literature. However, that literature has been primarily concerned with material capacity, including a number of measures of the firm's health in capital terms. Considering material capacity alone may not be enough to explain changes in stock price. Stock price may also be influenced by adaptive ability. Adaptation is at the core of strategic management and involves an organization's ability to respond to its environment. Chakravarthy (1982) suggests that adaptive ability flows from material capacity and organizational capacity. Organizational capacity is a measure of the firm's human resources or, in Galbraith's (1973) terms, its information processing ability.

Chakravarthy has proposed a comprehensive model that integrates material capacity, organizational capacity and adaptation. The main linkages in Chakravarthy's model involve strategic moves to alter a firm's material and organizational capacities. Changes in either or both capacities affect adaptive ability. The contribution of this paper is to relate Chakravarthy's model to stock price performance. It is organized as follows: Section II summa-

rizes Chakravarthy's model. Section III presents testable hypotheses based upon Chakravarthy's work. Section IV discusses data and test methodology. Section V presents empirical results, and Section IV contains a summary and concluding remarks.

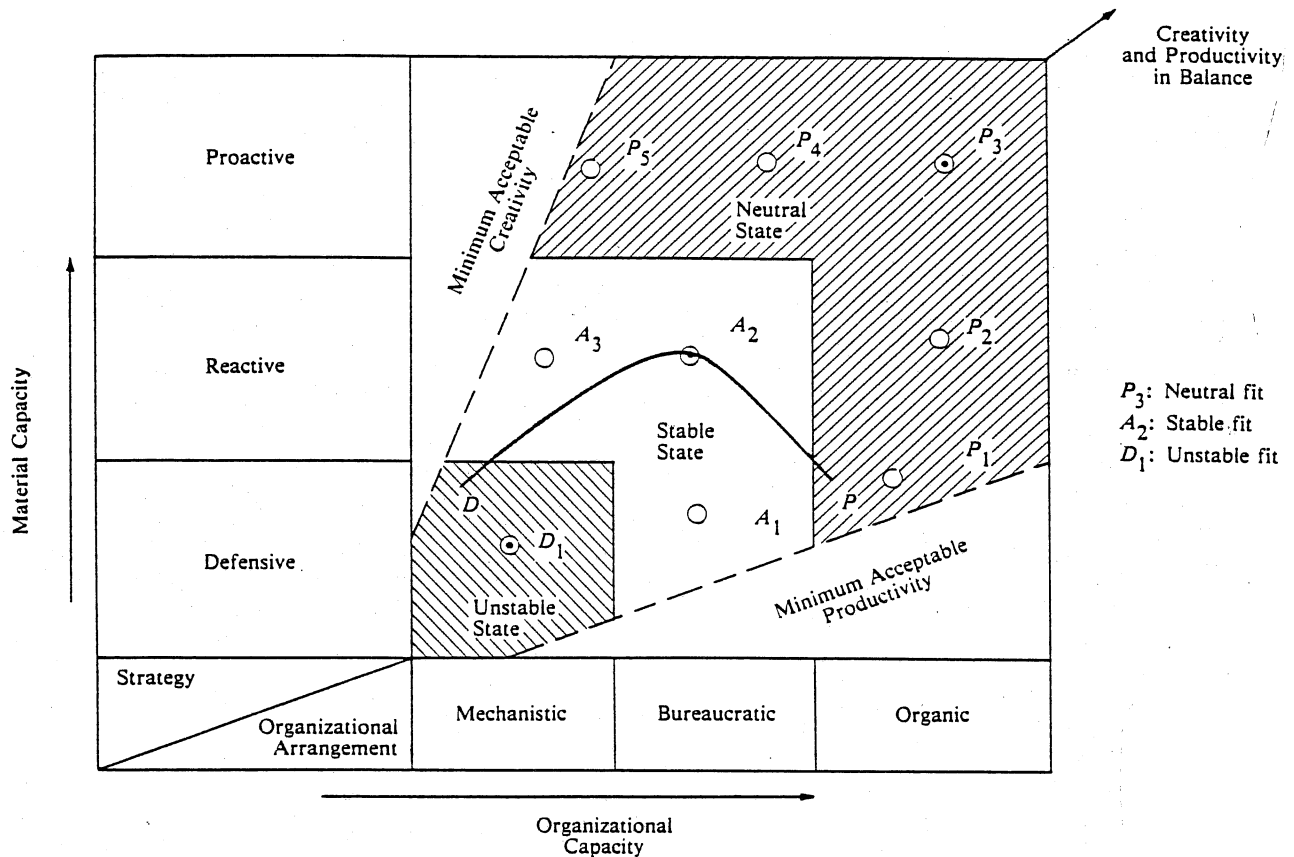
Chakravarthy's Framework for Strategic Adaptation

Chakravarthy presents a model for strategic management based upon adaptation or the activities of a firm as it strives for a better fit between its external and internal environments. Adaptive abilities, states of adaptation, and adaptive fits as proposed by Chakravarthy appear in Figure 1.

Figure 1 shows adaptive ability as a function of organizational capacity and material capacity. Organizational capacity appears on the X axis in the model. According to Chakravarthy, organizational capacity measures the information processing ability of a firm available through its human resources. Chakravarthy points out that, traditionally, there have been three perspectives on organization structure which have tied information processing to human resources. These perspectives are the mechanistic, the bureaucratic, and the organic forms of organization. In mechanistic forms, information flow is from the top and is boss-centered. In bureaucratic forms, information flow is through systems. In organic forms, information flow is from all positions. The three forms of organization, described in Appendix A, differ along a flexibility/rigidity continuum with organic forms most flexible and able to process the most information.

Material capacity is represented on the Y axis and consists of input materials, finance, and technology.

FIGURE 1
Chakravarthy's Model of Adaption



Source: Chakravarthy (1982), p. 41. (Reprinted with permission.)

According to Chakravarthy, firms which are low in material resources are forced to assume a defensive posture with respect to the environment. Such firms feel vulnerable to environmental forces and thus defend against their impact. As a firm with a low level of material capacity gains material resources, it moves to a reactive mode where it monitors the environment and reacts to the environment with minimal delay. Finally, organizations which have both financial resources and the flexibility to deploy them assume a proactive stance with respect to the environment. They create environmental change or they anticipate change and either prepare for it or take steps to influence the nature of the change. As with organizational capacity, the key element in establishing the continuum of defensive to proactive is flexibility in dealing with the environment. Appendix A contains definitions of terms pertaining to both organizational capacity and material capacity.

Adaptation results from the joint effects of organizational capacity and material capacity. Figure 1 presents

three states of possible adaptation: unstable, stable and neutral. Mechanistic organizations in a defensive mode resulting from lack of material capacity will be in the unstable state. This state provides the least immunity from environmental changes. In the unstable state, the firm attempts to provide a buffer because of extreme susceptibility to environmental elements. Within the limits imposed by organizational capacity and material capacity, Chakravarthy proposes that firms located along the diagonal bisecting the unstable state will achieve good short-term financial results but long-term viability is threatened. The diagonal represents the optimal match of material capacity and organizational capacity.

The next level in Figure 1 represents the stable state where the firm is bureaucratic in terms of organizational capacity and reactive in terms of material capacity. At this level the firm maintains a buffered core but is organized so that it is open and responsive to environmental moves. Limitations are imposed by information processing capacity restrictions associated with the bureaucratic form and

constraints on the latitude available to managers to exploit material resources. Again, subject to these limitations, optimal performance is possible along the diagonal.

The third level in Figure 1, the neutral state, provides the highest immunity and best chances for survival. Firms at this level are organic and proactive which, according to Chakravarthy, allows them to shape their own destiny. Again, the ideal balance between organizational capacity and material capacity is found on the diagonal.

As an organization in any of these three states moves away from the diagonal, suboptimization occurs. For example, in the neutral state to the left of the diagonal at position P5, the firm is in a proactive position in terms of its material capacity, but its mechanistic form inhibits the ability to process information. Therefore, this firm will be unable to take maximum advantage of the potential afforded by its material capacity. In contrast, position P1 represents a firm in a defensive position in terms of its material capacity but having an organic form in terms of organizational capacity. In this case, the firm will be unable to take maximum advantage of the potential afforded by its organic structure.

Two subprocesses, adaptive specialization and adaptive generalization, are included within the process of adaptation. Adaptive specialization is the process of improving the match with the diagonal within a given state of adaptation. It involves choosing a strategy appropriate to the environment and the resources of the firm and the design of a matching organizational structure.

When a firm is adaptively fitted to its environment, a surplus of contributions over inducements (Barnard, 1938) or "slack" (Cyert and March, 1963) is created. This slack can be used to increase the organizational and material capacities of the firm and thus elevate the level of adaptive functioning. This process is called adaptive generalization and it represents an intentional misfit or conscious disturbance designed to increase the potential for survival. Notice on Figure 1 that firms D1, A2, and P3 all are found on the diagonal. Therefore, all are adaptively fitted and will be generating slack. Management may then make use of the slack to create the disturbance by increasing material capacity or organizational capacity. This will move the firm off the diagonal. Making the adjustments required to return the firm to the diagonal (adaptive specialization) will place the firm at a higher level on the diagonal and thus increase its long-range survival prospects. Thus, the firm can be thought of as moving through continuous cycles of adaptive specialization and adaptive generalization. Movement to a higher level is not automatic but depends upon management's strategic use of its slack.

Testable Hypotheses

Chakravarthy's model concerns the level and process

of adaptation and, therefore, does not consider the impact these decisions might have on a firm's stock price. We developed the following hypotheses linking his model to stock performance.

Hypothesis I: The higher the level of adaptation, the better the stock performance.

Hypothesis II: The greater the adaptive fit, the better the stock performance, given the state of adaptation.

According to Chakravarthy, a higher level of adaptation is associated with an increased potential for survival. Our first hypothesis reflects this premise. Chakravarthy states that "whereas a state of adaptation ensures survival, an adaptive fit ensures in addition the optimal use of the material and organizational capacities of a firm" (p. 40). Since adaptive fit represents a desired balance between creativity and productivity, a company with such a fit should enjoy more positive reaction in the stock market than another company at the same adaptive level but without a fit. This argument forms the basis of our second hypothesis. However, if a lack of fit is intentional, our hypothesis may not hold. A firm's strategy may lead it through the cycle of adaptive specialization and adaptive generalization to a point where it is off the diagonal while moving to a higher level. Under these circumstances, the market may recognize and reward the firm's intentional misfit, perhaps on the basis of its past performance.

Data and Methodology

Sample

In drawing a sample for this study we confined ourselves to publicly-held, non-financial corporations headquartered in New Orleans, Louisiana. We offer two major reasons for restricting our sample to such firms. First, these firms have one important characteristic in common; all of them were confronted with what Hall (1980) describes as a hostile business environment. In Hall's paradigm, a hostile environment is characterized by slower and erratic growth, intensified inflation, government regulation, and both domestic and foreign competition. The environmental complexity in a hostile environment creates the need for adaptive ability and requires strategic moves to attain adaptive fit. When the study began, New Orleans was suffering from a recession caused by the decline in demand for domestically produced oil and gas. Regulatory demands and domestic and foreign competition also provided hostility. Inflationary pressures, however, were not so severe that costs could not be passed on to consumers.

Since a major objective of the study was to evaluate the impact of organizational capacity on stock price, the familiarity with and subjective evaluation of the information flow within the firm was an essential ingredient for

our analysis. This was the second reason for our sample selection. Proximity to corporate headquarters provided access to executives for information on 73 strategic decisions not available in public documents such as annual reports. To this end, an interview was held with the Chief Executive Officer, President, or other top level executive of each corporation at corporate headquarters. Most interviews were conducted during October and November in 1987. The interviews centered on the following questions:

1. What major changes in your organization have been made during the past five years? Why did you make these changes?
2. What major changes in your organization do you plan to make in the next five years? Why do you plan to make these changes?

Additional questions were included when necessary for clarification or amplification of responses. The interviews were audiotaped for accuracy, and a copy of the synopsis of each interview was provided to the interviewee to review for accuracy. Information was also obtained from annual reports, prospectuses, and related publications.

Our final sample consists of 18 of the 30 non-financial, publicly-held corporations headquartered in New Orleans, LA. Firms were omitted from the study for the following reasons: (a) a public company less than five years, (b) no revenue from operations, (c) financial information not currently available, or (d) majority-ownership by the parent company. Several of the firms were related to the oil and gas industry. Other areas, such as shipping, waste management, and retailing, were also represented.

Measure of Stock Performance and Testing Procedure

Recognizing that the impacts of strategic decisions on stock prices need to be measured relative to some reference point, Branch and Gale (1983) compare four alternatives - earnings, past price levels, replacement values, and book values. After discussing relative strengths and weaknesses of each of these four measures, they make a convincing argument in favor of using the ratio of stock price to per-share book value (P/B) as a useful measure of stock price performance. Since different industries face different opportunity sets, Branch and Gale further suggest the efficacy of comparing a firm's P/B with the P/Bs of firms in a similar industry. Following Branch and Gale, our stock performance measure is P/B relative, where

$$\text{P/B relative} = \frac{\text{P/B of the firm in period } t}{\text{P/B of the firm's industry in period } t}$$

Using COMPUSTAT data we compute P/B relative for each firm in the sample for the year 1988. Since COMPUSTAT data for 1989 was not available at the time of

this analysis, relevant information on 13 of the firms was collected from various sources. Based on our hypotheses, Level 3 (neutral state) firms should command higher P/B relatives than Level 2 (stable state) and both levels 3 and 2 should do better than level 1 (unstable state). Similarly, firms that are adaptively fitted should command higher P/B relatives than the firms which are in the same state of adaptation but without adaptive fits.

We use the Mann Whitney U test to test Hypotheses I and II. Our purpose here is to test whether two independent groups have been drawn from the same population. The Mann Whitney test is an efficient tool for this purpose especially when the sample size is small and normality assumption of the data is questionable. Siegel (1956) observes "it is a most useful alternative to the parametric t test when the researcher wishes to avoid the t test's assumptions..." (p.116). Mann Whitney's power efficiency approaches 95.5 percent as N increases, and is close to 95 percent even for moderate-sized samples.

RESULTS

The first step in testing the stated hypotheses is to determine the adaptive level and adaptive fit for each firm in the sample. In so doing, we relied on the interview synopses. Each firm was positioned on a continuum representing its organizational capacity and positioned on a continuum representing its material capacity following the definitions provided in Appendix A. The two positions were then plotted in Figure 2. Appendix B provides the methodology used to determine the location for each firm in Figure 2. Each firm has been assigned a number, instead of being identified by name.

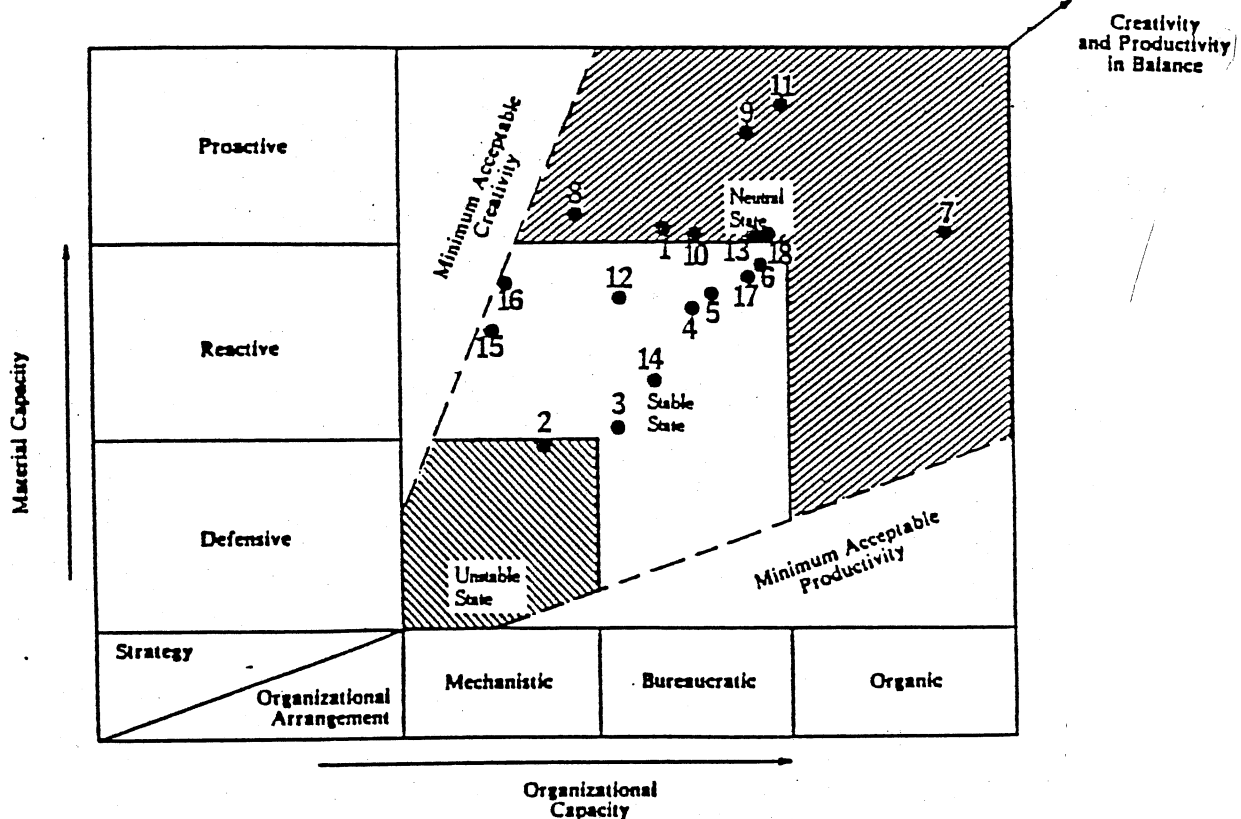
Firm locations in Figure 2 do not exhibit a discernible bias in regard to the firm asset size or industry. For example, firms 1, 13, and 12 fall in the same 4-digit SIC category. However, two of these firms are located in Level 3 while the third falls in Level 2 and only firm 13 is adaptively fitted. Firm 8 (one of the smaller firms in terms of asset size) is located in Level 3 while firm 3 (one of the larger firms in terms of asset size) is located in the middle of Level 2.

Testing Hypothesis I: Level of Adaptation and Stock Price

Since Level 1 (unstable state) contains only one firm, we tested the first hypothesis by comparing the stock performances of the firms in Level 2 (stable state) with the stock performances of the firms in Level 3 (neutral state). Table 1 shows the results of the Mann Whitney test for 1988 and 1989.

As Table 1 indicates, Level 3 firms outperformed Level 2 firms in both 1988 and 1989 at a high level of significance. This provides strong support for our first hypothesis.

FIGURE 2
Plotting of Sample Firms on Chakravarthy's Model of Adaptation



Note: See Appendix B for a generic description of each firm and the procedure for determining its location on Figure 2. The numbers indicating each firm's position correspond to the firm numbers in Appendix B.

Testing Hypothesis II: Adaptive Fit versus Non-adaptive Fit

For the purpose of testing the second hypothesis, we compared the performances of the firms that represent a balance between material and organizational capacities (located on or close to 45-degree line from the origin in Figure 2) with firms with the same state of adaptation but not adaptively fitted (not located near the 45-degree line). Thus, for Level 3, the performances of firms 13 and 18 (adaptively fitted) are compared with the performances of firms 1, 7, 8, 9, 10 and 11 (not adaptively fitted). For Level 2, we compared the performances of firms 3, 4, 5, 6, 14 and 17 (adaptively fitted) with the performances of firms 12, 15 and 16 (not adaptively fitted). The Mann Whitney test results did not support our second hypothesis for either 1988 or 1989 data. The lack of evidence supporting Hypothesis II could have been the result of firms not falling on the diagonal line because they were, as char-

acterized by Chakravarthy, "intentional misfits." These firms could have been positioning themselves to move to a higher level of adaptation. As such, the stock market might have perceived the lack of fit to be a temporary phenomenon.

Summary and Conclusions

The results of the research indicated a significant relationship between state of adaptation and stock price performance. No significant relationship was found, however, between adaptive fit and stock price performance. Both results have implications for future research.

The finding of a significant relationship between state of adaptation and stock price performance supports the validity of the Chakravarthy model and suggests further research that may provide additional support. During the interview process, we noticed that some of the firms had

TABLE 1
The Level of Adaptation and Stock Performance:
Results of the Mann Whitney Test

1988						1989					
Level 3			Level 2			Level 3			Level 2		
ID#	P/B Relative	Rank	ID#	P/B Relative	Rank	ID#	P/B Relative	Rank	ID#	P/B Relative	Rank
1	1.12	11	3	.56	3	1	1.49	11	3	--	--
7	2.27	17	4	.49	1	7	--	--	4	.71	4
8	.63	5	5	.50	2	8	1.34	10	5	1.33	9
9	.97	9	6	.68	7	9	.49	2	6	--	--
10	.98	10	12	1.53	15	10	1.21	8	12	1.00	5
11	1.32	13	14	.73	8	11	2.90	13	14	1.20	7
13	1.25	12	15	.56	4	13	1.61	12	15	.25	1
18	1.89	16	16	1.44	14	18	1.11	6	16	--	--
			17	.64	6				17	.69	3
Rank Total		93			60			62			29
MW U ^c		15*						8**			

* Significant at .025 level.

** Significant at .037 level.

Note: Of the 17 firms analyzed for 1988, one firm was acquired in 1989, and 1989 information was not available at this time for three firms. Our 1989 analysis, therefore, pertains to the remaining thirteen companies.

already moved or were positioning themselves to move from one level of adaptation to another. The assumption that the stock market will reward or punish a firm's movement from one adaptive level to another suggests the following hypothesis: Stock performance improves (deteriorates) as a firm moves up (down) to a higher (lower) level of adaptation. Future research can test this hypothesis.

Future research can also test the appropriateness of using 1988 and 1989 data to assess the impact of 1987 strategy. Long-term effects of the 1987 strategy may appear further into the future. Performance data from future years can be used to investigate this question.

APPENDIX A

Organizational Capacity

Organizational Arrangement

1. Mechanistic Leadership is highly boss-centered or position-based with only top management involved in forming strategic responses. Access to external information is limited. Important strategic information from lower management is often disregarded (Chakravarthy, 1982).

2. Bureaucratic Leadership is neither predominately boss-centered or based on position nor is authority determined by expertise with total participation by subordinates. Formal planning systems are used for determining strategic responses. Subordinates participate on a limited basis in evaluation and elaboration of strategies that have been identified by top management (Chakravarthy, 1982).

3. Organic A participative leadership style with authority derived from expertise regardless of position is characteristic. Access to external information is high (Chakravarthy, 1982).

Material Capacity

Strategy

1. Defensive Stability is created by activities that limit interaction with the external environment. Narrow product-market domains are characteristic with infrequent changes in technology, structure, or mode of operation (Chakravarthy, 1982).

2. Reactive A buffered core, similar to the defensive strategy, is characteristic. However, extensive market surveillance allows these firms to respond to the environment and follow the lead of competitors (Chakravarthy, 1982).

3. Proactive A constant search for market opportunities characterizes these firms. Changes in the environment are often created which cause competitors to react (Chakravarthy, 1982).

APPENDIX B

Determining Firms' Locations in Chakravarthy's Model

Firms were plotted on Figure 2 to identify adaptive abilities, states of adaptation, and adaptive fits. This involved a two-stage process. In the first stage, Figure 1 was traced with labeling limited to Organizational Arrangement—Mechanistic, Bureaucratic, and Organic. Interview synopses were reviewed, and characteristics of the firm were compared to the definitions presented in Appendix A. A location was then plotted along the continuum of Organizational Capacity. In the second stage, Figure 1 was again traced with labeling limited to Strategy—Defensive, Reactive, and Proactive. Interview synopses were again reviewed with characteristics of the firms compared to the definitions presented in Appendix A. A location was plotted along the continuum of Material Capacity.

Location of the plots on the axis in each modified Figure 1 was determined by measuring in millimeters. These locations on the two axes were merged to form one location on a fully-labeled Figure 2. The axis locations for each firm are shown below:

*** References ***

1. Barnard, Chester I., *The Functions of the Executive*, Harvard University Press, Cambridge, MA, 1938.
2. Branch, Ben, "The Laws of the Marketplace and ROI Dynamics," *Financial Management*, Vol. 9, No. 2, pp. 58-65, 1980.
3. Branch, Ben and Bradley Gale, "Linking Corporate Stock Price Performance to Strategy Formulation," *The Journal of Business Strategy*, Vol. 4, No. 1, pp. 40-50, 1983.
4. Chakravarthy, Balaji S., "Adaption: A Promising Metaphor for Strategic Management," *Academy of Management Review*, Vol. 7, No. 1, pp. 35-44, 1982.
5. Cyert, Richard M. and James G. March, *A Behavioral Theory of the Firm*. Prentice-Hall, Englewood Cliffs, NJ, 1963.
6. Galbraith, Jay, *Designing Complex Organizations*, Addison-Wesley, Reading, MA, 1973.
7. Hall, William K., "Survival Strategies in a Hostile Environment," *Harvard Business Review*, Vol. 58, No. 5, pp. 75-85, 1980.
8. Rappaport, Alfred, "Selecting Strategies that Create Shareholder Value," *Harvard Business Review*, Vol. 59, No. 3, pp. 139-149, 1981.
9. Siegel, Sidney, *Nonparametric Statistics for the Behavioral Sciences*, McGraw-Hill, New York, NY, 1956.
10. Strebel, Paul, "Using the Stock Market to Assess Strategic Position," *The Journal of Business Strategy*, Vol. 3, No. 3, pp. 77-83, 1983.

Axis Points

	Organizational Arrangement	Strategy
1. Contract drilling and exploration co.	3.55	5.45
2. Data base company	1.90	2.50
3. Department store	2.90	2.65
4. Electric utility	3.95	4.35
5. Energy services company	4.15	4.00
6. Entertainment facility	4.85	4.95
7. Environmental services company	7.35	5.40
8. Helicopter transportation company	2.35	5.65
9. International marine transportation co.	4.70	6.70
10. Natural gas distributor	4.00	5.30
11. Natural resources company	5.15	7.10
12. Oil & gas acquisition & exploration co.	2.95	3.30
13. Oil and gas exploration, production, and acquisition company	4.80	5.40
14. Oil field services company	3.40	3.30
15. Retail specialty company	1.20	4.05
16. Solid waste and tire company	1.40	4.70
17. Specialty restaurant chain	4.75	4.80
18. Waste analysis and treatment company	4.90	5.40