SUBHASH SHARMA & VIJAY MAHAJAN

Only recently have academicians and practitioners realized the importance of a systematic analysis of business failures. The authors develop a failure process model that can help managers to understand and predict failure. Causes and symptoms of failure are reviewed briefly as methods of analyzing failures. A parsimonious financial corporate failure model based on symptoms of failure (performance indicators) is developed and used to predict the business failure of retail establishments over the five-year period prior to the actual failure.

EARLY WARNING INDICATORS OF BUSINESS FAILURE

THE high failure rate of new products is well known (Crawford 1977). Similarly, every year several hundred thousand firms are started and an almost equal number are discontinued. Even more firms transfer ownership or control. For example, in 1977 about 8,000 concerns failed. Their aggregate liabilities totaled about $3 billion (*The Business Failure Record* 1978).

Failure is not restricted to products and firms. Military failures, failure of economics (Hazlitt 1959; Schoeffler 1955), and failure of technology (Juenger 1949) also occur. Yet academicians and practitioners alike have all but neglected the failure phenomenon. In journals and books very few pages have been devoted to the study of failures. Only recently has any serious attempt been made to study business failures and their causes (e.g., Altman 1968; Altman, Haldeman, and Narayanan 1977; Argenti 1975, 1976a, b, c; Cooper 1975, 1979; Hartley 1976). The reasons for lack of interest in studying business failures may be many, and they include:

- The very negative connotation of the term "failure."
- The notion that the failure process for each product or firm is atypical and hence does not lend to a scientific study.
- Lack of a systematic body of knowledge related to the failure process.
- The nature of the reward criteria used by management.
- The belief that failure is a sudden rather than a gradual process. Two examples substantiate this point: first, directors of Rolls Royce were unaware of its failure until the last minute; second, a well-known British merchant bank bought a Japanese firm which failed two weeks later (Argenti 1976b).

Why Study Failures?

The importance of systematically analyzing failures has long been recognized in fields such as engineering. After World War II, Aeronautical Radio, Inc. and Cornell

Subhash Sharma is Assistant Professor of Marketing, The University of South Carolina. Vijay Mahajan is Associate Professor of Marketing, The Wharton School, University of Pennsylvania.

Journal of Marketing
Vol. 44 (Fall 1980), 80–89.

University analyzed 45,000 and 100,000 vacuum tubes, respectively (Shooman 1966). The objectives of the analysis were to determine causes of failure and develop mathematical models for predicting failures. The results and the subsequent interest in failure analysis led to reliability engineering.

As mentioned earlier, very few studies related to systematic analysis of business failures have been undertaken. The results of the few major attempts to analyze business failure (e.g., Altman, Haldeman, and Narayanan 1977; Argenti 1976; Cooper 1979) have been encouraging. Thus, rather than accepting failures as they come, we need to develop a systematic study of failures that will enhance the body of knowledge and perhaps reduce the number of failures. Such study will eventually lead to:

- Identification of causes of failures.
- Identification of the indicators of failures.
- Development of mathematical models for predicting failures.

Therefore, the major purposes of our article are (1) to develop a failure process model, (2) to review briefly the major research studies involving analysis of failures, and (3) to illustrate a parsimonious financial corporate failure model to predict business failure.

What is a Failure?

One of the most difficult tasks of researchers in analyzing failures is to define the term "failure." The word has many meanings. *The McGraw-Hill Dictionary of Modern Economics* (1973) defines business failures as, "The cessation of operations by a business concern because of involvement in court procedures or voluntary actions which will result in loss to its creditors." According to *The Business Failure Record* (1978), failures include concerns involved in court proceedings or voluntary actions involving loss to creditors. An entrepreneur may discontinue operations for a variety of reasons, such as loss of capital, inadequate profits, ill health, and retirement, but if the creditors are paid in full, the business is not tallied as a failure. In contrast, *Webster's Third New International Dictionary* (1961) defines failure as "the fact of a certain action or process not having occurred . . . the fact of nonoccurrence." In the first two definitions of failure a business is viewed essentially as a reservoir of cash (Walters 1957). The firm is considered to be bankrupt (failed) when the reservoir becomes empty. In other words, an enterprise may be regarded as a "failure" when it cannot meet its liabilities (Van Horne 1977). However, if one takes a broader view of failure, as given in Webster's dictionary, a firm will be considered a failure if it does not meet the objectives set forth by management. On the basis of this definition one may classify Sears as a failure (*Business Week* 1975; *Time* 1980) because it has failed to achieve the overall goal set by management (e.g., image, positioning). In most of the studies pertaining to corporate failures, bankruptcy has been used as the definition of failure, whereas in studies on products the inability of the prod-

FIGURE 1
Failure Process

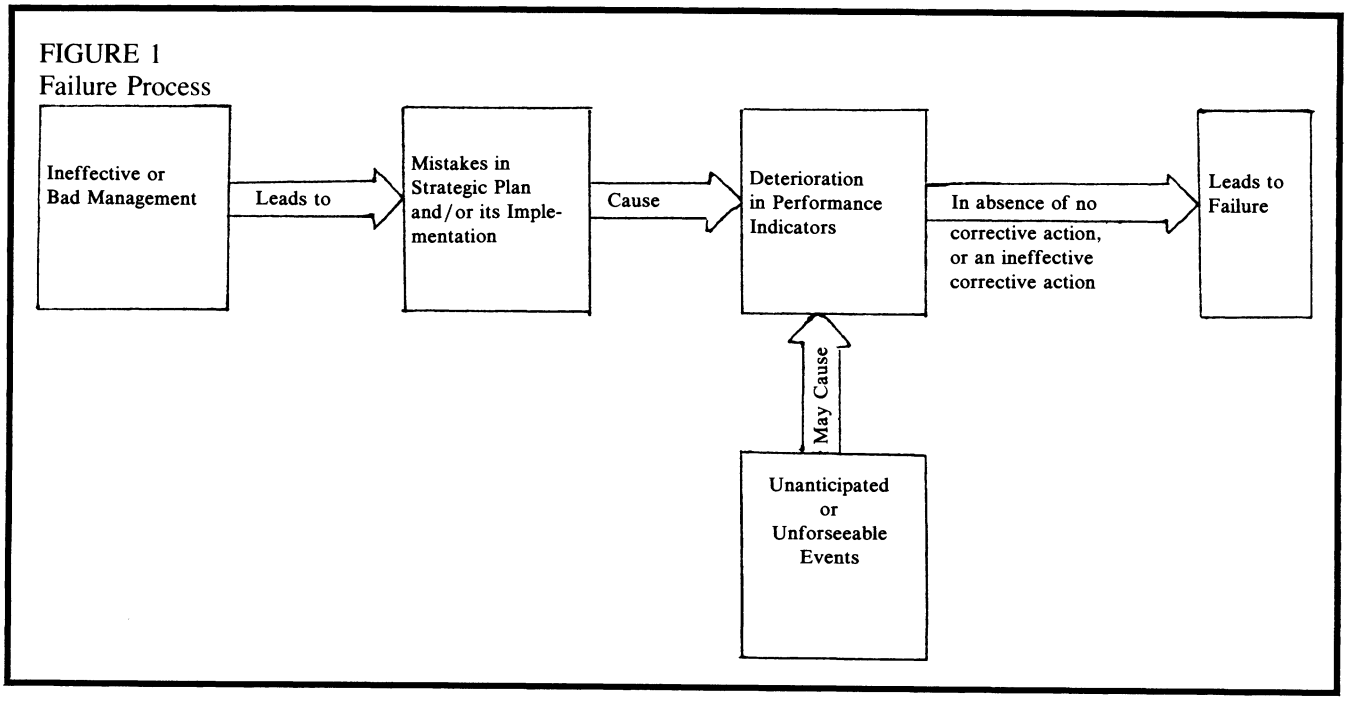


TABLE 1
Sample Description

Failed Firms				
Firm	Year Chapter 11 Filed	State & Year Incorporated	Primary Business	No. of Stores
Giant	1973	OH (1950)	Discount stores	15
Beck	1970	DE (1932)	Shoes and Apparel	257
Simon	1970	CA (1935)	Variety and hardware	[a]
Ayres	1972	IN (1896)	Department stores	1
Federals	1973	MI (1932)	Department stores	52
National Bellas	1973	DE (1932)	Department stores	84
Interstate	1974	DE (1928)	Department stores	120
Ancorp	1973	DE (1934)	Fast food restaurant	400
Fishman	1974	DE (1927)	Department store	52
Grant	1975	DE (1937)	Variety stores	1086
Hartfield-Zody's	1974	DE (1945)	Women's apparel	62
Arlans	1973	NY (1957)	Department store	111
Miller-Wohl	1973	DE (1932)	Women's apparel	212
Kenton	1974	DE (1968)	Variety and jewelry	23
Big-Bear	1976	OH (1933)	Supermarket-grocery	43
Bohack	1975	NY (1913)	Grocery stores	4
Harvest	1974	NY (1961)	Supermarket-grocery	14
Penn-Fruit	1975	PA (1952)	Supermarket-grocery	70
Mangel	1975	DE (1929)	Women's apparel	150
Unishops	1973	NY (1947)	Men's and boys' apparel	326
Coit	1975	TX (1967)	Fabrics and sewing notions	69
Botany	1971	DE (1966)	Men's and boys' wear	101
Horn and Hardart	1971	NJ (1898)	Fast food restaurants	[a]

[a]Information not available.

uct to perform as expected has been used as the definition.

Failure Process

A systematic study of failures requires a model of the underlying failure process. To understand the failure process one needs to know the planning process of a given firm. The success of any business firm is a result of the interaction of two major sets of factors. First, the performance of an enterprise is influenced by a variety of factors emanating from outside the business itself and thus beyond the control of business managers (uncontrollable variables). Such environmental conditions as the rate of growth of the economy, shifting preferences, attitudes, and behavior of consumers, and changing structure and operating characteristics of the marketplace clearly influence the profitability and market strength of individual businesses.

The other major factors influencing the performance of a business enterprise emanate from inside the firm. They determine the firm's ability to use its resources to adapt to and take advantage of the constantly changing environment. Through a continuous process of formulating strategic market plans and executing, monitoring, and evaluating those plans, management attempts to keep performance of the enterprise consistent with its environment and its resources.[1]

An enterprise has multiple responsibilities in terms of producing performance results. First, the firm must achieve certain market performance results such as sales volume, sales growth, competitive market share, and strength of market position. Second, the owners (i.e., stockholders and creditors) expect the firm to produce certain financial performance results in terms of profitability, growth, and liquidity. Finally, a variety of other stakeholders in the business, such as employees, suppliers, and the community, expect certain performance results in terms of employment stability and advancement, creditworthiness, and good "corporate citizenship" (Argenti 1976a). A firm may be regarded as a failure if it cannot meet one or more of its responsibilities. The degree to which a firm meets the responsibilities can be measured by performance indicators. Thus, the firm meets its responsibilities by formulating and

[1]We recognize that all firms do not have a strategic market plan. In fact, some firms may not have a formal "plan." The absence of a strategic market plan or a "plan" may itself be a cause of poor performance (see, for example, Karger and Malik 1975).

TABLE 1 (continued)

Nonfailed Firms			
Firm	State & Year Incorporated	Primary Business	No. of Stores
Jamesway	NY (1966)	Discount stores	50
Genesco	TN (1968)	Footwear, men's wear	1500
A-Dry Goods	VA (1916)	Department stores	[a]
Caldor	DE (1961)	Variety stores	50
Kings	DE (1961)	Variety stores	187
Outlet	RI (1925)	Department stores	21
Zayre	DE (1962)	Discount stores	251
Ginos	MD (1960)	Fast food restaurant	506
Hecks	VA (1959)	Discount stores	160
Woolworth	NY (1911)	Variety stores	3796
Cornwall	DE (1935)	Variety stores	193
Fed-Mart	CA (1954)	Low-margin retail stores	58
Winkleman	MI (1928)	Women's apparel	87
Richton	DE (1969)	Variety and jewelry	[a]
Kroger	OH (1902)	Supermarket-grocery	1202
Lucky	CA (1931)	Supermarket-grocery	1317
Penn-Traffic	PA (1903)	Department stores	44
Supermarket	DE (1966)	Supermarket-grocery	109
Lane-Bryant	DE (1920)	Women's apparel	188
Mays	NY (1927)	Department stores	8
House-of-Fabrics	CA (1946)	Fabrics and sewing notions	560
New Process	DE (1924)	Mail order	—
Host	DE (1914)	Fast food restaurants	188

executing strategic market plans, the outcome of which can be evaluated by the performance indicators.

The planning process described can be used to develop a failure process model. The model shown in Figure 1 is adapted from Argenti (1976a). Ineffective or poor management usually leads to mistakes in formulating a strategic market plan and/or its implementation. A poor strategic plan will be ineffective no matter how well it is executed. In contrast, an excellent strategic plan can be ruined by improper execution. Such mistakes affect the performance indicators. Thus, basically *management mistakes* are the major *causes* of failures and the *performance* indicators are the *symptoms* of possible failures. In fact, according to most studies relating to failure of firms and products, about 90% of all failures can be traced to lack of adequate management (e.g., Argenti 1975; *Business Week* 1971; Cooper 1975; Houston 1972; Kaye and Garter 1979; Lazo 1965; *The Business Failure Record* 1978; *The CPA Journal* 1975; Worthing 1966; Wyant 1972).

Methods for Predicting Failures

The failure process suggests that failures can be predicted either by analyzing the strategic plan and/or its implementation (i.e., causes of failures) or by observing the performance indicators (i.e., symptoms of failures).

Causes of Failures

In almost all of the studies on the causes of failure a list of causes contributing to the failure has been developed. The list is obtained by analyzing case histories of the failed firms or products (see, for example, Ross and Kami 1973).

Although these studies have provided useful insights into the causes of failures, they have certain limitations. First, the lists of causes may be, and are, different across studies. For instance, Smith (1966) lists six causes of failure, none of which are the same as those of Ross and Kami (1973). Second, one does not know which causes discriminate best between success and failure. Third, there is no indication as to how many causes must occur before a firm or product will eventually fail. Fourth, one does not know how to use the list of causes to predict or avoid failures.

Some of the limitations have been overcome in studies by Miller (1977), Miller and Friesen (1977), and Cooper (1979), who essentially used factor analysis to reduce a number of causes of failure to a few *underlying* causes. Cooper (1979) extended the objective not

only to measure the underlying causes of failures but also to determine which causes discriminate best between failures and successes. He first asked managers to choose two successful and two unsuccessful new products. The managers were then given a list of 77 potential causes of success or failure and were asked to indicate the degree (on a 0-10 scale) to which each cause contributed to success or failure of each of the chosen products. The resulting data were factor analyzed to obtain the underlying dimensions (causes) of success and failure. Discriminant analysis showed 11 dimensions to be significant determinants of success and failure. The power of discrimination was strong, with about 84% of the products correctly classified.

Cooper's model has important implications for the product manager. First, the estimated discriminant function can be used to predict success or failure. Second, because the causes for failure are known, management can take the necessary corrective action. However, the usefulness of the model will depend on the accuracy of management's rating of the product on the 77 items. This rating process may be the major limitation, because it is basically judgmental. Another limitation is that the factor structure defining the underlying dimensions may change. In spite of these limitations, Cooper's study shows how the *causes* of failures and successes can be analyzed systematically to develop a failure prediction model.

TABLE 2
Description of Financial Performance Indicators

Profitability
1. Return on Assets:
   Earnings Before Interest and Taxes/Total Assets

Leverage Ratios
2. Debt Service:
   Earnings Before Interest and Taxes/Interest Coverage
3. Cash Flow:
   Cash Flow/Total Debt
4. Capitalization:
   Market Value of Equity/Total Capital

Liquidity Ratios
5. Current Ratio:
   Current Assets/Current Liabilities
6. Cash Turnover:
   Net Sales/Cash
7. Receivables Turnover:
   Net Sales/Receivables
8. Inventory Turnover:
   Net Sales/Inventories
9. Sales Per Dollar Working Capital:
   Net Sales/(Current Assets – Current Liabilities)

Miscellaneous
10. Retained Earnings/Total Assets
11. Total Assets (in thousands of dollars)

Symptoms of Failures

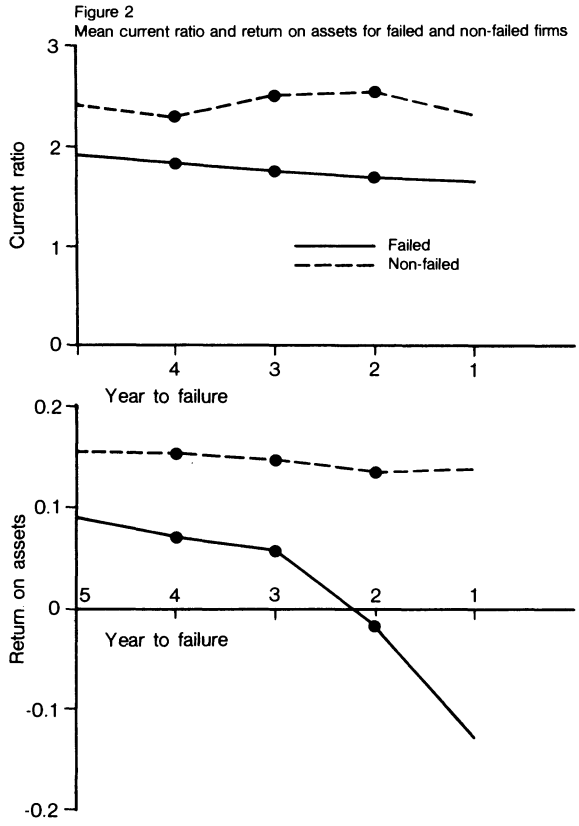
The second method which can be used to predict failures is analysis of the performance indicators (i.e., symptoms of failures). The usefulness and significance of this approach can be effectively illustrated by a parsimonious financial corporate failure model. Unlike earlier financial corporate failure models (e.g., Altman, Haldeman, and Narayanan 1977), this model is specifically developed for retailing firms because the determinants of success and failure could be different across industries (*Business Week* 1980a, b, c). Furthermore, of the businesses failing in 1977, 43% were retailing firms; they constituted the largest segment of all commercial and industrial business failures. Sixty percent of the failed retailing concerns were within their first five years of operation, 25% were within six to 10 years of operation, and 15% had operated more than 10 years (*The Business Failure Record* 1978). The model is developed to predict the business failure over the five-year period prior to failure. For the purpose of model development, failed firms are defined as ones that filed under Chapter XI of the bankruptcy act (Van Horne 1977). Note that the major objective of the business failure model is *not* to explain the success or failure of business performance but rather to predict success or failure from performance indicators.[2]

The underlying rationale of the model development is that an enterprise is a reservoir of cash and the objective of the firm is to manage its cash flows effectively (Day 1977; Walters 1957). The firm is considered to be bankrupt when this reservoir becomes empty. The "amount" of cash in the reservoir, however, can be measured by certain financial performance indicators reflecting the firm's profitability, growth, and liquidity (see, for example, Table 2). Therefore, an examination of these indicators should provide signals of possible failure (Beaver 1966; Fitzpatrick 1931).

Such a framework has been utilized in several studies to predict business failure. In an extensive research study, Beaver (1966) used financial performance ratios to predict business failure. The study encompassed a

[2]In recent years some attempts have been made to study empirically the relationships among various strategic variables and to identify the determinants of market and financial performance. The scope of these studies has ranged from the identification of determinants of profitability for a specific industry (e.g., Schendel and Patton 1978) to the formulation of "propositions" of corporate strategy (e.g., PIMS). The most substantial attempt yet in the field of business policy and corporate strategy is an ongoing study being conducted by the Strategic Planning Institute (referred to as the PIMS program). See Wind and Mahajan (forthcoming) for details of this program.

FIGURE 2
Mean Current Ratio and Return on Assets for Failed and Nonfailed Firms



sample of 79 relatively large firms that failed during the 1954–1964 period. For each of these companies, another firm was selected that did not fail but was in the same industry and was of approximately the same size as the firm that failed (referred to as the paired design). The data collected for the nonfailed companies were for the same years as those for the failed firms. These samples were used to test the predictive ability of 30 financial ratios by univariate analysis. Beaver's work has been extended by Altman (1968) and others (e.g., Blum 1974, Taffler and Tisshaw 1977). Whereas Beaver used univariate analysis to determine the predictive ability of individual financial ratios, researchers who extended his work used discriminant analysis (Joy and Tollefson 1975). The discriminant scores were used to distinguish between failed and nonfailed firms. Although individual financial performance indicators measure certain important aspects of the firm's performance, discriminant analysis is a means of capturing the information provided by individual indicators into one composite score.

In our proposed model for retailing firms, we employ a series of discriminant analyses to predict business failure. The runs are conducted separately for each year over a five-year period prior to failure. We use a paired design approach to select the sample of nonfailed firms. The validity of the model is established by the Lachenbruch holdout method.

The Model

To develop the business failure model for retailing firms, we selected a sample of 46 firms. The sample was

FIGURE 3
Scores of Failed and Nonfailed Firms One Year Prior to Failure

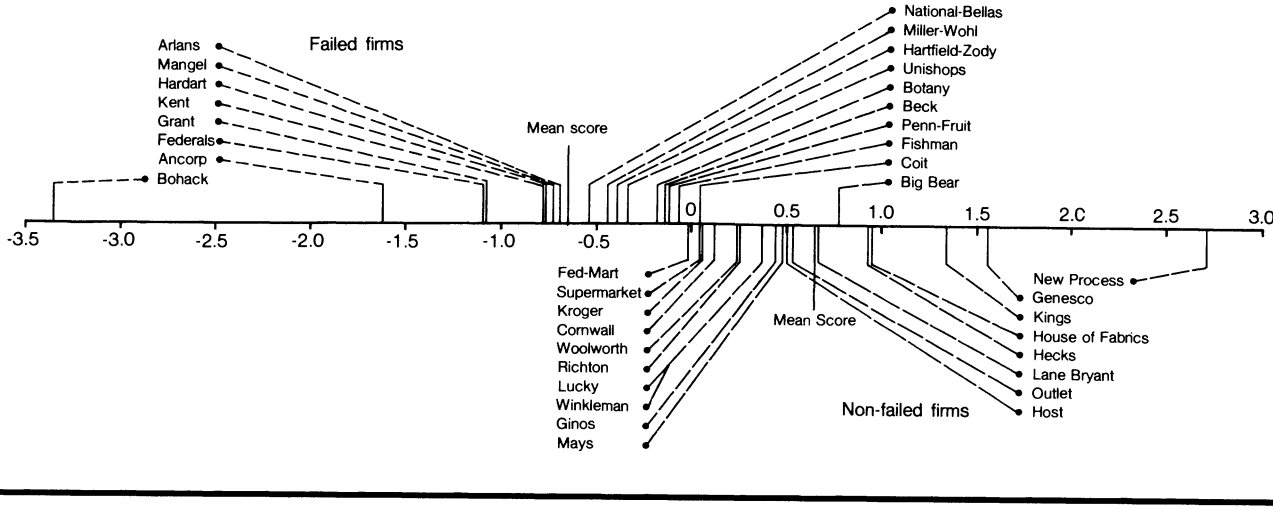


TABLE 3
Means and Standard Deviations of Indicators

Indicator[a]	Year to Failure 1		Year to Failure 2	
	Failed	Nonfailed	Failed	Nonfailed
1. Return on assets	−.130 (.226)	.139 (.050)	−.020 (.240)	.135 (.047)
2. Debt service	−5.092 (12.587)	17.885 (38.352)	−.567 (10.243)	39.686 (79.33)
3. Cash flow	−1.551 (5.292)	1.342 (3.419)	.162 (.603)	1.207 (2.806)
4. Capitalization	.382 (2.014)	1.364 (1.113)	1.125 (1.087)	1.909 (2.806)
5. Current ratio	1.628 (.994)	2.295 (.967)	1.658 (.571)	2.549 (1.184)
6. Cash turnover	43.667 (28.240)	69.680 (106.660)	52.562 (50.735)	49.732 (50.385)
7. Receivables turnover	44.436 (63.201)	81.329 (92.081)	35.527 (56.001)	65.914 (72.181)
8. Inventory turnover	18.630 (35.883)	11.734 (16.304)	9.198 (12.388)	10.138 (11.580)
9. Sales per dollar working capital	17.894 (48.442)	11.554 (8.815)	9.997 (38.708)	10.050 (8.506)
10. Retained earnings/ total assets	−.179 (.532)	.302 (.129)	.159 (.193)	.304 (.132)
11. Total assets	127.878 (265.720)	302.568 (534.346)	126.977 (262.901)	253.738 (452.683)

[a]Numbers in the parentheses are standard deviations.

limited to 46 firms because they were the only ones for which financial data were readily available from published sources such as Moody's *Industrial Manual*. Half of the sample consisted of failed firms. All failures occurred during 1970–1976. Table 1 is a description of the failed and nonfailed firms.

The firms were paired on the basis of firm type as classified by Moody's *Industrial Manual* (e.g., discount store, department store) and size (total assets). For example, Giant (discount store) was paired with Jamesway (also a discount store); Miller-Wohl (women's apparel) was paired with Winkleman (also a women's apparel store).

Eleven financial performance indicators were selected to discriminate the failed from nonfailed firms. Table 2 is a description of the indicators. The selection of these indicators was governed by the following considerations.

1. Results of past research which established the importance of various financial indicators as determinants of success or failure (e.g., Altman 1968; Beaver 1966; Blum 1974).
2. The development of a comprehensive set of indicators reflecting the financial performance in terms of profitability, leverage, and liquidity. These indicators have been shown to measure the financial health of firms (Van Horne 1977).
3. Data availability that permitted the calculation of certain indicators across firms and across years.

Data on 11 performance indicators were taken from Moody's *Industrial Manual* for five years prior to failure for failed firms and for a corresponding five-year period for each nonfailed firm. Table 3 gives the mean and standard deviation for each indicator across the five years for failed and nonfailed firms, respectively. Mean values of two indicators—return on assets and current ratio—are depicted in Figure 2. Visual examination of mean values suggests the differences between failed and nonfailed firms on these indicators.

A two-group discriminant analysis was conducted to find the "best" linear discriminant functions for the five years prior to failure. Table 4 is a summary of the results. Wilk's lambda values, canonical correlations,

TABLE 3 (continued)

Year to Failure 3		Year to Failure 4		Year to Failure 5	
Failed	Nonfailed	Failed	Nonfailed	Failed	Nonfailed
.058	.146	.073	.153	.0922	.155
(.055)	(.058)	(.054)	(.060)	(.050)	(.051)
5.400	16.529	6.445	15.083	7.559	13.455
(5.955)	(17.774)	(9.202)	(12.887)	(9.441)	(10.829)
.426	1.159	.352	.710	.536	.742
(.868)	(2.355)	(.587)	(.677)	(.679)	(.639)
.946	2.575	1.203	3.531	1.338	3.856
(.690)	(2.195)	(1.006)	(3.241)	(.897)	(4.119)
1.751	2.508	1.915	2.273	1.923	2.401
(.537)	(1.213)	(.781)	(.838)	(.613)	(1.236)
78.848	42.105	44.44	35.884	47.939	53.563
(98.628)	(32.667)	(58.190)	(19.962)	(32.942)	(73.590)
46.462	89.948	44.710	68.757	84.072	57.610
(49.368)	(136.478)	(51.559)	(77.579)	(101.195)	(92.199)
10.606	10.496	8.961	10.555	11.359	9.522
(12.201)	(10.562)	(8.949)	(12.121)	(10.794)	(5.494)
16.220	10.923	13.000	10.653	15.972	12.193
(21.779)	(9.939)	(16.074)	(7.878)	(14.419)	(12.665)
.203	.311	.232	.319	.289	.337
(.149)	(.126)	(.142)	(.129)	(.122)	(.127)
123.734	223.794	114.848	206.051	137.281	266.937
(246.50)	(400.900)	(216.691)	(371.346)	(246.707)	(426.135)

and the percentage correct classification of the sample itself indicate a high degree of separation between the two groups across the five years. The discriminant functions for each of the five years include only two indicators—return on assets and current ratio. The discriminant scores for one year prior to failure are plotted in Figure 3.

The appearance of current ratio and return on assets as two important indicators of failure is not surprising as both ratios indirectly or directly affect the cash flow of a firm. Argenti (1976a), after analyzing a number of business failures, concluded that high leverage (measured by current ratio) and the inability to make a profit (measured by return on assets) were among the major symptoms of failure.

The fact that ratios such as inventory and receivables turnover do not enter the discriminant function is surprising because the model was developed specifically for retailing firms. A reason may be that these ratios affect the profitability of a firm and return on assets essentially captures most of the information they provide. However, the reason why some ratios did or did not enter is not important because the objective of analyzing performance indicators is *not* to explain why they are different but to provide an *early warning signal* of a possible failure.

Before applying the results to predict business failure, one must validate the model. Validation can be done by means of a holdout sample. As our small sample size precluded such an analysis, we validated the model by using the Lachenbruch holdout method. This procedure involves holding out one group member at a time and predicting its membership by using the discriminant function derived from the remainder of the sample. The validated correct classifications, as shown in Table 4, for years one through five are 92%, 78%, 74%, 73%, and 77%, respectively. These results indicate the strong separation power of the model and suggest that the model is at least partially validated.

The model and its concepts have several managerial implications. First, the discriminant weights of Table 4 can be used along with the appropriate financial ratios to calculate the discriminant score. If the discriminant score is less than the cutoff score (which happens to be zero), the firm is a potential candidate for bankruptcy. A negative score does not predict that the firm will become bankrupt. Rather, it is an *early warning signal* of a *potential* problem calling for a detailed marketing

TABLE 4
Discriminant Analysis Results

	Year Before Failure				
	1	2	3	4	5
	Weights				
Return on Assets	3.679	3.031	7.905	10.831	10.298
Current Ratio	0.380	0.630	0.443	0.201	0.417
Constant	−0.862	−1.534	−1.875	−1.779	−2.277
Canonical Correlation	0.651	0.531	0.539	0.491	0.564
Wilk's Lambda	0.576	0.718	0.710	0.759	0.682
Chi square	18.230	14.259	14.745	11.286	8.790
Significance	.000	.001	.001	.004	.012
Number of Companies Available	36	46	46	44	26
Classification Rate (%)	91.67	78.26	73.91	75.00	80.77
Classification Rate (%) (Lachenbruch Holdout Method)	91.67	78.26	73.91	72.73	76.92

audit (Kotler, Gregor, and Rogers 1977).

Second, the model can be incorporated in the management information system and used as a control model for monitoring a firm's performance over time. This monitoring can be accomplished by an analysis of the trend of discriminant scores. A positive trend (i.e., the scores increase over time) is indicative of a healthy firm. A negative trend is an early warning signal for an ailing firm that may be heading for bankruptcy and needing some sort of detailed performance evaluation by management.

Third, the model is not limited to the prediction of potential bankruptcy of the firm as a whole. It can be used for decision making at a micro level, such as evaluating products, salespeople, and good and bad credit risks. For example, Cheek (1979) analyzed various performance indicators of successful and failed products to develop a lexicographic rule for predicting failures. He claims a classification rate of about 88%. The details of his study are not available to discuss or evaluate.

Obviously, an empirical model such as ours has certain limitations. First, the choice of performance indicators is not based on any "theory" but on the findings of previous research studies. Second, it may not be possible to obtain a perfect pairing of failures and successes. The effect of a paired design is not known and needs to be investigated. However, these limitations may not be severe given the objective of the model—to *predict* business failures by using performance indicators rather than to explain it.

Conclusion

We stress the importance of analyzing failures and propose a failure process model. The model suggests that failures can be predicted by analysis of either the causes of failure or the performance indicators. The major limitation of the former is that the inputs to the model rely on managers' judgments and therefore are subject to bias and error. Failure prediction models which use performance indicators do not have this limitation. Their inputs are completely objective. These models, however, do not tell the causes of failure. They only predict the possibility of failure. Because each model has its own advantages and disadvantages and their objectives are different, management could use both as complementary models. Argenti (1977) describes a subjective method by which the two models might be combined. We believe that combining Cooper's method for analyzing causes of failures with the method we suggest for analyzing symptoms of failures should be an interesting topic for further research.

Finally, in spite of the limitations of analyzing failures, the identification of determinants of market and financial performance of business firms is of interest to both practitioners and academicians. The recent empirical investigations, however, seem to have been limited to going concerns (e.g., PIMS program). An important objective of our article is to suggest that the scope of these performance investigations and the value of their results can be enhanced by including failures. Only through the investigation of failures and successes can determinants of business performance be identified and predicted.

REFERENCES

Altman, E. I. (1968), "Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy," *Journal of Finance*, 23 (September), 589–609.

———, R. Haldeman, and P. Narayanan (1977), "ZETA Analysis: A New Model to Identify Bankruptcy Risk of Corporations," *Journal of Banking and Finance*, 1 (June), 29–54.
Argenti, J. (1975), "Company Failure: The Tell Tale Signs at the Top," *The Director*, 28 (September), 287–9.
——— (1976a), *Corporate Collapse: The Causes and Symptoms*. New York: John Wiley & Sons, Inc.
——— (1976b), "Corporate Planning and Corporate Collapse," *Long Range Planning*, 9 (December), 12–17.
——— (1976c), "How Can You Tell If They Are Going Bust?" *Accountancy*, 87 (October), 42–4.
——— (1977), "Company Failure—Long Range Prediction Not Enough," *Accountancy*, 88 (August), 46–8, 50–2.
Beaver, W. H. (1966), "Financial Ratios as Predictors of Failure," in *Empirical Research in Accounting: Selected Studies*, Supplement to *Journal of Accounting Research*, 4, 71–111.
Blum, M. (1974), "Failing Company Discriminant Analysis," *Journal of Accounting Research*, 12 (Spring), 1–25.
The Business Failure Record (1978), New York: Dun and Bradstreet, Inc.
Business Week (1971), "Hard Look at Why Brokers Fail," (August 7), 54–5.
——— (1975), "Sears Identity Crisis," (December 8), 52–7.
——— (1980a) "The Economic Case Against Government Bailouts . . . and Who May Need Them," (March 24).
——— (1980b), "In Excellent Shape," (April 7), 4–5.
——— (1980c), "Dealing in Cash Commodities," (April 14), 7.
Cheek, M.L. (1979), "Predicting Your Product's Profitability," *Managerial Planning*, 27 (May–June), 1–8, 40.
Cooper, R. G. (1975), "Why New Industrial Products Fail," *Industrial Marketing Management*, 4 (January), 315–26.
——— (1979), "The Dimensions of Industrial New Product Success and Failure," *Journal of Marketing*, 43 (Summer), 93–103.
The CPA Journal (1975), "Some Common Reasons for Business Failure," 45 (April), 74.
Crawford, M. C. (1977), "Marketing Research and the New Product Failure Rate," *Journal of Marketing*, 41 (April), 51–61.
Day, G. S. (1977), "Diagnosing the Product Portfolio," *Journal of Marketing*, 41 (April), 29–38.
Fitzpatrick, P. J. (1931), *Symptoms of Industrial Failures as Revealed by an Analysis of the Financial Statements of the Failed Companies*, Washington, D. C.: Catholic University of America.
Hartley, R. F. (1976), *Marketing Mistakes*, Columbus, Ohio: Grid Publishing Inc.
Hazlitt, H. (1959), "The Failure of the 'New Economics': An Analysis of the Keynesian Fallacies," Princeton, New Jersey: D. Van Nostrand Company, Inc.
Houston, B. (1972), "Let's Put More Espirit in De Corporation," *Harvard Business Review*, 50 (November–December), 55–61.
Joy, O. M. and J. O. Tollefson (1975), "On the Financial Applications of Discriminant Analysis," *Journal of Financial and Quantitive Analysis*, 10 (December), 723–39.
Juenger, F. G. (1949), *The Failure of Technology: Perfection Without Purpose*, Hinsdale, Illinois: Henry Regnery Company.
Karger, D. W. and Z. A. Malik (1975), "Long-Range Planning and Organizational Performance," *Long Range Planning*, 8 (December), 60–4.
Kaye, J. L. and L. N. Garter (1979), "Early Warning Signs of Business Failure," *Credit and Financial Management*, 81 (June), 36–7.
Kotler, P., W. Gregor and W. Rogers (1977), "The Marketing Audit Comes of Age," *Sloan Management Review*, 18 (Winter), 25–42.
Lazo. H. (1965), "Finding a Key to Success in New Product Failures," *Industrial Marketing*, 50 (November), 74–7.
The McGraw-Hill Dictionary of Modern Economics: A Handbook of Terms and Organizations (1973), New York: McGraw-Hill Book Company.
Miller, D. (1977), "Common Syndromes of Business Failure," *Business Horizons*, 20 (December), 43–53.
——— and P. H. Friesen (1977), "Strategy-Making in Context: Ten Empirical Archetypes," *The Journal of Management Studies*, 14 (October), 253–80.
Ross, J. E. and M. J. Kami (1973), *Corporate Management in Crisis: Why The Mighty Fail*, Princeton, New Jersey: Prentice-Hall, Inc.
Schendel, D. and G. R. Patton (1978), "A Simultaneous Equation Model of Corporate Strategy," *Management Science*, 24 (November), 1611–21.
Schoeffler, S. (1955), *The Failures of Economics: A Diagnostic Study*, Cambridge: Harvard University Press.
Shooman, M. L. (1968), *Probabilistic Reliability: An Engineering Approach*, New York: McGraw-Hill Book Company.
Smith, R. A. (1966), *Corporations in Crisis*, New York: Doubleday and Co. Inc.
Taffler, R. and H. Tisshaw (1977), "Going, Going, Gone—Four Factors Which Predict," *Accountancy*, 88 (March), 50–4.
Time (1980), "Sears Searches for Success," 115 (May 5), 88.
Van Horne, J. C. (1977), *Financial Management and Policy*, 4th edition, New York: Prentice-Hall, Inc.
Walters, J. E. (1957), "The Determination of Technical Solvency," *Journal of Business*, 30 (January), 30–45.
Webster's Third New International Dictionary (1961), Chicago: R. R. Donnelly and Sons Inc.
Wind, Y. and V. Mahajan, *Portfolio Analysis and Strategy*, Reading, Massachusetts: Addison-Wesley, forthcoming.
Worthing, J. C. (1966), "Who Fails and Why," *Advanced Management Journal*, 31 (January), 21–6.
Wyant, R. (1972), "Business Failures," *Dun's*, 99 (June), 131–2.