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Masoud Hemmasi

Louisiana State University and Agricultural & Mechanical College

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COMPETITIVE ENVIRONMENT, BUSINESS STRATEGY, AND
ORGANIZATION STRUCTURE: AN ANALYSIS OF FIRM PERFORMANCE

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COMPETITIVE ENVIRONMENT, BUSINESS STRATEGY,
AND ORGANIZATION STRUCTURE:
AN ANALYSIS OF FIRM PERFORMANCE

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in Partial Fulfillment of the
Requirements for the Degree of
Doctor of Philosophy

in

Interdepartmental Program of Business Administration

by
Masoud Hemmasi
BBA, Tehran Business College, 1974
MBA, North Texas State University, 1976
May, 1983

This Dissertation is Dedicated to
My Parents,
Reza and Aghdas Hemmasi
for their lifetime commitment
to their children's education

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ABSTRACT

This research attempts to develop and empirically test an integrative model of business economic performance. The research framework includes certain concepts and relationships that emanate from the literature in Industrial Organization Economics, Business Policy, and Organization Theory.

In general, the key tenet of the study is threefold: a) that there are industry differences in types of challenges confronting top level management; b) that strategic and organizational responses that different environmental challenges elicit are quite different and somewhat predictable; and c) that the combination of the environmental, strategic, and organizational characteristics of the organizations affect their economic performance.

The sample for this research was selected from the less-diversified manufacturing companies on COMPUSTAT tapes. The sample proved to be quite diverse, representing a broad cross section of different manufacturing industries.

The analysis of the data, in general, supported the major contentions of the study. The results suggested that organizations' responses to external contingencies vary by industry characteristics. In addition, it was concluded that the environmental, strategic, and structural profile of high-performing companies is indeed different from that of low-performing firms.

CHAPTER ONE

INTRODUCTION

The purpose of the first chapter is twofold. First, the research problem that is dealt with in the dissertation is stated and the research model presented. Secondly, the importance of this research is justified in light of the shortcomings in previous writings and research on the subject.

I. THE RESEARCH PROBLEM:

The question of what determines the level of performance achieved by companies still defies a sure answer. The problem is extremely complex due to the fact that a vast number of interwoven influences, both internal and external to organizations, are at work. Given the complexity of the problem, it is not surprising that there exist many independent theoretical frameworks that have attempted to explain business performance (Theorelli, 1977a; Bourgeois and Astley, 1978; Bourgeois and Astley, 1979; Caves, 1980; Lenz, 1980; White and Hamermesh, 1981). Yet, few of these have been used in their entirety to guide investigations. "Instead, research has generally proceeded under the direction of more restricted formulation

associated with specific research traditions." (Lenz, 1980:2). These often independent research traditions, as White and Hamermesh (1981) suggest, use different and usually singular explanatory factors, have different conceptual schemes, employ different languages, examine different organization units, and serve different objectives.

Industrial organization (IO) economists, for example, seek to identify sets of market and industry attributes that influence economic performance and to build theories detailing the nature of the links between those attributes and end performance (Caves, 1967; Boyle, 1972; Scherer, 1980). As a result, they have developed models of competitive and monopolistic industrial behavior. These models suggest that given the limiting structural conditions of these two market forms, it is possible to predict with considerable accuracy the resulted performance of firms in response to basic changes in industry supply and demand. Findings of IO line of research are often used in formulation of public policy.

Industrial market structure in IO literature is typically assessed with objective summary measures that are intended to capture the overall configuration of a competitive setting (e.g., sales concentration ratios, rate of growth in demand, advertising-to-sales ratio). No

explicit role is assumed for the managerial perceptions of the industry attributes in the industry structure-conduct-performance framework. The IO paradigm also fails to recognize that how a firm organizes and administers its activities can too affect its performance. Investigations of these factors have largely been the province of another theoretical orientation, organization theory (OT).

The predominant line of thought in this area (i.e., OT) has come to be known as contingency theory. It takes the view that organizations are responsive to their environment and that performance is contingent upon the goodness of fit between environment and internal structure of organizations (Burns and Stalker, 1961; Lawrence and Lorsch, 1967). In this context, structure is usually conceptualized and operationalized along bureaucratic dimensions of differentiation, centralization, formalization, etc.

Contrary to IO researchers, most students of organization theory rely exclusively on managerial perceptions in measuring environmental characteristics. They base this practice on the arguments presented by Weick (1969) and Child (1972) that organizations respond not to the actual environment but rather to the environment that is perceived by managers. In other words, it is only through managerial perception that environment becomes meaningful

for decision makers. As such, objective reality of physical environment is less than important in determining or influencing the way organizations are designed or managed (Miles, Snow, and Pfeffer, 1974; Anderson and Paine, 1975; Hambrick and Snow, 1977). In addition to the operationalization of environment, the way this construct is conceptualized is also different across the IO and OT disciplines. Where intensity of competition, barriers to entry, product differentiation, and so forth, characterize environment in Industrial Organization, the dimensions of environment that have captured the attention of organization theorists are for the most part consistent with those used in cybernetics (Ashby, 1957). These dimensions center on environmental uncertainty and complexity. Surprisingly, even in a few OT studies that concepts of environment common to those of IO are used, perceptual measures or heuristic procedures are employed to tap the variables (Negandhi and Reimann, 1972; Khandwalla, 1973; Pfeffer and Leblebici, 1973; Simonetti and Boseman, 1975; Hrebiniak and Snow, 1980).

The models of performance developed by organization theorists are generally deterministic. They take a reactive stance by viewing the environment and other "contextual" factors as imperative forces to which organizations respond

(Child, 1972; Bobbitt and Ford, 1980). That is, an organization finds itself in a particular set of circumstances. It adapts and survives, or it fails. What this view often does not explicitly consider is that organizations are purposive entities and management is a creative and proactive process. Depending on environmental and internal properties, they not only have considerable leeway in making choices to meet contingencies, but also have the capability of influencing the environment.

Business policy's (BP) approach to studying of performance fills this gap by viewing management as a proactive or opportunistic agent and focusing much of the research on the strategy variable (Mintzberg, 1972). In the Business Policy framework, strategic decision making is seen as the heart of organization-environment co-alignment process and as the key administrative activity through which organization leaders establish organizational goals, define its domains of action, and determine how it will navigate and compete within the chosen domains. Accordingly, one of the major streams of research in the area of strategic management, known as the content approach, centers on the makeup of firms' strategic postures, and various conditions under which they have been adopted or proven successful (e.g., Hofer, 1973; Glueck, 1976; Khandwalla, 1976; Paine

and Anderson, 1977; Hatton, et al., 1978; Schendel and Patton, 1978; Jauch, Osborn and Glueck, 1980). It is interesting to note that, although the essence of formulating competitive strategy is relating a company to its environment and a key aspect of the firm's environment is the industry in which it competes, during much of the development of the field Industrial Organization made no impact on Business Policy's concept of strategy. Porter (1979a) suggests that this reflects some real underlying differences in the purpose, frame of reference, unit of analysis and research values that each field has traditionally embraced. Within the last ten years, however, the promises of IO is being recognized by strategic management writers and researchers (Hofer, 1973; Hatton, et al., 1978; Hofer and Schendel, 1978; Schendel and Patton, 1978; Caves, et al., 1980; Porter, 1980).

With respect to OT research, the BP literature has paid occasional attention to strategy implementation, with a focus on the design of the administrative structure. Such works are based on the idea that strategy guides the choice of structure (Chandler, 1962; Fouraker and Stopford, 1968; Rumelt, 1974; Galbraith and Nathanson, 1978). However, the measures of structure used in these studies are largely limited to the distinction between functional and multi-

divisional forms, which give a summary configuration of organization structure. Very little research has been done on the relationship of strategy and internal bureaucratic structural features and processes that are of great interest to OT scholars. Also, most of such BP studies have not considered performance in their models, and when they have, results have been less than conclusive (Rumelt, 1974).

The brief overview of the directions of research in the fields of IO, OT, and BP certainly indicates that there is a clear need and considerable opportunity for cross-fertilization, with the subsequent widening of research boundaries across these disciplinary areas. The proposed research in this dissertation is intended to fill some of the gap among these fields by developing and putting to empirical testing an interdisciplinary model of firms' economic performance (Figure 1-1). The major feature of this integrative model is that it connects, in a single framework, the concepts of industry attractiveness and structure, perceived intensity and nature of competition, strategic responses to environmental demands, organization structure, and level of business performance.

In general, the primary contention of this proposal is threefold:

- (a) that there are industry differences in types of

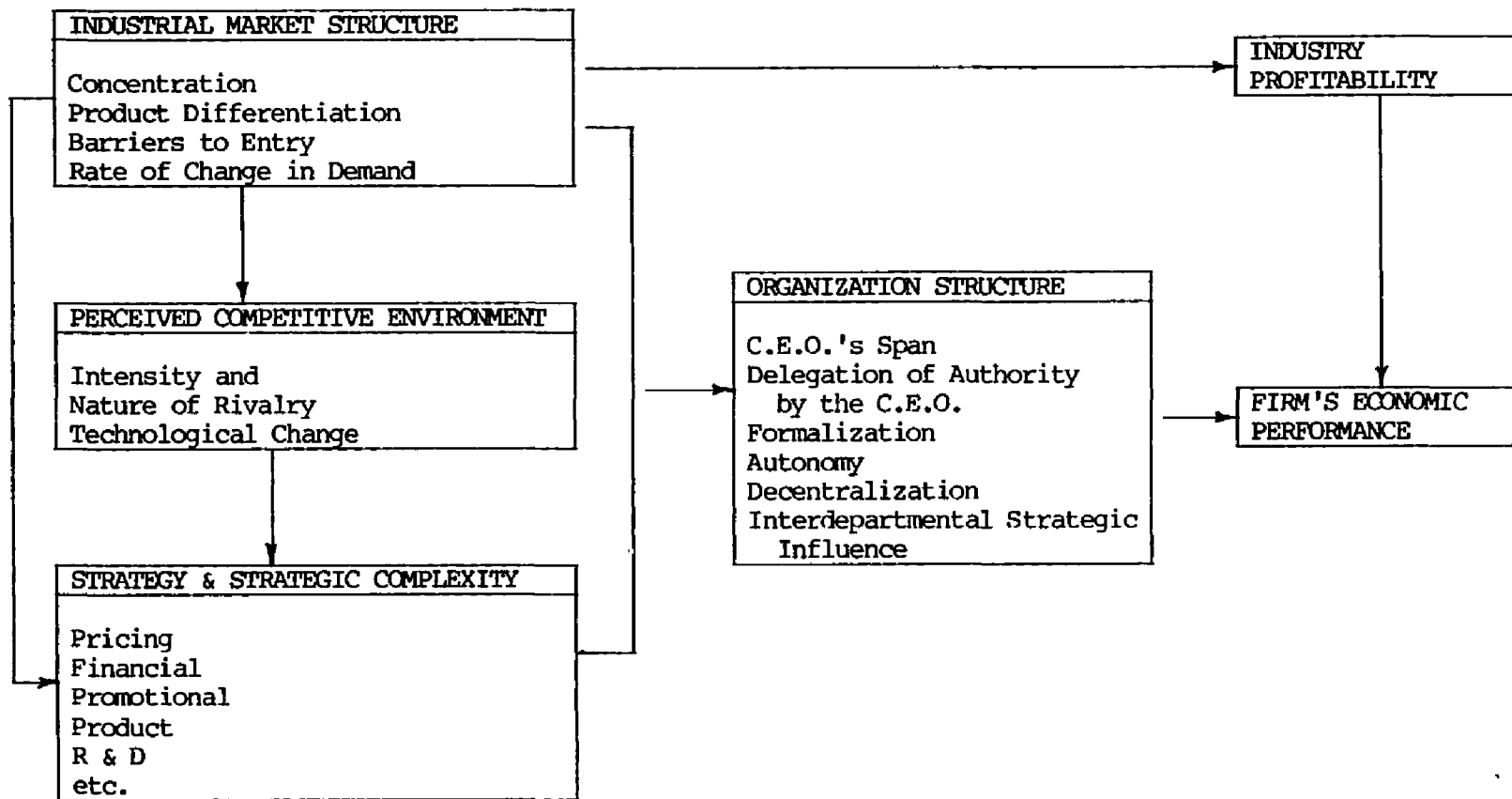


FIGURE 1-1.

THE RESEARCH MODEL

challenges and uncertainties confronting top level managements;

(b) that responses that these challenges elicit, in terms of strategic actions and internal structural patterns, vary by industry types; and

(c) these strategic and structural responses affect firm profitability, as do industry profitability differences (Beard and Dess, 1979).

II. JUSTIFICATION:

From the above summary of the research in IO, OT, and BP, it is evident that these fields have adopted rather independent approaches. This, though not without value, has often encouraged a certain fragmentation in the resulting theories that makes it difficult to detect the cumulative implications of research findings of these various disciplines. The position presented in this paper is that industrial organization, organization theory, and business policy have gone their separate ways for too long. Although different in perspectives, these areas have overlapping and sometimes identical explanatory variables. They have a great deal in common and should be exchanging theoretical frameworks and expanding their research boundaries. One benefit growing out of such a broad approach is that it

would relate and put into perspective a diverse array of research virtually all of which bears upon business performance. This would be a matter of significant importance to academicians and practitioners alike. An essential step toward that end, however, is to develop models that synthesize and relate together relevant concepts from these areas in a meaningful manner (Preston, 1977; Thorelli, 1977b; Caves, 1980; Miles and Snow, 1981; Hamermesh and White, 1981). The proposed study is indeed an attempt in that direction. It presents and empirically tests an interdisciplinary model of a firm's economic performance.

Fairly rich theory and a considerable body of empirical data already independently link the factors of this model. However, the strong links and overlaps between the independent variables used by different schools of thought have gone largely unstated. Though researchers in each of these fields are already beginning to integrate their efforts, all of the empirical work along this line concentrates on only two of the three identified areas (e.g., Khandwalla, 1973; Miles and Snow, 1978; Steer and Cable, 1978; Grinyer, et al., 1980; Hrebiniak and Snow, 1980, Miller and Friesen, 1980; Jemison, 1981). Efforts to tie together models of all three disciplines (see Figures 1-2 and 1-3, for example) are theoretical, and limited only to

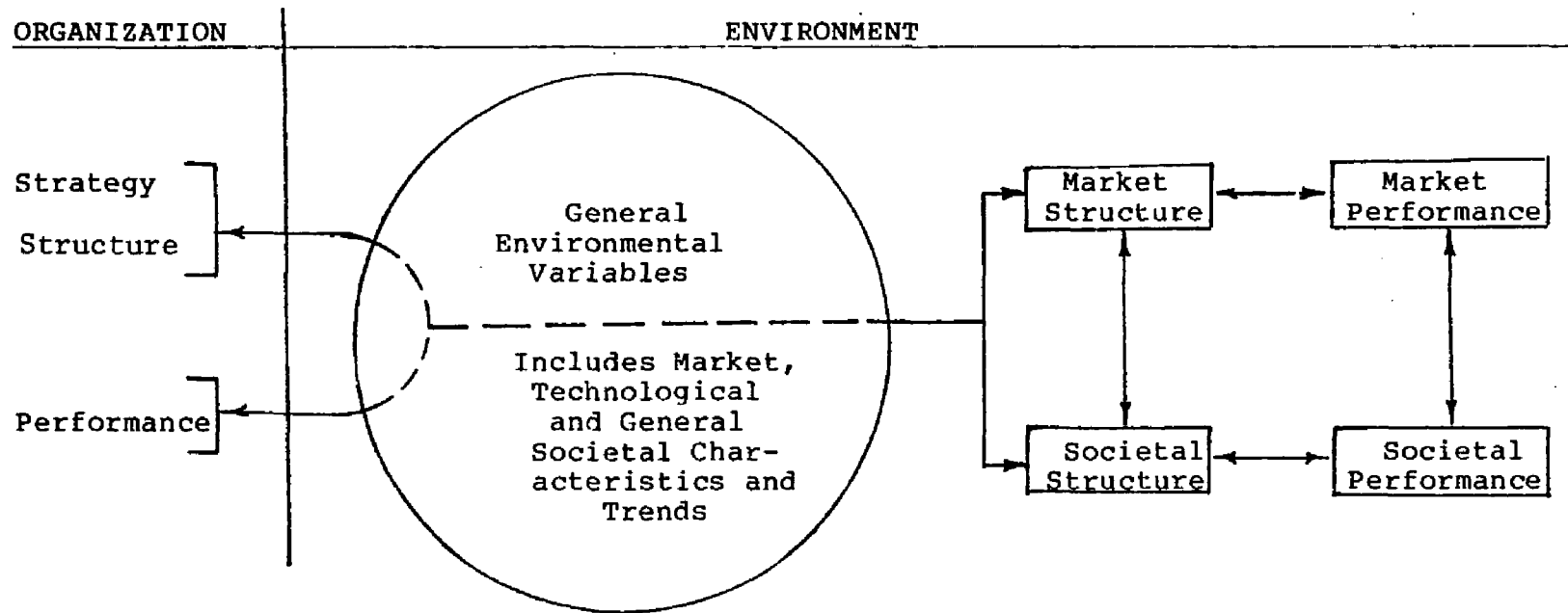


Figure 1-2. Synthetic Framework for Organization-Environment Analysis
 Source: Preston, Lee E. (1977:40)

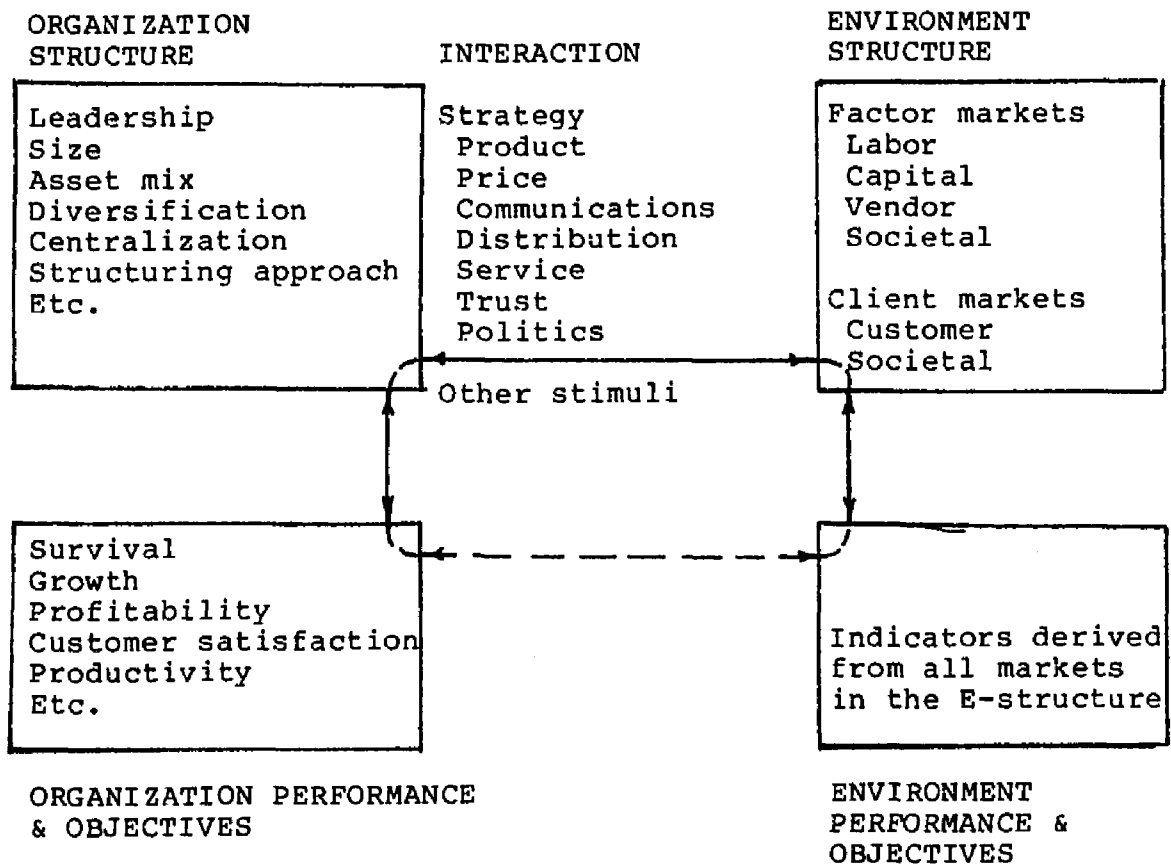


Figure 1.3. Structure-Strategy-Performance Ecosystem
 Source: Thorelli, Hans B. (1977:10)

calling for such empirically integrative works (Preston, 1977; Thorelli, 1977b; Bourgeois, 1980; Lenz, 1980; Porter, 1980; Hamermesh and White, 1981; Miles and Snow, 1981). The study proposed here is a response to those calls and an effort to fill the existing gaps and deficiencies. It incorporates the IO concept of industry structure into management's strategy--structure--performance paradigm, recognizing that industry is the fundamental arena in which organization behavior occurs. That is, there are distinguishing characteristics of industries that affect the type of external issues or problems salient to top management and the strategic options chosen to deal with them. This position is consistent with Steiner's (1969) findings in a survey of 259 corporate executives. He reports that there is a wide variation in importance attributed to strategic factors among groups of companies operating in different industries. The position is also supported by industry case studies. For example, Business Week (1979) suggests that the home appliance industry is becoming the exclusive province of companies that compete only on a high-volume, low-cost basis. On the other hand, the tobacco industry is reported to be characterized by a much broader range of strategic behaviors, with companies "competing on a manufacturing, marketing, or product

development basis" (reported in Miles and Snow, 1981:550).

Therefore, industry structure seems to be a variable that circumscribes organizations in ways that are both theoretically and practically meaningful and worthwhile to investigate. As Miles and Snow (1981) point out, industry structure is a proxy for a number of important characteristics of a firm's environment, such as required capital investment, degree of product differentiation, types of production technology, expected long-term profit prospects, and so forth. These are the types of environmental factors that determine the intensity and nature of competition in an industry and affect managerial decision making (Caves, 1967; Boyle, 1972; Porter, 1980; Scherer, 1980).

Secondly, "industry is an environmental context that is rooted in reality. Unlike other environmental dimensions presumed to affect organizational behavior, such as uncertainty, munificence, or hostility, industry structure factors are concrete and frequently externally verifiable" (Miles and Snow, 1981:549). Some writers have already warned us that "...measures based solely on subjective data provide information about the subject not about his environment" (Starbuck, 1976:1087). And that "...an exclusive reliance on perceived environment relegates the researchers to the study of a psychological state of

uncertainty per se rather than extra-organizational phenomena, and thereby negates the very concept of external environment" (Bourgeois, 1980:35).

Finally, the scientific validity of some of the most commonly used perceived-uncertainty scales is doubtful. Tosi, Aldag and Storey (1973) suggest that Lawrence and Lorsch's environmental measure is methodologically inadequate. This conclusion is reached based on the assessment of the internal reliability of the measurement instrument and based on how it compares to other measures of environmental volatility. Downey, et al., (1975) also report that there appears to be a lack of communality between Lawrence and Lorsch's (1967) and Duncan's (1972) scales which are presumably designed to measure the same concept. As a result, they contend that "uncertainty concepts presently used in organization theory involve much ambiguity. The findings...should serve to put the researcher on guard against at least some potential pitfalls involved in current uncertainty conceptualizations and their applications" (Downey, Hellriegel and Slocum, 1975:628).

There also seems to exist a confusion with respect to the concept of competition in the management literature. In modern economic theory an industry is said to be competitive (or more precisely, purely competitive) when the number of

firms selling a homogeneous commodity is so large, and each firm's share of the market is so small, that no single firm is able to influence appreciably the commodity's price by varying the quantity of output it sells. This technical definition of competition that emphasizes market structure is drastically different from the usage adopted by business people and some management writers who emphasize the behavior and conduct of sellers and buyers. In this latter conception, competition is perceived as a conscious striving of business firms against one another for patronage (Scherer, 1980:Ch. 2). Scherer uses the term "rivalry" to characterize such activity that business people and some management writers refer to as "competition." He contends that "essence of rivalry is striving for potentially incompatible positions combined with a clear awareness by the parties involved that positions they seek to attain may be incompatible" (Scherer, 1980:10). Under this dichotomy, as Scherer suggests, it is possible for there to be vigorous rivalry where there is a low degree of competition (e.g., automobile industry). At the same time, there can be pure competition without any rivalry (e.g., grain industry). In the present study such distinction is recognized by objective measurement of the structural attributes of the

industries reflecting the economic conception of the competition. And at the same time, perceived measures of intensity and nature of rivalry (i.e., price competition, promotional competition, product competition, etc.) are included to take account of the behavioral aspects of competition. Therefore, adoption of simplified and undimensional concepts of competition and rivalry, as done by some management researchers (Negandhi and Prasad, 1971; Pfeffer and Leblebici, 1973), is avoided. In addition, reliance on multiple sources of information, as in this research, not only will help alleviate some of the above-mentioned theoretical and methodological problems, but will also present the chance to assess the explanatory role of perceptual environmental constructs vis-a-vis their objective counterparts. Finally, if management theory and research is to become more comparative and parsimonious, useful will be studies across industries, where the strengths and limitations of environmental and strategic concepts and measures would be most apparent.

In short, it is hoped that results of this work will serve to validate the utility of synthesizing from diverse conceptual schemes and lay the cornerstones for programs of future research.

CHAPTER TWO

REVIEW OF LITERATURE

In this chapter, the literature relevant to this research is reviewed and research propositions are derived. To facilitate an orderly review of the related literature, as well as an organized approach to derivation of propositions, this chapter is arranged around sets of constructs and linkages used in the literature. This approach results in the identification of the following three groups of relationships:

I. INDUSTRY STRUCTURE-STRATEGY-PERFORMANCE:

Studying this chain of relationships has been predominantly the province of students of IO. The essence of the IO paradigm is that a firm's performance in the marketplace depends critically on the characteristics of the industry environment in which it competes. This is expressed in the familiar industry structure-conduct-performance trilogy (See Figure 2-1). Bain (1968:2) has defined market structure as "those characteristics of the organization of a market that seem to exercise a strategic influence on the nature of competition and pricing." A number of characteristics are usually identified as exercising a

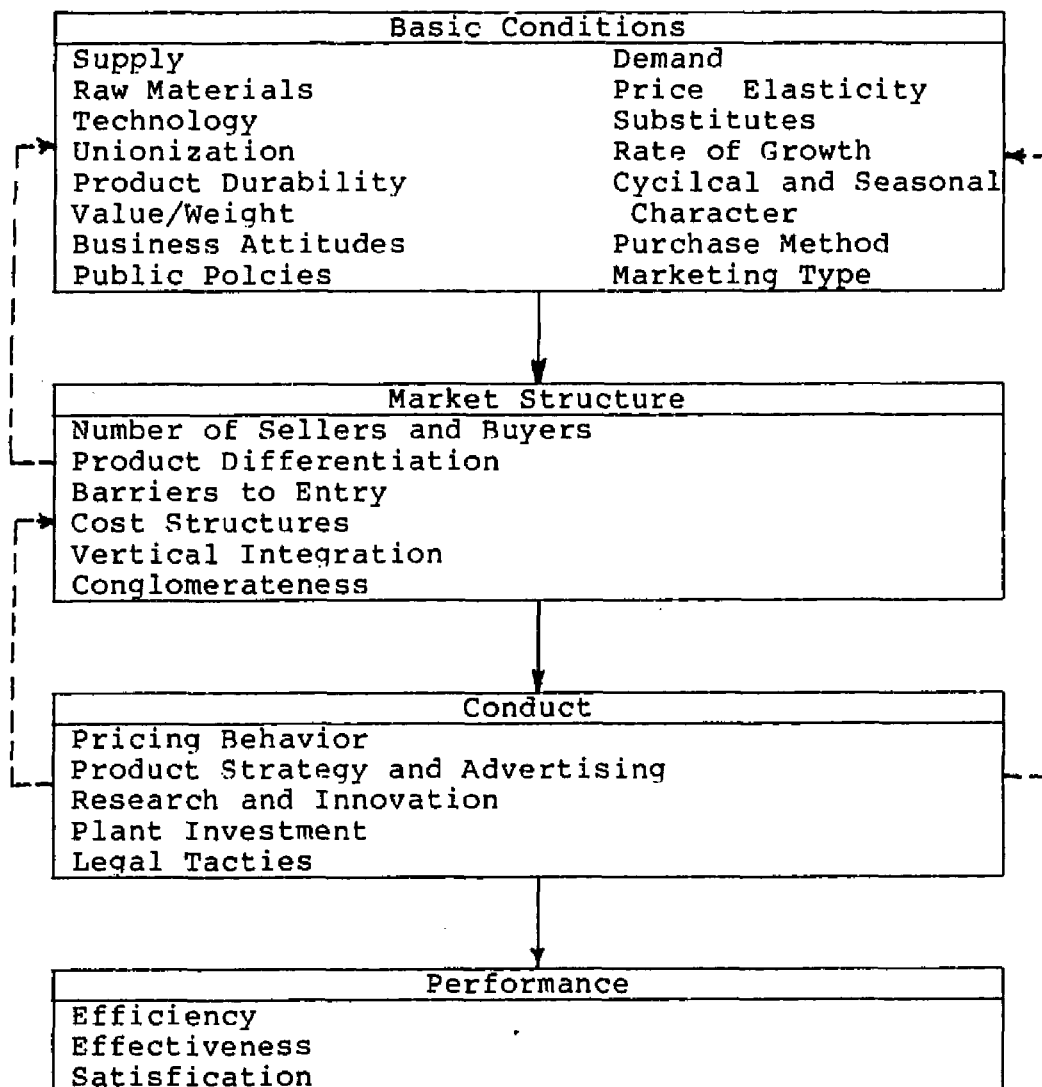


Figure 2-1. A Model of Industrial Organizational Analysis

Source: Scherer, F.M. (1980:4)

strategic influence: degree of seller concentration, degree of product differentiation, barriers of entry (of new sellers to the market), and growth in demand are among the most important ones.

Concentration is a proxy for the number and size, distribution of the firms in an industry. It is the cumulative market share of the few largest firms in the industry. Barriers to entry are indicative of the difficulty that new entrants will face in order to enter the industry. Product differentiation is primarily a function of the degree of product substitutability among competing firms' products. Industry products are differentiated when for some real or imagined reason, one firm's products are preferred by at least some buyers over rival products at a given price. The structure of a purely competitive market, for example, is characterized by product homogeneity (lack of product differentiation), many sellers, each holding a small share of the market (low seller concentration), and freedom of entry (lack of barriers to entry). In such an environment, the individual firm has no concern for "spoiling the market" (Vernon, 1972) or causing prices to fall. So long as the price exceeds the marginal cost, it will be profitable to increase level of output and sales. So, firms' competitive conduct will revolve mainly

around competitive pricing and cost efficiency.

Almarin Philips (1962), an economist skillful in behavioral sciences, argues that as the number of firms in an industry increases and the share of the industry output supplied by each firm decreases, it will be increasingly more difficult for individual sellers to anticipate (and pay attention to) the effect of their price and output decisions on rival actions and overall level of prices. Such conditions will also hamper the chances of any coordinative and collusive efforts among the rivals. Furthermore, the more numerous the rivals, the greater will be the probability that at least one becomes a maverick, pursuing an independent aggressive pricing policy. Such a maverick can make it hard for others to hold prices high.

On the other hand, according to the oligopoly theory, when rivalry is among a few, the firms can recognize, to some extent, the impact of their competitive moves on their rivals, and fear retaliation or efforts to counter the moves. That is to say that the firms are mutually interdependent. As such, some forms of rivalry, noticeably price competition, are highly unstable and quite possibly will leave the entire industry worse off from the standpoint of profitability. Under such conditions, it is quite likely that the firms will be able to collude (tacitly or

otherwise) to raise prices above long-term average costs (Scherer, 1980; Caves, 1972).

When barriers to entry are low or non-existent, super normal profits cannot, in the long run, exist. Because even if high profits exist in the short run, new firms attracted by the profit will come into the market, bringing with them new production capacity and a desire to gain market share. As a result, industry output will increase, shifting the supply curve to the right. This process will continue until the price is lowered to the level of average total cost for the representative firms. With presence of higher barriers to entry, however, price of the industry's product can exceed the average total cost for each firm, generating above-normal profits (Scherer, 1980; Caves, 1972). The mechanism through which entry barriers (scale economies in particular) can deter potential entrants from entering an industry is demonstrated by Vernon (1972) in a simple illustration. Consider the average cost curve of a typical firm in industry A, as shown in Figure 2-2.

To achieve minimum average cost, a firm entering industry A must produce an output of a least OB... Suppose that total output of industry A is OT, and OB is about one third of OT. If there are two firms already in the industry, then they must be willing to reduce their market share significantly to permit the entrant to attain minimum efficient scale. For

example, if each had 50 percent before entry, they would be cut to 33 percent after entry. The potential entrant would clearly recognize that the two existing firms would not be willing to allow this to happen without a struggle (for example, price and advertising warfare). The recognition of this possibility should serve to discount attractiveness of entry to industry A at minimum efficient scale.

Of course, the entrant could enter at a smaller scale, say, output OA in the figure. However, at output OA the entrant's unit cost would be higher than the cost of established firms (that is, OC compared with OD) (Vernon, 1972:78-79).

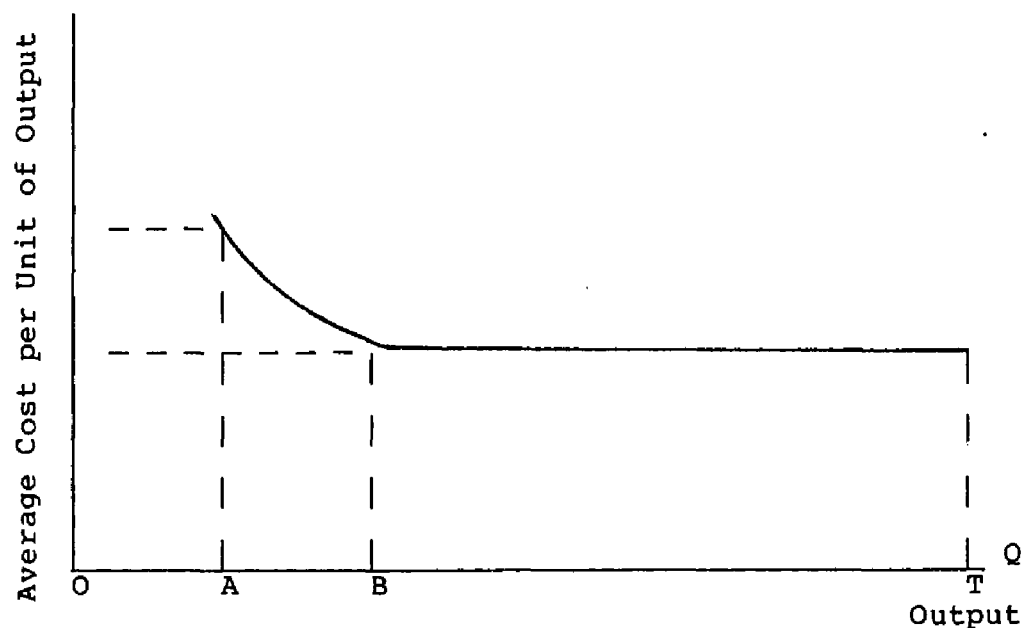


Figure 2-2. Scale Economy Barriers

Source: Vernon, John M. (1972:78)

Product differentiation means that established firms have brand identification and customer loyalties due to their past and present advertising, product design, servicing, distribution, or simply to their being first into the industry. It tends to reduce the price sensitivity (elasticity) of demand for the products by creating buyer preferences. Buyer preference and lower price elasticity of demand in turn enable firms to raise their profit margins. Product differentiation via advertising is more likely to occur in consumer goods than in producer goods industries because buyers are relatively uninformed about the relative merits of the existing products. In such industries, the new entrants will have to sell at a price below the established brands to overcome existing customer loyalties. This will be a deterrent to entry for prospective entrants (Wilson and Camanor, 1967).

The foregoing structural characteristics and their consequences can be well exemplified by the breakfast cereal industry. In 1972, the Federal Trade Commission charged the major companies in this industry with practicing a shared monopoly (Business Week, 1978). The charge was that the "Big Four" of this industry (namely, Kellogg, General Mills, General Foods, and Quaker Oats) do not compete on a price basis, enjoy monopoly level profits, and make it tough for

other firms to enter this industry because of their large advertising budgets and their grip on shelf space through their brand proliferation.

Growth of industry, in terms of sales, is also a determining factor with respect to the conduct and profitability of the firms in an industry. First, opportunities for earning higher profits are simply more readily available in growing industries. Secondly, as Porter (1980:18) suggests, "slow industry growth turns competition into a market share game for firms seeking expansion. Market share competition is a great deal more volatile than is the situation in which rapid industry growth insures that firms can improve results just by keeping up with the industry...." Thirdly, even "in oligopolistic industries where fixed costs are relatively high, slow growth or decline in demand may cause the breakdown of collusive, joint-profit-maximization pricing behavior, thus leading to lower price-cost margins" (Khalilzadeh-Shirazi, 1974:64). For all of the foregoing reasons, firms in industries facing rapid growth are less likely to feel competitive pressures than those in industries characterized by slow growth or stagnation, and thereby accrue temporary windfall profits. However, Caves (1972:30-31) offers a different line of argument. He

contends that in oligopolistic industries, rapid growth of demand is likely to induce firms to behave highly competitively. Given such a demand pattern, price cutting, even if it leads to lower current profits, would be an attractive strategy for increasing market share and can ultimately lead to greater profits in the future. In stagnating or declining industries, however, any attempt by a firm to increase its market share will be likely to result in lower profits for the entire industry. Therefore, the pricing behavior of firms should be less competitive in the latter case.

In the IO literature, the discussion of the firm's conduct in different types of industries, as represented above, is by and large limited to theoretical explanations. The empirical work instead has focused mostly on the direct relationship of industry structure and economic performance at the industry level (e.g., Weiss, 1963; Comanor and Wilson, 1967; Holtermann, 1973; Khalilzadeh-Shirazi, 1974; Orr, 1974), and some at the firm level (e.g., FTC, 1969; Vernon and Nourse, 1973; Bass et al., 1977). These studies in general show a positive correlation between the above-mentioned structural attributes and profitability.

PROPOSITION I-1.

The higher the concentration, product differentiation, entry barriers, and industry growth, the higher will be the profitability of the industry and the firms operating in it.

PROPOSITION I-2.

Higher concentration, production differentiation, and barriers to entry are associated with perceived product and marketing rivalry (non-price) in the industry, and tend to accentuate the strategic importance of non-price components of the strategic make up of the competing firms.

PROPOSITION I-3.

Firms in faster-growing industries are faced with less intense rivalry than firms in slower growth industries.

PROPOSITION I-4.

There is a positive correlation between industry profitability and firm profitability.

Management researchers have also occasionally shown interest in inter-firm differences due to inter-industry variations. Harrigan (1980) in her study of strategies for declining industries pointed out to industry structure as an important factor influencing firms' relative success. Beard

and Dess (1979) have recently found a positive and significant relationship between industry profitability and profitability of firms belonging to those industries. Studies coming out of the well-known PIMS research program report that fixed capital intensity is very unprofitable in unconcentrated industries, or that a comparative product quality is more profitable when market growth is medium to high (Schoeffler, et al., 1974; Buzzell, et al., 1975; Schoeffler, 1977). Lawrence and Lorsch (1967) noted and specified the dominant environmental demands as product and technical development in plastics, product development and market research in consumer foods, and customer services and product quality in standardized container industries. Hofer (1973) in the study of the case descriptions provided by Fortune found, among other things, that the relative success of different possible strategic responses differs for different types of strategic challenges. "For example, increasing penetration of existing products for existing markets seems to succeed more often as a response to major changes in technology. By the same token, the development of new products for existing markets appears to be more successful as a response to major changes in technology than is horizontal diversification." (Hofer, 1973:51).

Other researchers have similarly found that the range

and nature of strategic options to cope with competition are different across industries (e.g., Steiner, 1969).

Khandwalla (1976) in his study of seventy-nine American manufacturing firms came to the conclusion that firms operating in environments threatened by product competition and technological change are likely to have more multi-faceted strategies. For example, they tend to put greater emphasis on product development and marketing (in comparison with firms in an environment characterized by price competition). This is also confirmed by Jauch, et al. (1980), who write: "Apparently the environmental challenge requiring the most variety in strategic action is change in technology." Khandwalla (1976) offers a rationale for such a finding by suggesting that competition and technological change imply uncertainty and environmental complexity. And that "the general effect of a dynamic, complex, uncertain environment is to raise the importance of a larger number of strategic-type activities. A complex environment apparently begets a complex and comprehensive corporate strategy" (Khandwalla, 1976: 69).

PROPOSITION I-5.

The strategic postures assumed by a company reflect its top management's perception of the intensity and nature of rivalry in its industry.

PROPOSITION I-6.

The more intense the perceived overall rivalry in the industry, the greater will be the strategic complexity of the firms in the industry.

Lieberson and O'Connor (1972) have attempted to explain the variance of corporate performance through environmental, corporate, and leadership influences, for 167 companies in thirteen different industries. The portion of the profitability variance accounted for by industry variables, corporate variables and leadership were 29 percent, 23 percent and 15 percent respectively. In a similar study of 193 manufacturing corporations over a 19-year period, however, the researchers found that their stewardship (leadership) variable was the most powerful in explaining corporate profitability. Their three environmental variables - GNP, industry sales, and concentration, however, had fairly low explanatory power. They attributed this result, partially, to the larger size and diversity of the corporations in their sample (Weiner and Mahoney, 1981).

PROPOSITION I-7.

Combination of environmental and strategic variables associated with high performance firms is significantly different from that of low performance firms.

Where all of the above-reviewed studies have used data from firms in different industries, a few studies have concentrated on companies in a single industry. Of the most prominent among them are studies by Hatton, et al. (1978) and Schendel and Patton (1978) on strategies of groups of firms in the brewing industry and their effects on profitability. They have developed quantitative models of business strategy for the firms' objectives, strategies and environments. Lenz's (1980) research of savings and loan associations is another single-industry study. He has found that high performance saving and loan firms belong to environments characterized by lower levels of social economic development, obtain higher prices for their services and seem to have flatter organizational hierarchies. Competitive strategy in the U.S. TV industry has been studied by Datta (1979). He suggests that quality is the most important factor of success in this industry.

With respect to single-industry studies, although not without benefit, these studies may not permit the development of generic hypotheses that will result in a "contingency theory of business strategy" (Hofer, 1975). In any case, it seems that different market industry environments provide to companies hosts of competitive challenges and response possibilities that are different in

scope and complexity. And the nature of the match between challenges and responses to them have an impact on the economic performance of the firms.

II. ENVIRONMENT-ORGANIZATION STRUCTURE-PERFORMANCE:

In their search for the components of a general theory of organization structure, several theorists have been impressed with explanatory potential of the environment in which the organization is located. These theorists argue that unlike physical objects, and like any other living entities, organizations survive by constantly engaging in an input-transformation-output process (Emery and Trust, 1965; Katz and Kahn, 1966). The organization-environment exchanges, however, dictate the dependence of the organization on its external environment. Dependency poses certain "constraints" and "contingencies" which interfere with attainment of organization rationality and, therefore, threaten the survival of the organization (Thompson, 1967). Studies of such environmental impacts have made some theorists conclude that environment is in fact "imperative" to organizations (see Jackson and Morgan, 1978). These studies indicate that the more variable and unpredictable the environment, the more the prevailing structure would be flexible and adaptive with coordinating techniques more

elaborate and based increasingly on mutual adjustment (Dill, 1958; Burns and Stalker, 1961; Lawrence and Lorsch, 1967; Morse and Lorsch, 1970; and Duncan, 1972). Studies also show that complex and heterogeneous environments are likely to require more highly differentiated organizational structures than are simple and homogeneous environments (Dill, 1958; Lawrence and Lorsch, 1967; Duncan, 1972).

The explanation for these results can follow from Ashby's (1957) law of requisite variety; greater disparity in factors external to an organism should be matched with greater variability of factors internal to that organism. As Weick puts it, it takes equivocality to deal with equivocality (Wick, 1969). Organisms that follow this law of requisite variety are expected to have a higher survival potential.

Some writers and researchers have taken issue with the use of perceived uncertainty concept as used in OT literature. Several studies have shown that objective environmental uncertainty and the uncertainty perceived by managers are not the same things (Tosi et al., 1973; Downey, Hellriegel, and Solcum, 1975). Others have examined whether perceptions of environmental uncertainty are more characteristic of the environment or of the perceiver (Downey and Slocum, 1975). There are even those who

question the direction of causality of the perceived uncertainty-organization structure relationship. They argue that it may be the degree of differentiation and uncertainty in the organization structure that conditions the extent to which environment is perceived to be dynamic and complex (Huber, et al., 1975).

While uncertainty has been the primary dimension of the environment examined in OT research, Aldrich (1979) offers the degree of interconnectedness of the system of organizations as being an important variable. Pfeffer and Salancik (1978: Ch. 4), on the other hand, argue that the important dimensions of the environment are the degree of concentration of resources, and the degree of interconnectedness of the organizations. Pfeffer suggests that:

They view uncertainty as the result of relationships among social actors, which in turn were governed by the conditions of the environment in which these actors operated. One implication of this argument is that uncertainty may be too global a concept to use in explaining structure, and that the more fundamental dimensions of either the environment itself or else relationship among the social actors should be used as the independent variables. (Pfeffer, 1981:87).

Occasionally studies have dealt with the market processes surrounding organizations and their influence on organizational structure. Conceptualization of these market

processes often emphasizes competitive conduct (i.e., rivalry) rather than structural dimensions of the environment, even though the term competition is used (see Scherer, 1980:Ch. 2). Khandwalla (1973), for instance, has studied effects of intensity and type of "competition" (i.e., rivalry) on the structure of organizations. He concludes that "competition" in general tends to lead to decentralization of authority, use of sophisticated management controls, and greater selectivity in implementing both. His data also suggest that while price competition has little impact on the firm's top management authority and control structure, marketing competition seems to be positively related to both. Furthermore, product competition requires a high order of flexibility and creativity, a high degree of internal control and coordination, and a high level of selectivity in delegating and controlling. Broadly similar results have emerged from Simonetti and Boseman's (1975) study of Mexican and Italian firms. They concluded that firms in highly "competitive markets" will be more effective if they employ more decentralization of decision making, whereas this structural feature is unrelated to the effectiveness of firms in non-competitive markets. Pfeffer and Leblebici (1973), on the other hand, hypothesized that a competitive environment

requires tighter coordination and more orderly use of the firm's resources. Thus, a competitive firm should choose less horizontal differentiation and more hierarchical layers of supervisors. It should require more frequent reporting, specify decision-making procedures more fully in advance, and depend more on oral communication. For a sample of manufacturing firms, they found competition (measured from the chief executives' perception) indeed to be positively correlated with formalization, proportion of oral communication, and review of performance.

PROPOSITION II-1.

The higher the perceived intensity of overall rivalry in the industry, the higher the organizational decentralization, autonomy, and C.E.O.'s delegation of authority.

Dubick's (1978) analysis of competition and organization structure on 72 newspapers is the only study of this nature that uses one of industrial economics' objective measures of competition (i.e., 2-firm concentration ratio). Differentiation of organization structures is shown to be positively related to this variable.

One of the most recent studies of differences in organizational characteristics due to inter-industry

variations is probably that of Hrebiniak and Snow's (1980). They argue that there may be "objective" characteristics of industries that affect the perception of managers regarding the type of uncertainty and appropriate response to it. Interestingly enough, however, they did not use objective criteria in collecting their data; they relied on expert judgment. Nevertheless, they found that perceptions of environmental uncertainty, intraorganizational influence, and degree of structural decentralization vary by industry. As a result, they suggested that "organizational researchers increasingly should incorporate industry effects into their efforts at theory development and empirical research" (Hrebiniak and Snow, 1980:758). The results of this study with regards to the relationship of inter-industry variations with intraorganizational distribution of influence is defensible in light of the "strategic contingencies" theory of intraorganizational power" (Hickson et al., 1971). According to this theory, the relative power of an organizational unit is, at least partially, a function of the extent to which that unit controls and copes with the critical strategic contingencies facing the organization (Hickson, et al., 1971; Jemison, 1981; Pfeffer, 1981).

PROPOSITION II-2.

The higher the industry product differentiation is, and the more rivalry is perceived to be marketing related, the more the internal power balance in the organization is likely to shift to marketing oriented units.

PROPOSITION II-3.

The more rivalry is perceived to be product related, the more the internal balance in the organization is likely to shift to technocratic and management science-oriented units.

PROPOSITION II-4.

The more rivalry is perceived to be price related, the more the internal power balance is likely to shift to production and financial units.

PROPOSITION II-5.

The greater the rate of innovations with respect to products and processes in the industry, the more the internal power balance is likely to shift to the R&D unit.

PROPOSITION II-6.

Combination of external industry characteristics and internal organization characteristics of high performance firms is significantly different from that of low performance firms.

III. STRATEGY-STRUCTURE-PERFORMANCE:

It was just stated, in the previous section of this chapter, that power accrues to organizational units that cope with the critical strategic contingencies facing the organization. It was also assumed that these critical contingencies have their roots in the external environment of the organization. However, according to Hambrick (1980), both environment and strategy account for the critical contingencies that organizations have to deal with. As such, the organizational influence patterns are related to both environmental and strategic factors. This position is not only hypothesized, but also supported, by Hambrick (1980).

PROPOSITION III-1.

The more financial factors are emphasized in the organization strategy, the more mechanistically the organization will be structured and the production and financial units will have more influence with regards to strategic decisions.

PROPOSITION III-2.

The more emphasis on product development and R&D activities in the strategic makeup of a firm, the more organization structure will be organic, and the greater will be the influence of the technocratic and management science oriented units.

PROPOSITION III-3.

The more reliance on marketing promotional strategies, the more influential the marketing oriented units will be, with respect to strategic decisions.

Anderson and Paine (1975) also, in their perceptually based strategy model, proposed that policy makers' decisions are responses to their perceptions of environmental uncertainty and their perceived need for internal changes. Their response patterns, in turn, affect several organizational properties, including organizational form (structure).

The idea of a link between strategy and structure of the organizations has its origins in Chandler's (1962) historical study of large American enterprises. Chandler's main thesis is that structure of an organization follows its growth strategies that are most important for insuring long-term survival of business organizations. He suggests that firms change their strategies from volume expansion to geographical expansion, to vertical integration, and finally to product diversification in order to employ resources more profitably in the face of changing technology, income, and population. Each new strategy, however, poses new administrative problems. Solutions to these problems require new or, at least, refashioned structures that fit the new strategies.

Chandler has noted that most firms in his study started out initially as plants, warehouses, sales offices, and the like, in a single industry, a single location, and a single function of either manufacturing, wholesaling, or sales. Volume expansion was the first stage of growth, and created a need for an administrative office. Next, geographical expansion strategy was adopted which called for functional departmental offices in order to handle the problems of interunit coordination, specialization, and standardization. The next stage, i.e., vertical integration, gave rise to the problem of balancing the sequential movement of goods through the interdependent functions of manufacturing, wholesaling, and sales. The outcome was the development of forecasts, schedules, and capacity balancing techniques. Finally, product-diversification strategy entailed problems of appraisal and evaluation of product divisions and alternative investment opportunities. The remedy was the evolution of the new multi-divisional form of structure. In this form, the divisions were responsible for short-term operating decisions, while the central office was responsible for long-run strategic decisions.

Chandler's findings provoked a number of empirical studies, especially by the Harvard policy group. First, Wrigley (1970) refined the theory of diversification by

distinguishing the four different strategies of single-product business, dominant business, related business, and unrelated business. He found that single-product firms are always organized functionally. The dominant business category, however, is associated with multi-divisional forms by managing the dominant business through a functional structure and the diverse products through a divisional structure. The companies that are diversified into related and unrelated businesses predominantly choose multi-divisional structure. From Wrigley's data it is clear that structure follows strategy, and that diversification results in multi-divisional forms. The same type of analysis is also replicated for European countries, with generally the same results (see, for example, Pavan, 1976).

Rumelts's (1974) study is probably the most comprehensive research of this nature. He elaborated Wrigley's (1970) diversification typology and identified nine different strategies to characterize his sample of U.S. firms from the Fortune 500. He also incorporated the financial performance of the firms in the study to test strategy-structure-performance relations. Rumelt, like others, supported the idea that structure follows strategy. But he failed to show that high performance comes from a match between strategy and structure.

PROPOSITION III-4.

The more strategy emphasizes proliferation of a wider range of products, the wider will be the C.E.O.'s span of management, and the more decentralized will be the structure.

On the OT camp Child (1972), has been given credit for stimulating interest in environment-strategy-structure performance type of relationships. He has criticized the conventional contingency models of explaining organizational structure on the grounds that: "these models proceed to the simplest theoretical solution which is that the contextual factors determine structural variables because of certain, primarily economic, constraints the former are assumed to impose" (Child, 1972:2). He then continues by suggesting that ... "this simple theory is inadequate primarily because it fails to give due attention to the agency of choice by whoever have the power to direct the organization" (Child, 1972:2).

Building on Child's theoretical argument, several writers have examined a variety of variables in search of common patterns or configurations of environment, strategy, and structure. Montanari (1979) reports on an examination of such a model, using a large sample of U.S. and Canadian firms. He operationalized the strategic choice concept in terms of perceived power and perceived managerial discretion.

He succeeded in partially supporting the model. Miles and Snow (1978) developed and examined a typology of organizations in a study of firms in the four industries of textbook publishing, electronics, food processing, and hospitals. They propose that more proactive organization types (e.g., prospectors and analyzers) tend to adopt an organicistic organization structure and a human resource approach to management.

Miller and Friesen (1980) through a factor analytic technique have constructed a typology of organizational transition and adaption processes. These organizational types, that they refer to as archetypes, include clusters of intercorrelated environmental, strategic, and structural variables. This research suggests that there are different approaches through which an organization can achieve success (or failure).

It is interesting to note that a remarkable consistency in thrust is observable among these foregoing works. That is, there is a trend in this type of work to de-emphasize simple bivariate relationships among few variables in search of causation. What is being attempted is a synthesis or an emphasis on clusters among many attributes in search of Gestalts. In any case, despite the differences in scope, sample, and methodology, these studies have at least one

overwhelmingly common conclusion. Namely, combinations of environment, strategy, and structure of high-performing organizations differ from combinations associated with low performance organizations.

PROPOSITIONS III-5.

Combination of strategy and internal structure of high-performance firms is significantly different from that of low-performance firms.

PROPOSITIONS III-6.

Combination of industry characteristics, strategy, and organization structure associated with high-performance firms is significantly different from that of low-performance firms.

CHAPTER THREE

METHODOLOGY

In this section, the major methodological aspects of this dissertation research are presented.

I. THE SAMPLE:

Sampling for this study was done from corporations included in the standard and Poor's COMPUSTAT data base. Specifically, the 1980 industrial annual and OTC (Over-The-Counter) annual COMPUSTAT tapes provide a variety of profitability, financial, and operating information covering over 3200 corporations. The companies include all New York and American Stock Exchange companies and a large number of over-the-counter stocks. The sample for the study includes only the less diversified manufacturing firms on these tapes. Manufacturing companies are used mainly because industrial market data are more frequently available for manufacturing industries. Data on about 1700 firms operating primarily in manufacturing industries (i.e., the Standard Industrial Classifications of 2000-3999) are available on the tapes. Less diversified firms from the list of 1700 are used for two reasons. First, a highly diversified firm is involved in multiple lines of business

in a variety of industries with different structural characteristics. As such, it would be difficult and even somewhat meaningless to designate one specific industry with specific structural attributes as the competitive arena in which it operates.

Secondly, the economic performance and financial data provided by the COMPUSTAT tapes are not broken down in terms of a company's different lines of business. They are aggregated for all of the businesses a company is involved in. For these data to be more meaningful and more representative of the strategic tendencies of a business unit, a sample of less diversified (idealistically, not diversified) firms was deemed appropriate. For the foregoing reasons, only manufacturing firms with operations in one or at most two 4-digit SIC categories were selected. Among these were a few companies for which only 3-digit primary SIC numbers were provided by the data base. The 1980 Standard and Poor's Register of Corporations was used to secure the 4-digit primary SIC numbers. In a few cases when such information was furnished by neither of the two sources, the company was eliminated as a prospective sample member.

The previous screening processes left us with about 174 companies. Out of these, six companies which operate

primarily in industries with regional markets were dropped (i.e., soft-drink, cement, and concrete industries). Another group of six firms were excluded, from which three companies were based in countries other than the U.S. (i.e., Canada and Mexico), two could not be located, and one had been shut down and gone out of business. The remaining 162 less diversified manufacturing corporations on the COMPUSTAT tapes comprised the target sample for this research. These companies, with an average sale of 77 million dollars and average personnel size of 1300, represented 68 different 4-digit SIC's. From the 162 members of target sample, 48 participated in the study and supplied the information necessary for the project (a response rate of about 30%). The descriptive statistics on this final sample and those of the target sample are presented and compared in Table 3-1. It is obvious from this table that the research sample is indeed a reasonable representative of the target sample. It also covers a broad and divergent cross section of different manufacturing industries, a characteristic highly desirable for the present study.

II. DATA COLLECTION:

Secondary published sources and questionnaires filled

	Target Sample (n = 162)	Research Sample (n = 48)
Sales (in \$ Million):		
Mean	77	61
Std. deviation	107	72
range	0.97-724	2-321
Number of Employees:		
Mean	1303	1132
Std. deviation	1560	1499
range	35-9700	35-7725
Number of 4-digit SIC's represented	68	29

Table 3-1. Comparison of the Research Sample with the Initial Target Sample

out by the chief operating officers of the companies have been the primary sources of data for this dissertation (see Table 3-3, page 61). Statistics necessary for computing some of the structural attributes of the industries (namely, concentration ratios and barriers to entry) were obtained from Census of Manufacturers and its special report, Concentration Ratios in Manufacturing Industries. These are published once every five years by the U.S. Bureau of Census. The latest issues (published in 1979) contain industry data pertaining to 1977. Statistics concerning rates of industrial growth came from U.S. Industrial Outlook, U.S. Department of Industrial Economics, 1981. And the product differentiation information was acquired from Schonfeld and Associates' estimates of 1979 advertising-to-sales ratios reported in Advertising Age, July, 1980. Industry profitability ratios were available in the Robert Morris Associates' Annual Statement Studies, 1981. Information related to firm profitability ratios and the financial ratios representing certain selected dimensions of actual business strategy of the companies was retrieved from the COMPUSTAT tapes.

Perceptual measures of rivalry in the industry, along with the data on internal organizational structure and perceived competitive strategies of the firms were collected

through a survey research method. Questionnaires accompanied by a standard cover letter were mailed out to the companies. The letters, addressed to the chief operating officers, requested their participation in the research and promised confidentiality for the information obtained. This initial inquiry secured responses from 33 companies. Three weeks later, reminder letters along with a second copy of the questionnaire were mailed out to those individuals who had not yet replied. The second contact resulted in 15 additional responses, providing a total of 48 responses. Copies of the cover letters are present in Appendix A.

III. VARIABLES:

A. Industrial Market Structure:

Bain (1968:2) has defined market structure as "those characteristics of the organization of a market that seem to exercise a strategic influence on the nature of competition and pricing." The five most important dimensions of this construct were considered for the purpose of this study:

1. CONCENTRATION RATIO: This variable concerns the extent of inequity in the number and size distribution of firms in different industries. As a widely used measure

of monopoly (competition), 4-firm concentration ratio was defined here as the sum of the percentage of total shipment in the firms' primary industry contributed by the largest four firms in the industry. In addition to this measure, 8-firm concentration ratio was also used.

2. PRODUCT DIFFERENTIATION: Product homogeneity or differentiation is primarily a function of the degree of substitution among competing sellers' products. Products are differentiated when for some real or imagined reason one firm's products are preferred by at least some buyers over rival products at a given price. Price differentials are possible and profits tend to be higher in industries that are highly differentiated. This variable was operationalized by the ratio of a firm's primary industry's advertising expenditures to the value of sales. The rationale for using this proxy was taken from Bain (1968), who concluded that advertising is the major source of product differentiation in the consumer goods industries. Producer goods industries, he concluded, have nearly homogeneous products, with insignificant or slightly differentiated products.

3. BARRIERS TO ENTRY: "New entrants to an industry bring new capacity, the desire to gain market share, and often substantial resources. Prices can be bid

down or incumbents' costs inflated as a result, reducing profitability" (Porter, 1980:7). Barriers to entry are indicative of the difficulty new firms will have to enter an industry. Two proxy measures were used to capture some sources of barriers to entry:

a. Barriers to entry due to economies of scale enjoyed by established firms were measured, based on estimates of minimum efficient plant scale (MES). MES is estimated by average plant size (in terms of sales) among the largest plants accounting for 50 percent of industry shipment. This average plant size was divided by total industry shipment to obtain the scale economies variable (Comanor and Wilson, 1967).

b. The second type of barriers to entry is due to "absolute capital requirements" for entry. This amount of capital required for entry at the scale of a single efficient plant is based on the above-mentioned estimate of scale economies. The average output level of plants at minimum efficient scale was multiplied by the ratio of industry total assets to total shipment (Comanor and Wilson, 1967).

4. RATE OF CHANGE IN DEMAND: This variable is the reflection of the extent of industry growth. It was tapped by the percent of change in total sales (in millions

of constant 1972 dollars) over the latest four-year period for which this data was available (1975-1978).

B. Industry Profitability:

Three-year average return on assets for the firm's primary industry was used as the measure of industry profitability.

C. Perceived Competitive Environment:

Perceived intensity and nature of rivalry variables were measured by a variant of an instrument designed by Khandwalla (1976). The chief operating officers were asked to rate on seven-point scales the intensity of rivalry in their primary industries with respect to price, promotion, sales and distribution, and product quality and variety. They have also rated on other seven-point scales the importance of each of these to their firms' profitability. The rating for intensity of each type of rivalry was multiplied by the rating for its importance. By taking the square root of the product of these two numbers, a weighted measure of the magnitude of that competition experienced by the firm was provided. The same procedure was followed to obtain the scores for magnitude of technological change resulting in new processes and that resulting in new products. Finally, all the scores on different types of rivalry and technological change were summed to operationalize intensity of overall rivalry in the

industry, as perceived by the firms' top executives (Khandwalla, 1973).

D. Strategy and Strategic Complexity:

The instrument used for capturing the perceived strategic posture of a firm was adopted from Bourgeois' competitive weapons questionnaire (1980). The original questionnaire consists of a list of 23 industry-relevant weapons to be rated by C.E.O.'s on a 1-to-5 scale of importance. A few modifications on this instrument were deemed appropriate, which resulted in the 26-item questionnaire used in this project. Strategic complexity was measured by the number of strategic dimensions on the Bourgeois instrument that were viewed very important to a company by its chief operating officer--that is, the number of items on the strategy questionnaire that were marked 5 (i.e., very important) by the respondents.

For the purpose of this study, an attempt was also made to objectively measure some of the aspects of the strategic makeup of the companies. The data required to carry out this task were retrieved predominantly from COMPUSTAT tapes, except for the production capacity utilization that was collected through the questionnaire. See Table 3-2 for description of these variables and the way they are operationalized.

<u>Strategic Variable</u>	<u>Operationalization</u>
Research and Development	R&D expenditures as a percentage of sales (3 years average)
Advertising Intensity	Advertising expenditures as a percentage of Sales (3 years average)
Financial Liquidity	Current Ratio=Current assets/current liabilities (3 years average)
Capital Intensity	Total Assets/Total Sales (3 year average)
Credit Policy (Collection Management)	Collection Period= $\frac{\text{Receivables Capital} \times 365}{\text{Sales}}$ (3 year average)
Plant and Equipment Modernization	Net book value of the plant and equipment/ gross book value of the plant and equipment* (3 year average)
Production Capacity	Average percent of production capacity currently utilized

* See Schendel and Patton (1976)

Table 3-2. Objective Strategic Variables and Their Operationalization

E. Organization Structure:

For the purpose of this study, a multi-dimensional concept of structure is adopted. The structural variables included in the study are as follows:

1. C.E.O.'s SPAN OF CONTROL: Refers to the number of people directly reporting to the C.E.O.

2. DELEGATION OF AUTHORITY BY THE C.E.O: This variable is concerned with the extent to which the chief executives of the firms have delegated authority to others to make decisions regarding several strategically important issues. Scores on this dimension of organization structure were secured by Khandwalla's (1973) instrument.

3. FORMALIZATION: This variable refers to the extent to which policies, rules, procedures, operating instructions, and communications are written. It was measured by the number of specific role-defining documents--from a set list--which exist in organizations, and, in some cases, the extent of their application or distribution (Inkson, et al., 1970).

4. AUTONOMY: "An organization lacks autonomy if decisions are taken at a level of authority outside the organization's own structure" (Inkson, et al., 1970:328). Therefore, autonomy (or lack of it) was determined on the basis of the number of decisions which are taken at a level

of authority higher than the organization's chief executive (for example, by the board of directors or by the parent organization).

5. DECENTRALIZATION: Centralization has to do with the locus of authority for making decisions affecting organizational operations. Degree of decentralization was captured based on the number of decisions (from a list of twenty-three) made at various levels of the organizational hierarchy (Inkson, et al., 1970).

6-8. DECENTRALIZATION OF MARKETING, PRODUCTION, AND OPERATING DECISIONS: A factor-analytic procedure similar to that of Grinyer and Yasai-Ardakani (1980) was followed to find measures of decentralization of different types of decisions. Principal component analysis on the overall decentralization scale and an oblique rotation on the result of it were carried out. Three distinct clusters of variables emerged--marketing decisions, production decisions, and operating decisions. The scores on the related items in each of these subscales were then summed to secure measurements for decentralization of their respective cluster. A more detailed discussion of this procedure will be presented in Chapter Four of the dissertation.

9. INTERDEPARTMENTAL STRATEGIC INFLUENCE: This variable is concerned with the extent of influence exerted

by different organizational units with respect to strategic decision making in the firms. The 5-point Likert type scale designed to tap this structural dimension is presented in Appendix B.

F. Firm Profitability:

Organization performance has to be assessed in reference to some criteria. It could, however, be defined and measured in different ways, depending upon whose frame of reference you adopt and whose interest you think an organization should serve (Parsons, 1960; Steers, 1975). Profitability is the performance criterion employed in this research and its use can be justified on the following grounds. First, survival is the ultimate test of organization effectiveness. But profitability is a necessary requirement for long-term survival of private economic enterprises, including the ones that are the subjects of this study. Secondly, profitability is a concept that is meaningful and commonly used across the three disciplines of IO, BP, and OT. Thirdly, it is the one that is predominantly used as a performance objective by industry executives.

Three indices of profitability, i.e., return on assets (ROA), return on equity (ROE), and return on sales (ROS) were constructed. They are all three-year averages covering the period of 1978-1980. The three-year span should

be sufficient to reduce the effects of an exceptional year, without, at the same time, extending too far back to a time when the attributes of the companies might have been significantly different from those measured in the research.

Table 3-3 (page 61) provides a summary of all of the research variables, their operationalization, and their sources of data. Copies of all the questionnaire instruments used for the research are presented in Appendix B. Appendix C represents selected descriptive statistics on all research variables.

IV. DATA ANALYSIS:

The analysis of the data included two major stages. In the first stage, certain preliminary steps had to be taken in order to prepare the data for the actual analysis and testing of the propositions. Specifically, factor analysis was used to develop the different subscales measuring different types of decentralization. Likewise, a factor-analytic procedure was used to pool the 26 perceived strategy variables together into a manageable number of constructs. And, finally, for the reasons discussed in the later paragraphs of this section, cluster analysis was employed to designate the high-performance and low-performance groups of companies. After the foregoing preliminary steps were accomplished, the task of verification

Table 3-3. Major Research Variables, Their Measurements, and Sources of Data

VARIABLES	MEASUREMENTS	SOURCE OF DATA
I. INDUSTRIAL MARKET STRUCTURE:		
1-1. Concentration	4-form concentration ratio	<u>Census of Manufacturers, 1979</u>
1-2. Product Differentiation	Industry advertising expenditures/ Industry sales	<u>Schonfeld & Associates, Advertising Age, July 1980</u>
1-3. Barriers to Entry		
1-3-a. Economies of Scale	Minimum efficient plant scale/ total industry shipment	<u>Census of Manufactures, 1979</u>
1-3-b. Absolute Capital Requirement	Minimum efficient plant scale X (industry assets/industry shipment)	<u>Census of Manufactures, 1979</u>
1-4. Rate of Change in Demand	Per cent of change in total industry output over the last 4-year period for which data is available (1975-1978)	<u>U.S. Industrial Outlook, 1981</u>
II. INDUSTRY PROFITABILITY		
11-1. Industry Return on Assets	Industry Pretax Profit/Industry total assets (3-year average)	<u>Annual Statement Studies, 1981</u>
III. PERCEIVED COMPETITIVE ENVIRONMENT		
111-1. Perceived Intensity of Rivalry	Khandwalla, 1976	questionnaire
111-2. Perceived Nature of Rivalry	Khandwalla, 1976	questionnaire
111-3. Technological Change	Khandwalla, 1976	questionnaire
IV. STRATEGY AND STRATEGIC COMPLEXITY:		
IV-1. Subjective Measurement	Bourgeois, 1980	questionnaire
IV-2. Objective Measurement	See Table 3-2, page 56.	COMPUSTAT tapes

Table 3-3 (continued). Major Research Variables, Their Measurements, and Sources of Data

V. ORGANIZATION STRUCTURE:

V-1. Interdepartmental Strategic Influence		questionnaire
V-2. Delegation of Authority by the C.E.O.	Khandwalla, 1973	questionnaire
V-3. Autonomy	Inkson et al., 1970	questionnaire
V-4. Decentralization	Inkson et al., 1970	questionnaire
V-5. Formalization	Inkson et al., 1970	questionnaire
V-6. C.E.O.'s Span of Control	Number of individuals reporting directly to C.E.O.	questionnaire

VI. FIRM PROFITABILITY

VI-1. Return on Assets	Per-tax Profit/total assets (3-year average)	COMPUSTAT tapes
VI-2. Return on Equity	Per-tax Profit/shareholders' equity (3-year average)	COMPUSTAT tapes
VI-3. Return on Sales	Per-tax Profit/total sales (3-year average)	COMPUSTAT tapes

of the research propositions was undertaken.

The direct pairwise relationships among the different variables and constructs were tested by zero-order product moment correlations. Next, attempts were made to show that firm performance is a function of the interaction between a) competitive environment and strategy, b) competitive environment and internal structure, c) strategy and structure, and, finally, d) combination of all of the above mentioned factors. Since the data obtained on the firms and their environments invariably consist of observed values of a set of mutually correlated variables, the analysis necessitates consideration of the variables together rather than one at a time. One technique that lends itself well to this form of investigation is discriminant analysis. This technique is concerned with the problem of distinguishing (discriminating) between two (or more) populations on the basis of observations of a multivariate nature. It is similar to multiple regression analysis in that it tries to predict a dependent variable as a function of a set of independent variables. However, instead of trying to find a model that best fits the data as regression analysis does, discriminant analysis tries to determine weighted linear combination(s) of independent variables that best discriminate between two (or more) a priori defined groups.

The stepwise method is useful when, as in this case, analysis includes a relatively large number of independent variables. It involves entering the independent variables into the discriminant function one at a time on the basis of their contributions to the discriminating power of the variables already in the model. This way, variables which are not useful in discriminating between the groups are eliminated and a linear combination of the reduced set of useful variables is identified (Hair et al., 1979; Klecka, 1980).

One important point to note in applying discriminant analysis is, however, that the groups to be delineated must be specified in advance. In the case of this study, the two subsamples of low- and high-performance firms have to be designated. Assignment of the companies to these two groups is accomplished by using Cluster Analysis. This is a procedure which classifies objects (firms, in this case) into two (or more) clusters in such a manner that each object possesses a high degree of similarity with other members of the cluster with respect to some selection criteria (profitability, in this case). The resulting groups should, therefore, have high internal (within cluster) homogeneity and high external (between cluster) heterogeneity (Green and Tull (1978). The outcome of the cluster analysis determines

the values of the criterion (i.e., dependent) variable for the stepwise discriminant procedure. More detailed discussion of the steps followed is covered in Chapter Four of the dissertation.

CHAPTER FOUR

ANALYSIS OF THE DATA AND DISCUSSION OF THE RESULTS

This chapter consists of two parts. The purpose of Part One is to report on the results of the preliminary data preparation steps that were undertaken. As such, this section will include discussions of factor analysis of the decentralization scale, factor analysis of the perceived strategy variables, and cluster analysis of the companies, based on their profitability. In Part Two of the chapter, however, patterns of interrelationships of the research variables are examined in order to verify the plausibility of the research propositions put forth in Chapter Two of the dissertation.

PART ONE: DATA PREPARATION

I. Factor Analysis of the Decentralization Scale:

To construct subscales that measure decentralization of different types of decisions, factor analysis was performed on the Inkson et al.'s (1970) decentralization scale. Principal component analysis, using the SAS program, was applied to the data. As a result, seven factors with eigenvalues of larger than one were initially extracted. Based on a scree test (Kim & Mueller, 1978:44-45) on

these principal components, four factors were retained. To interpret and name these underlying dimensions of the decentralization data, orthogonal (Varimax) and oblique (Promax) rotation of the factor patterns were carried out, using the SAS program. Rotation of factor patterns redistributes the portion of variance explained by the factors and achieves a simpler and theoretically more meaningful factor structure. Orthogonal rotation creates factors in such a way that the factor axes are maintained at 90 degrees to one another. "Therefore, the correlation between factors is arbitrarily determined to be zero" (Hair et al., 1979:221). In this case, however, the Varimax rotated factor structure was very similar to the oblique rotated solution. In addition, the oblique solution showed existence of interdependence among the factors (Table 4-1). Therefore, it was concluded that the imposition of the independence assumption by the orthogonal rotational technique was unrealistic and masked the true interrelationships of the factors. For this reason, and in order to provide a more realistic representation of the decentralization constructs and their interdependencies, the Promax (oblique) rotated factor solution was adopted (See Table 4-1). Notice that the highest factor loading of every variable (marked by an asterisk) is 0.50 or higher. The solution closely resembles

Table 4-1. Promax Rotated Factor Solution For The Decentralization Scale

<u>List of Decision Items:</u>	<u>FACTOR 1</u>	<u>FACTOR 2</u>	<u>FACTOR 3</u>	<u>FACTOR 4</u>
1. TO CREATE NEW LEVELS OF SUPERVISION	*0.68780	0.25306	-0.13155	0.02613
2. APPOINTMENT OF SUPERVISORY STAFF FROM OUTSIDE	0.49562	-0.20669	-0.07109	*0.51349
3. PROMOTION OF SUPERVISORY STAFF	0.49218	-0.25114	-0.03996	*0.59530
4. SALARIES OF SUPERVISORY STAFF	0.45747	-0.07279	0.05329	*0.52005
5. TO SPEND UNBUDGETED MONEY ON CAPITAL ITEMS	*0.55366	0.01300	0.12854	-0.13038
6. TO SPEND UNBUDGETED MONEY ON REVENUE ITEMS	*0.52949	0.19621	0.00191	0.11218
7. WHAT TYPE, OR BRAND EQUIPMENT BE PURCHASED	-0.23687	0.39860	0.10361	*0.56430
8. TO DETERMINE A NEW PRODUCT OR SERVICE	0.14703	*0.69806	-0.25635	0.17479
9. TO DETERMINE MARKETING TERRITORIES COVERED	0.04203	*0.64548	0.06081	-0.05423
10. THE EXTENT AND TYPE OF MARKET TO BE AIMED FOR	0.13166	*0.57804	0.00304	-0.11424
11. WHAT SHALL BE COSTED	0.02520	*0.52716	0.43027	0.04996
12. WHAT SHALL BE INSPECTED	0.05020	0.14603	*0.75465	0.12817
13. WHAT OPERATIONS SHALL BE WORK STUDIED	0.19377	-0.21598	*0.65098	-0.08275
14. DISMISS A SUPERVISOR	*0.78392	-0.00413	-0.13070	0.13728
15. TRAINING METHODS TO BE USED	*0.50615	-0.43785	0.20585	-0.02301
16. BUYING PROCEDURES	-0.12418	0.03262	*0.77391	0.34179
17. WHICH SUPPLIERS OF MATERIALS ARE TO BE USED	-0.10417	0.16415	0.19906	*0.77492
18. WHAT AND HOW MANY WELFARE FACILITIES	0.24045	-0.15082	*0.51507	-0.02764
19. THE PRICE OF THE PRODUCT OR SERVICE	0.28375	*0.57979	-0.18388	0.25090
20. TO ALTER RESPONSIBILITIES OF SPECIALIST UNITS	*0.65196	0.24474	0.22214	-0.06589
21. TO ALTER RESPONSIBILITIES OF LINE DEPARTMENTS	*0.68241	-0.05680	0.17524	0.00477
22. TO CREATE A NEW DEPARTMENT	*0.77716	0.30433	0.06034	-0.13302
23. TO CREATE A NEW JOB	*0.68840	0.25199	0.20524	-0.03681
VARIANCE EXPLAINED BY THE FACTORS	6.236686	3.143369	3.286387	3.508517
PERCENT OF VARIANCE EXPLAINED	27.11602	13.66682	14.28863	15.25442

Table 4-1 (continued) Interfactor Correlations

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
FACTOR 1	1.00000	0.13503	0.26031	0.35665
FACTOR 2	0.13503	1.00000	0.10740	0.11654
FACTOR 3	0.26031	0.10740	1.00000	0.16608
FACTOR 3	0.35665	0.11654	0.16608	1.00000

the results obtained by Grinyer and Yasai-Ardakani (1980) in a similar attempt. High loadings of the items 2, 3, and 4 on both factors 1 and 4, and examination of the correlation between these two factors (Table 4-1) suggest that they have a significant amount of common variance and, in fact, tap the same dimension of the data. Hence, they should be combined and treated as one factor. This conclusion is reinforced by the fact that the contents of both factors are predominantly related to personnel and administrative decisions. As such, factors 1 and 4 were combined to create a composite index named "Decentralization of Operative Decisions." The score of this subscale was obtained by summing the questionnaire ratings on items with their highest loadings on factors 1 and 4 (namely, items 1, 2, 3, 4, 5, 6, 7, 14, 15, and 17).

The variables with their highest loadings on factor 2 center predominantly on marketing decisions. Factor 2 was, thus, named accordingly. The subscale represented by this factor (i.e., Decentralization of Marketing Decisions) was scored by aggregating the ratings on items 8, 9, 10, 11, and 19.

The pattern of loading coefficients in factor 3 indicates that this factor is, in essence, production oriented. Therefore, the construct reflected in this factor was named "Decentralization of Production Decisions," and was

measured by the sum of items 12, 13, 16, and 18.

II. Factor Analysis of the Perceived Strategy Variables:

The perceived-strategy part of the questionnaire included 26 items. For the sake of data reduction and having a more manageable number of variables to deal with, a two-stage factor analytic procedure was applied to these variables. The hierarchical refactoring technique adopted is a variant of the higher order factoring used for data reduction purposes (Harman, 1967; Rummel, 1970).

The objective of the first stage was to statistically (rather than a priori) collapse the 26 variables into a few independent but crude and broad categories, based on their pattern of intercorrelations. This was accomplished through an orthogonal rotation (Varimax) of the three major principal components extracted (see Table 4-2). Notice that the questionnaire item concerning importance of "Low Prices" is not included in the factor solution. This is so because this item had a very low communality and therefore did not load highly on any of the factors. As such, this variable represented a separate and different dimension of the strategy scale and deserved exclusion from the factor analysis and treatment as an independent construct.

In the second stage, the contents of each of the three

Table 4-2. First Stage Factor Analysis on the Perceived Strategy Scale:
Varimax Rotated Factor Solution

<u>Variables</u>	<u>FACTOR 1</u>	<u>FACTOR 2</u>	<u>FACTOR 3</u>	<u>COMMUNALITY</u>
1. FINANCIAL LIQUIDITY	*0.46312	-0.11983	0.45421	0.435146
2. NEW SOURCES OF FUNDS	*0.55407	0.10274	0.25204	0.381076
3. ADVERTISING FREQUENCY	0.13657	*0.72300	0.15418	0.565152
4. ADV. QUALITY	0.22551	*0.70121	0.22521	0.593267
5. COST REDUCTION	*0.46697	-0.06492	0.24036	0.280045
6. EMPL EFFICIENCY	*0.55654	-0.09550	0.16534	0.346199
7. HI PRICE	0.27568	*-0.52549	-0.01275	0.352305
8. BRAND IMAGE	0.20770	*0.45982	-0.06187	0.258401
9. PRODUCT QUALITY	-0.03609	*0.41906	-0.07034	0.181861
10. PRODC T WARRANTY	*0.43426	0.19678	-0.02651	0.228004
11. CUSTOMER CREDIT	*0.65004	0.30393	0.08204	0.521662
12. CUSTOMER SERVICE	*0.36678	-0.05942	0.15781	0.162965
13. WIDE PRODUCT RANGE	0.13269	-0.42111	*0.42410	0.374803
14. NARROW PRODUCT RANGE	-0.18055	*0.54620	-0.13850	0.350116
15. NEW PRODUCT DEVELOPMENT	0.37715	-0.07362	*0.47011	0.368672
16. PRODUCT IMPROVEMENT	0.43191	-0.03416	*0.48419	0.422156
17. BCKWRD INTEGRATION	*0.56033	0.13354	-0.09064	0.340015
18. FRWRD INTEGRATION	*0.41311	-0.07641	0.19394	0.214110
19. PREDICTING CUSTOMER TASTE	-0.06481	0.28174	*0.66854	0.530521
20. PREDICT COMPETITORS' ACTIONS	0.07853	-0.04153	*0.63887	0.416048
21. IMPROVE PROCESS TECHNOLOGY	*0.71081	-0.39544	0.03057	0.662560
22. INCREASE CAPACITY USE	*0.75722	-0.25955	-0.06278	0.644688
23. EXPAND CAPACITY	*0.59977	0.09107	-0.29323	0.454002
24. INCREASE MARKET SHARE	-0.09365	0.31804	*0.53989	0.401405
25. MERGERS	0.06655	-0.30597	*0.59404	0.450926
EIGENVALUE	4.31043	2.85203	2.76135	9.92342
PERCENT OF VARIANCE EXPLAINED	17.24171	11.40810	11.04500	39.69369

initial classes of variables (i.e., the above-mentioned factors) were examined and decomposed further into more refined subgroups composed of more strongly interrelated variables. This was achieved by factor analyzing each of the three groups of variables that loaded the highest on factor 1, factor 2, and factor 3 separately. Needless to say, the rotation method used to obtain the final factor analytic solutions was of oblique type (i.e., Promax). The final outcome of the described hierarchical factor analytic procedure are the eight factors presented in Tables 4-3, 4-4, and 4-5. Notice that the highest factor loading of every variable is larger than 0.40 in all cases and that factors were named according to the nature and the signs of the more dominant variables represented by them.

The justification for the application of the two-stage factoring procedure lay partly in the diverse nature and relatively large number of variables that, in the first stage, loaded highly on more than one factor (on factors 1 and 2, in particular). Factors with such characteristics are very difficult to interpret and may well be theoretically meaningless, especially if used as input to other predictive models. The solution to this problem was first approached through retaining a larger number of factors (e.g., 4, 5, 6). However, the results were

Table 4-3. Second Stage Factor Analysis on the First Group of Strategy Variables

Promax Rotated Factor Solution

<u>Variables</u>	<u>FACTOR 1</u> Financial Consciousness	<u>FACTOR 2</u> Customer-service based strategy	<u>FACTOR 3</u> Production & operations expansion strategy	
1. FIN LIQUIDITY	*0.71905	-0.22498	0.23677	
2. NEW FUNDS	*0.48223	-0.11507	0.41836	
5. COST REDUCTION	*0.85269	-0.01196	0.12814	
6. EMPL EFFICIENCY	*0.56179	0.52348	-0.19925	
10. PRDCT WARRANTY	-0.20209	*0.66476	0.11268	
11. CUSTOMER CREDIT	0.19701	*0.59071	0.15662	
12. CUST SERVICE	-0.10692	*0.68044	0.09081	
17. BCKWRD INTEGRATION	-0.01386	0.34832	*0.47313	
18. FRWRD INTEGRATION	-0.02057	*0.73677	-0.06223	
21. IMPROVE PROCESS TECH	0.28457	0.00452	*0.64448	
22. INCREASE CAPACITY USE	0.39517	0.29456	*0.48306	
23. EXPAND CAPACITY	-0.18731	0.00594	*0.88950	
VARIANCE EXPLAINED BY THE FACTORS	2.697272	2.740639	2.564618	8.003
PERCENT VARIANCE EXPLAINED	22.47726	22.83865	21.37181	66.688

INTERFACTOR CORRELATIONS

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	1.00000	0.25432	0.26391
FACTOR 2	0.25432	1.00000	0.20287
FACTOR 3	0.26391	0.20287	1.00000

Table 4-4. Second Stage Factor Analysis on the Second Group of Strategy Variables

Promax Rotated Factor Solution

<u>Variables</u>	<u>FACTOR 4</u> Promotional Strategies	<u>FACTOR 5</u> Product Special- ization Strategy	
3. ADV. FREQ	*0.86638	0.05190	
4. ADV. QUALITY	*0.68233	0.31760	
7. HI PRICE	0.03452	*-0.84419	
8. BRAND IMAGE	*0.79049	-0.24901	
9. PROD QUALITY	-0.01699	*0.67592	
14. NARROW PROD RANGE	-0.01394	*0.43020	
VARIANCE EXPLAINED BY THE FACTORS	1.973778	1.676826	3.651
PERCENT VARIANCE EXPLAINED	32.89630	27.94710	60.843

INTERFACTOR CORRELATIONS

	FACTOR 4	FACTOR 5
FACTOR 4	1.00000	0.28186
FACTOR 5	0.28186	1.00000

Table 4-5. Second Stage Factor Analysis on the Third Group of Strategy Variables

Promax Rotated Factor Solution

<u>Variables</u>	<u>FACTOR 6</u> Risk Reduction Strategies	<u>FACTOR 7</u> Market Share Expansion	<u>FACTOR 8</u> Product Innovation	
13. WIDE PROD RANGE	*0.68355	-0.18748	0.16375	
15. NEW PROD DEV	-0.00537	-0.11978	*0.90714	
16. PROD IMPROVEMENT	0.22455	0.14634	*0.59449	
19. PREDICTING CUST TASTE	-0.17013	*0.75702	0.40829	
20. PRED COPT ACTION	*0.54704	0.10441	0.33385	
22. INCREASE MKT SHRE	0.08588	*0.92086	-0.18964	
25. MERGERS	*0.88330	0.09407	-0.12610	
VARIANCE EXPLAINED BY THE FACTORS	1.804581	1.697506	1.739807	5.242
PERCENT VARIANCE EXPLAINED	25.77972	24.25008	24.85438	74.884

INTERFACTOR CORRELATIONS

	FACTOR 6	FACTOR 7	FACTOR 8
FACTOR 6	1.00000	0.20341	0.15157
FACTOR 7	0.20341	1.00000	0.19794
FACTOR 8	0.15157	0.19794	1.00000

disappointing in every case, for the rotation factor solutions did not even resemble a "simple structure." That is, a relatively large number of variables loaded highly on two or more factors. The problem was also compounded in each case by several variables that spread their variance so thinly and evenly on a number of factors that they did not load significantly on any of the factors. The two-stage factoring was, therefore, deemed appropriate and indeed proved successful.

Since the eight factors after the second stage were to replace the original variables in further analysis, factor scores had to be computed. Factor scores are composite measures for each factor representing each firm. After computation of the factor scores, therefore, each company is represented by only eight summary measures (factor scores) rather than the original 25 strategic variables factor analyzed.

III. Clustering Firms into High- and Low-Performance Groups:

In order to perform stepwise discriminant analysis on combinations of different groups of variables to test propositions I-6, II-6, III-5, and III-6, firms first had to be assigned to low-performance and high-performance

subsamples. One way to do this was to define a cutoff point such as the mean or the median of the profitability values. Each company could then be assigned to the high-performance group if its profitability surpassed the cutoff point, or to the low-performance group if its profitability fell short of it. The problem with such a procedure is that the selection of the assignment criterion (mean or median) would be an arbitrary decision on the part of the analyst and might result in subgroups that are nothing more than artifacts. To avoid this problem, therefore, the decision was made to utilize an assignment procedure that would achieve the same goal but through a more objective and statistically valid approach. One technique that meets these requirements is cluster analysis. This statistical technique assigns objects to two or more classes based on their similarities with, and distances from, other objects with respect to certain characteristics (predictor variables). Objects within a class are then assumed to be indistinguishable from one another.

For the purpose of this study, then, cluster analysis was used to assign companies to low- and high-performing clusters based on their profitability rates. The initial intention was to use the three profitability ratios (i.e., return on assets, return on equity, and return on sales) as

multiple predictor variables. However, an inspection of the correlation coefficients among them indicated that these three were highly correlated (see Table 4-6). Since cluster analysis is sensitive to multicollinearity, the decision was made to use only return on assets (ROA) alone as the predictor variable.

Table 4-6: Correlation Coefficients Among Profitability Ratios

	ROA	ROE	ROS
ROA	1.00000	0.89505***	0.86228***
ROE		1.00000	0.80619***
ROS			1.00000

*** Significant at 0.0001 level

Another important point with respect to clustering procedure that had to be taken into account was the presence of an outlier in the data. Where the values of ROA for 47 of the 48 firms in the sample ranged between -15% to 43%, the one remaining firm had an ROA of 81 percent. Since this

outlier had a tremendous biasing effect on calculation of the similarity and distance measures, it was excluded from the analysis at this stage. Needless to say that this firm is clearly a high-performer and is classified accordingly for further analysis. The clustering routine used produced a 20-member cluster of high-performance companies (precluding the outlier) with an average ROA of 25.79 percent, and a 27-firm cluster of low performers with an average ROA of -6.08 percent. The t-statistic for the difference of these two means is significant at .001 level. The result of the SAS Cluster Analysis routine and the associated cluster map are presented in Tables 4-7 and 4-8, Figure 4-1, respectively.

Table 4-7. Clustering of the Companies Based on Their Profit Performance (ROA)

	<u>Cluster</u>	<u>Firm ID Number</u>	<u>Firm Standardized ROA</u>	<u>Firm ROA</u>
HIGH PERFORMANCE =	1	1	0.18819	16.8600
	1	44	0.20393	17.0600
	1	14	0.25666	17.7300
	1	27	0.40698	19.6400
	1	38	0.38101	19.3100
	1	35	0.32749	18.6300
	1	10	0.46286	20.3500
	1	42	0.45263	20.2200
	1	19	0.56595	21.6600
	1	13	0.92404	26.2100
	1	22	0.67220	23.0100
	1	28	0.71391	23.5400
	1	47	0.69817	23.3400
	1	9	1.18296	29.5000
	1	11	1.08695	28.2800
	1	33	1.45999	33.0200
	1	43	1.35532	31.6900
	1	21	2.07463	40.8300
	1	46	2.12736	41.5000
	1	29	2.27375	43.3600
	1	MEAN	0.89075	25.7870
		STD. DEV		,8.1774

Table 4-7 (continued). Clustering of the Companies Based on Their Profit Performance (ROA)

LOW PERFORMANCE =	2	2	-0.24308	11.3800
	2	7	-0.27614	10.9600
	2	34	-0.27378	10.9900
	2	5	-0.16753	12.3400
	2	23	-0.14786	12.5900
	2	16	-0.04791	13.8600
	2	37	-0.01564	14.2700
	2	39	0.05913	15.2200
	2	41	0.11264	15.9000
	2	24	-0.42881	9.0200
	2	36	-0.38946	9.5200
	2	26	-0.32887	10.2900
	2	48	-0.32887	10.2900
	2	45	-0.35405	9.9700
	2	31	-0.53585	7.6600
	2	32	-0.57756	7.1300
	2	3	-0.89708	3.0700
	2	15	-0.83569	3.8500
	2	12	-0.77037	4.6800
	2	6	-1.05291	1.0900
	2	30	-1.02930	1.3900
	2	17	-0.99388	1.8400
	2	40	-0.99152	1.8700
	2	18	-1.24572	-1.3600
	2	8	-2.14841	-12.8300
	2	20	-2.29794	-14.7300
	2	25	-1.60853	-5.9700
	2	MEAN	-0.65981	-6.0848
		STD. DEV		7.3964

Table 4-7 (continued). Clustering of the Companies Based on Their Profit Performance (ROA)

DISTANCES WITHIN AND BETWEEN CLUSTERS
 MAXIMUM / AVERAGE / MINIMUM

Number of Points	Cluster	1		2		
		MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MINIMUM
20	1	4.44408035		21.35466003		
		0.89089938		3.26164091		
		0.00000000		0.00583220		
27	2	21.35466003		5.93723392		
		3.26164091		0.79328410		
		0.00583220		0.00000000		

VI = ID NUMBER

NUMBER OF CLUSTERS 1 4 1 2 3 5 1 4 1 1 2 2 4 9 1 3 4 2 4 2 2 7 3 5 2 1 1 3 4 2 3 2 4 4 3 3 3 1 1 6 3 1 4 1 8 2 2
 4 4 7 8 5 0 2 9 3 2 8 7 1 3 1 1 6 7 4 1 6 7 9 1 4 6 6 8 5 1 2 5 2 0 7 0 8 0 5

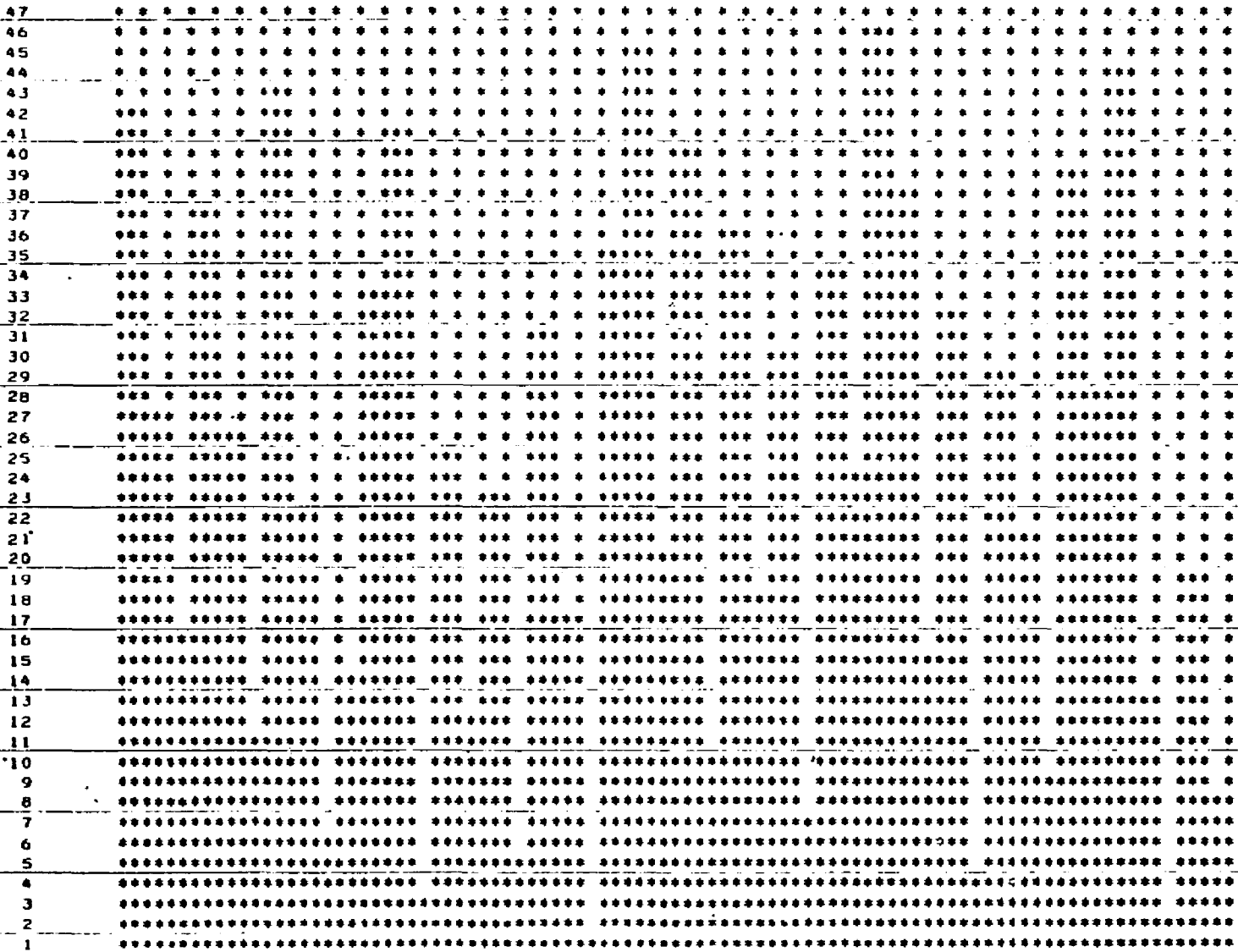


Figure 4-1. The Cluster Map

PART TWO: TESTING OF PROPOSITIONS

As obvious from the propositions laid out in an earlier chapter, two different modes of analysis will be utilized in this Part. One is a descriptive mode whereby the interrelationships of different classes of variables (i.e., environmental, strategic, and structural) are studied without any reference to how they are related to organizational performance. That is, the question addressed will mainly center on how organizations in the sample actually respond and adapt to environmental and strategic contingencies facing them. Clearly, the prevailing patterns of organizational adaptability and coalignment, with respect to the above mentioned factors, do not necessarily contribute to greater economic effectiveness. However, if the same variables are incorporated into a model, (as independent variables) with the corresponding levels of performance (as the dependent variable), normative conclusions could be drawn. In other words, if interdependencies of the environmental and organization factors are examined in light of firms' profitability levels, it might be possible to identify organizational postures and environmental opportunities that are associated with greater economic success (or failure). This is precisely what the second type of analysis

adopted here, i.e., the normative mode, will attempt to achieve.

Presentation and discussion of the research results in part two are organized around the same three sets of relationships used in Chapter Two.

I. ENVIRONMENT-STRATEGY-PERFORMANCE:

This section begins with a statistical analysis of the types of rivalry that top managers associate with different aspects of industrial market structure. This is followed by an examination of the different strategies that companies operating in different environmental conditions adhere to. Finally, the dimensions of the competitive environment and competitive strategy that discriminate between high and low performance companies are reported.

A. Industry Structure, Rivalry, and Performance:

This section is concerned with testing of propositions I-1 through I-4. The simple correlations between industry structure and perceived intensity and nature of rivalry are presented in Table 4-8. This table also demonstrates the relationships of these competitive environment variables with industry and firm profit indices. It is clear from the table that while the support

Table 4-8. Correlations Among Industry Structure, Perceived Competitive Rivalry, Industry Profitability, and Firm Profitability.

Industry Structure	Perceived Intensity & Nature of Rivalry							Industry ROA	Firm Performance		
	Intensity of Overall Rivalry	Promotional and Advertising Competition	Selling and Distribution Competition	Product Quality and Variety Competition	Price Competition	Rate of Product Innovation	Rate of Process Innovation		Firm ROA	Firm ROE	Firm ROS
4-Firm Concentration	-.00576	.19673	-.15931	.09926	-.12222	-.04638	-.00097	-.05420	-.04039	-.01510	-.07850
8-Firm Concentration	.11502	.27338*	-.12417	.08779	-.13124	-.09870	.15116	.16795	-.03817	.05217	-.05332
Scale Economies	.08547	.23852*	-.07817	.07734	-.11535	.04356	.10137	.11954	-.08523	.00620	-.07973
Capital Requirements	.09741	.13749	.05629	.14232	-.06192	.05789	.10521	.02634	-.07942	-.05383	-.06900
Product Differentiation (Advertising to Sales Ratio)	.16538	.31378**	.30845**	.10693	-.02732	.04091	-.18430	-.26163*	-.18111	-.19799	-.17026
Industry Growth	.25699*	.19093	-.00481	.06564	-.00766	.24245*	.35102***	.58468***	.18474	.30857**	.22643
Industry ROA	-.08091	.04857	-.18801	-.24977*	-.24296*	.10325	-.19074	1.0000	.35742***	.33100**	.27704*
Firm ROA	.20571	.30688**	.11317	-.34992***	-.46524***	-.15069	-.19835	.35742***	1.0000	.89505***	.86228***
Firm ROE	-.09291	.24329*	.09640	-.25158*	-.30766*	-.02724	-.11155	.33100**			.80619***
Firm ROS	-.09383	.17743	.03469	-.21088	-.36509***	.02346	-.02230	.27704*			

*** $P < 0.01$
 ** $P < 0.05$
 * $P < 0.10$

for proposition I-2 is unequivocal, the evidence for proposition I-1 is mixed.

Proposition I-1 suggested that industry and firm profitability are positively related to concentration, product differentiation, entry barriers, and industry growth. With respect to this proposition, although the relationships of 8-firm concentration and the entry barrier variables with industry profitability (ROA) are in the predicted direction, the magnitude of the correlation coefficients are not statistically significant. In addition, neither the concentration nor the entry barrier variables are significantly related to measures of firm performance. The only industry structure variable whose correlations with both industry performance (ROA) and firm return on equity (ROE) are positive and highly significant, is industry growth ($r=0.58$ and $r=0.31$, respectively). On the contrary, the measure of industry product differentiation is consistently negatively related to all four of the industry and firm performance measures. Although these associations are not statistically significant at the firm level, they do not seem to be negligible in magnitude. At any rate, this finding at first appears to cast doubts on the validity of the related I-0 theories, from which proposition I-1 was derived. The product

differentiation variable, however, is positively related to executives' perception of promotional rivalry in the industry ($r=0.31$). Also, firms operating in industries characterized by promotional rivalry tend to exhibit higher levels of ROA and ROE ($r=0.31$ and $r=0.24$, respectively). These conflicting results can, possibly, be reconciled as follows. Higher industry advertising outlay (index of product differentiation) can represent two different things. One, it may, as economists suggest, reflect a type of rather subtle rivalry whereby products are made to appear differentiated in the eyes of the buyers, making demand less price elastic. Alternatively, new needs and uses for the products may be created and promoted, thereby increasing the current customers' usage and demand for the product.

Two, larger advertising outlays may, as Buzzell and Farris (1977) argue, reflect a fierce rivalry for market share among the competitors*, where companies aggressively compete and try to attract business away from one another.

*This scenario seems to be supported by our data. Industry advertising to sales ratio is significantly correlated with companies' pursuit of market share expansion strategies ($r=0.30$, see table 4-9). However, as expected, perception of promotional rivalry is not related to such strategic postures ($r=0.13$, see table 4-10).

In the former case, the result is either monopolistic competition (Chamberlin, 1933) if market concentration is low; or type II oligopoly (Kaysen and Turner, 1959) if market concentration is high. Under both of these conditions, companies are likely to enjoy higher profit rates explaining the positive correlations between promotional rivalry and performance indices.

In the later case, on the other hand, competition resembles a zero-sum game, where advertising dollars are aggressively spent to gain larger market shares at the cost of competitors. Market share warfare, however, is almost always expensive and results in lower profitability, at least in the short run (Buzzell, Gale, and Sultan, 1975). The negative relations between the industry advertising to sales ratio and the performance indices are, perhaps, reflective of this latter situation.

Proposition I-2 concerning the nature of rivalry in relation to competitive structure of industries finds strong support from the data. This proposition postulates that in industries characterized by higher concentration, product differentiation, and entry barriers, rivalry is more likely perceived to be non-price related. Table 4-8

indicates that as industries become more oligopolistic in structure, the dominant mode of rivalry in them is likely to become non-price related in general, and of promotional form in particular. This is evidenced by the invariably negative correlations of price competition with all the industry structure variables; even though these correlation coefficients are not large enough to be statistically significant. Moreover, the table also reveals that price competition is consistently associated with lower industry and firm performance, as implied in the IO literature.

Proposition I-3 stated that overall rivalry in faster growing industries would be perceived to be less intense. The data refutes this hypothesis, for the relationship between these two variables is positive and significant ($r=0.26$). Caves (1972) offers a plausible explanation for this result which is discussed in detail in the next section of this chapter.

Finally, strong support is observed from Table 4-8 for proposition I-4. It was stipulated that industry profitability and firm profitability would be positively correlated, and they indeed are. This conclusion matches

that of Beard and Dess (1979) in a research involving 35 manufacturing firms randomly selected from COMPUSTAT Industrial File. Their inter-industry variable, i.e., industry profitability explained a greater proportion of the total variance in firm performance than did firms' market share, debt leverage, or capital intensiveness.

B. Competitive Environment and Business Strategy:

Table 4-9 shows the zero-order correlation coefficients of industry structure and organizational strategy measures. As predicted by proposition I-5, strategic postures that firms assume, are related to the competitive structure of their environment. Apparently, the more characteristics of a company's industry resemble an oligopoly the more the non-price components of its strategy (marketing and product promotion activities in particular) are emphasized. This finding is, of course, in line with IO theories of competitive conduct (Caves, 1972; Scherer, 1980), and is reflected in the significant and positive correlation of the perceived importance of the product promotion activities with industry concentration ratios, product differentiation and scale economy barriers to entry.

Table 4-9. Industry Structure - Business Strategy Correlations

OBJECTIVE STRATEGY:	INDUSTRY STRUCTURE					
	4-Firm Concentration	8-Firm Concentration	Scale Economies	Capital Requirements	Advertising Product Differentiation	Industry Growth
R & D/Sales	0.02694	0.04379	0.00272	0.11366	-0.22672	0.35329**
Advertising/Sales	0.12379	0.05323	0.07454	-0.12828	0.75110***	-0.18602
C. Assets/C. Liabilities (Financial Liquidity)	0.00320	-0.01821	-0.07745	-0.00869	0.09423	0.01387
Assets/Sales (Capital Intensity)	-0.19275	-0.14515	-0.12004	-0.10314	-0.01017	-0.02402
Collection Period (Credit Policy)	-0.05521	-0.01736	-0.02839	-0.13171	-0.02773	0.16471
Plant and Equipment Modernization	-0.12787	-0.03031	-0.08194	0.02555	0.09005	0.24219*
% Production Capacity Utilization	-0.09434	0.05768	0.02746	0.10778	-0.00513	0.06768
<u>PERCEIVED STRATEGY:</u>						
Factor 1. Financial Consciousness	-0.03724	-0.09331	-0.13496	-0.02996	-0.11089	0.07854
Factor 2. Customer-Service Based Strategy	-0.17573	-0.03299	-0.09740	0.05632	-0.25611*	0.07558
Factor 3. Production-Operations Expansion	-0.10317	0.02175	0.01018	0.07812	-0.19909	0.08286
Factor 4. Promotional Strategies	0.30500**	0.41645***	0.35640**	0.22273	0.28990**	0.13934
Factor 5. Product Specialization	-0.04222	0.11974	0.03848	0.07943	0.10572	0.09002
Factor 6. Risk Reduction Strategies	0.06688	-0.00485	-0.10002	0.03072	-0.08043	0.09132
Factor 7. Market Share Expansion	-0.02078	-0.04267	-0.10236	-0.13772	0.29793**	-0.20105
Factor 8. Product Innovation	-0.02979	-0.00599	-0.06192	-0.07845	0.08699	-0.09452
Low Price	0.04447	0.04724	0.08252	0.11229	-0.16858	0.29749**
Strategic Complexity	-0.04499	0.00579	-0.10449	0.06279	-0.03107	0.05210

***p < 0.001

**p < 0.05

*p < 0.10

The correlation matrix also shows that especially when industries are characterized by higher product differentiation, companies operating in them claim to place less importance on service based strategies, focusing more on expansion of their market share. The market share strategy, however, is not pursued through competitive pricing. Rather, the path followed involves more monitoring of the customer needs and tastes, projecting and enhancing the appropriate image for the brand, and advertising to increase customer awareness of the products and creating customer loyalty for their brand. Such a trend is also echoed by the very strong and positive correlation of firms' advertising to sales ratio with industry product differentiation ($r=.75$). That is, firms facing a high degree of product differentiation in their environment allocate a greater percent of their income to their advertising budgets.

The relationship of industry growth with business strategy reported in Table 4-9 is interesting, in that, while refuting Proposition I-3, it is consistent with what was observed earlier about this variable. Although potentially more profitable, faster growing industries are sites of more intense rivalry (Table 4-8). The companies

in these industries, although, do not perceive price rivalry to be prevalent in their environment (see Table 4-8), they do, however, acknowledge practicing competitive pricing as a viable strategic option ($r=.30$). This phenomenon contradicts the thesis shared by many writers, including Porter (1980), concerning rivalry in such industries. This finding, on the other hand, is predicted and justified by Caves (1972). Caves argues that rapid growth is likely to induce firms to practice price cutting as an attractive strategy that might improve their relative standing in the market and can ultimately lead to greater future profits.

Table 4-9 also reports significant and positive correlations for industry growth in relations to firms' R&D outlet ($r=.35$), and measure of plant and equipments modernization ($r=.24$). This is explainable in light of the positions of companies in their industry life cycle. Companies' products and their industries evolve through certain stages of development called a life cycle. As Gup (1980) suggests, businesses that are in the pioneering and expansion phase of their industry life cycle, are users of cash and are characterized by more intense R&D, and plant

modernization and expansion. Such activities enable them to keep up with the diverse and growing demands of their market. These businesses are what the Boston Consulting Group refers to as "stars" and "wildcats (or Question Marks)". The intense fund requirements of these firms is probably why, in spite of their higher profitability, they are not necessarily financially more liquid. This is, of course, evident from the insignificant correlation of the firm liquidity ratio with industry growth (see Table 4-8).

Correlations between the intensity and nature of rivalry, as perceived by the executives, and firms strategic responses are presented in Table 4-10. The pattern of correlations strongly support the plausibility of propositions I-5 and I-6. Specifically, top managements' strategies seem to be related to their perceptions of their environmental contingencies. Notice that the largest correlation coefficients of the perceived advertising and promotional competition in the industry are with firm's strategic importance of product promotion ($r=0.61$) and firm's advertising to sales ratio ($r=0.48$). Apparently, when competition is perceived to be of advertising-promotional nature, companies generally respond by specializing in manufacturing of a narrower range of products

Table 4-10. Simple Correlations of Perceived Competitive Environment with Strategy

<u>OBJECTIVE STRATEGY:</u>	Intensity of Overall Rivalry	Promotional and Advertising Competition	Selling and Distribution Competition	Quality and Variety Competition	Price Competition	Rate of Product Innovation	Rate of Process Innovation
R & D/Sales	0.16948	-0.06054	-0.29902*	0.09964	-0.01523	0.49183***	0.28345
Advertising/Sales	0.03832	0.47931***	0.39095**	-0.04918	-0.24608	-0.07954	-0.28854
C. Assets/C. Liabilities (Financial Liquidity)	-0.04237	0.05418	0.00020	-0.09915	-0.22300	0.05618	0.04350
Assets/Sales (Capital Intensity)	-0.06078	-0.32651**	-0.15393	0.04646	-0.08476	0.13110	0.18597
Collection Period (Credit Policy)	-0.18057	-0.27480*	-0.31248**	-0.06459	-0.18225	0.15207	0.03694
Plant and Equipment Modernization	0.04271	0.12700	0.18196	-0.15913	-0.24682*	0.11183	0.10231
% Production Capacity Utilization	0.17623	0.16382	0.05367	0.16101	-0.10425	0.17415	0.13961
<u>PERCEIVED STRATEGY:</u>							
Factor 1. Financial Consciousness	0.19055	0.00745	-0.15677	0.00584	0.20411	0.15406	0.39367***
Factor 2. Customer-Service Based Strategy	0.15978	-0.20389	-0.03003	0.10599	0.07709	0.16715	0.43290***
Factor 3. Production-Operations Expansion	0.24222*	-0.03956	-0.10197	0.22832	0.36936***	0.06925	0.30279**
Factor 4. Promotional Strategies	0.18439	0.61007***	0.19474	-0.03680	-0.25575*	0.00044	0.07141
Factor 5. Product Specialization	0.13522	0.30920**	0.11122	0.06304	-0.17826	0.12085	0.00681
Factor 6. Risk Reduction Strategies	0.15316	-0.25480*	-0.11323	0.32992**	0.26283*	0.17727	0.14247
Factor 7. Market Share Expansion	0.08182	0.13506	0.24145	0.01771	-0.05194	-0.00579	-0.04238
Factor 8. Product Innovation	0.43108***	-0.11793	-0.12653	0.39119***	0.23970	0.63269***	0.40113***
Low Price	0.15750	-0.16968	-0.02818	0.09055	0.51464***	0.03217	0.11291
Strategic Complexity	0.26956*	0.10937	0.12330	0.15694	0.05166	0.15437	0.31968**

***p < 0.01
 **p < 0.05
 *p < 0.10

($r=0.31$), devoting more funds ($r=0.48$) as well as attention to advertising for and enhancing of their brand image ($r=0.61$), and adopting a more stringent credit policy ($r=0.27$), probably to improve the cash flow. Companies also seem to be less capital intensive, under the foregoing environmental condition ($r=0.33$). This can be attributed to PIMS findings regarding these variables (Schoeffler et al., 1974). The PIMS studies and their replications (i.e., Zeithaml et al., 1981) report that investment intensity is a hindrance to profitability. But this negative relationship is especially stronger with higher levels of marketing intensity. Therefore, it can be argued that in environments predominantly characterized by marketing warfare, companies maintain a lower degree of capital intensity to protect their profits. An alternative plausible explanation might be that the more firms are capital intensive, the less their collective conduct (rivalry) revolves around advertising and promotional activities which might endanger the profitability of everyone.

At any rate, the almost exact opposite strategic route is followed by companies when competition is per-

ceived to be "cut throat" and price related, rather than promotional in form. Here, firms tend to reduce the risks involved ($r=0.26$) by monitoring competitors actions and by manufacturing a wider range of products, while placing more weight on competitive pricing component of their strategic package ($r=0.51$). Two other options are also likely to be adopted in order to compensate for the negative profit impact of the pricing warfare. First, companies might expand their production and operation ($r=0.37$) to enjoy economies of scale and secure in-flow of required parts and materials. Secondly, they may downplay the costly moves that are of less immediate necessity and have negative effects on short run profit picture. For example, under such circumstances, plant and equipment modernization and promotional activities are likely to be overlooked. This is depicted from the negative and moderately significant correlations of these two strategic actions with perception of price rivalry in the industry ($r=0.25$ and $r=0.26$, respectively).

Other types of rivalry in the environment and how they are reacted to by the businesses are also presented in the Table 4-10. For instance, strategic responses to more intense selling and distribution competition are

fairly similar to those under promotional and advertising competition. Whereas, when rivalry is perceived to revolve around the quality and variety of the products, companies tend to play along by the use of product innovation ($r=0.39$).

Moreover, environments that are technologically more dynamic, induce companies to stress a more diverse set of strategic factors, including financial matters, product innovation, expansion of operations, and various customer services. As Khandwalla (1976) contends, to the extent that technological change threatens a firm with obsolescence of its products and manufacturing processes, it should be expected to place a priority on product development and its financing to maintain viability. Notice that rate of technological change (in processes) and intensity of overall rivalry are both positively and significantly correlated with firms' strategic complexity ($r=0.32$ and $r=0.27$, respectively). This finding substantiates Khandwalla's conclusion that "A complex environment apparently begets a complex and comprehensive corporate strategy. A simple environment seems to beget a simple corporate strategy centering around only a few activities"

(Khandwalla, 1976: 69). The rationale offered by Khandwalla is that rivalry and technological change imply uncertainty, dynamism and complexity. And to the extent that complex, dynamic environments are richer in contingencies, they would appear to raise the importance of a larger number of strategic-type activities. This notion is of course at the heart of the concept of requisite variety. The law of requisite variety states that "the variety within a system must be at least as great as environmental variety against which it is attempting to regulate itself. Put more succinctly, only variety can regulate variety (Buckley, 1968: 495)."

C. Performance = f (Environment, Strategy):

This section focuses on testing of the proposition I-7. The following question is at the heart of this proposition. Is the environment-strategy profile of the economically successful firms significantly different from that of less successful ones? As suggested in chapter three, stepwise discriminant analysis was employed to tackle this question. This task involved deriving a weighted linear combination of the independent variables that best discriminate between the two groups of firms. The linear combination (discriminant function) takes the

following form: $D = d_1 z_1 + d_2 z_2 + \dots + d_n z_n$;

where D is the discriminant score, the d's are weighting coefficients and Z's are the standardized values of the discriminating variables. This function is used to determine whether and how two or more groups differ substantially from one another.

To do so, each subject's (firm's) score on the discriminating variables in the model are multiplied by their corresponding weights and added together to obtain a composite discriminant score. The discriminate scores for all subjects (firms) within each particular group are then averaged to arrive at group centroids (see, for example, Table 4-12). Comparison of the group centroids indicates how far apart the groups are along the dimensions being tested. Some measure of the distance between the group centroids is employed to test for the statistical significance of the discriminant function.

Since the variables used in discriminant analysis, like in most other multivariate techniques, are preferred to be of comparable scales, the scores on all independent variables were first standardized. That is, the raw data was transformed into variables with a mean of zero and

standard deviation equal to one.

Next, the SPSS statistical package was used to perform the stepwise discriminant procedure. In the stepwise method, a variable is considered for selection only if its partial multivariate F-ratio is significant at a specified level. (The partial F-ratio measures the discrimination introduced by the variable after taking into account the discrimination achieved by the other selected variables.) In addition, variables are tested for removal from the model on the basis of their partial F-ratios. For the purpose of this study, the required significance level for the F-values (pertaining to entry and removal) were specified to be 0.10 or smaller.

Results derived from the analysis are presented in four tables. Table 4-11 summarizes the stepwise process of item selection. This table shows the set of variables that distinguished the two subsamples of companies, along with their partial F-ratios. According to the table, the discriminant function after the final step included four strategic items (i.e., financial liquidity, capital intensity, capacity utilization, and production-operations expansion) and one environmental item (i.e., industry product differentiation via advertising). A chi-square test

Table 4-11. Results of the Stepwise Discriminant Analysis
of Environment and Strategy by Firm Performance

Step Number	Name of Item Entered At Each Step	Name of Item Removed at Each Step	Wilks' Lambda	Partial F	Significance Level
1	Firm Liquidity Ratio		0.8657720	7.689877	0.0080
2	Industry Product Differentiation via Advertising		0.698842	9.696119	0.0003
3	Firm Capital Intensity		0.592185	10.10036	0.0000
4	% Production Capacity Utilized		0.528728	9.581798	0.0000
5	Production-Operations Expansion		0.474040	9.320023	0.0000
Chi-Square		Degrees of Freedom		Significance Level	
32.471		5		0.0000	

of this function's overall discriminating power was significant at $p < 0.01$ level. The results provide support for proposition I-6. Namely, combination of environmental and strategic characteristics of high profit organizations are significantly different from those of the low profit companies. The absolute sizes of the partial F-values in Table 4-11 shows the relative discriminating power of the individual variables (see Hair, 1979: 105). Apparently, firm capital intensity and financial liquidity, respectively, are the most and least potent determinations for membership to the two subsamples.

Table 4-12 reveals the signs and magnitudes of the coefficients associated with the discriminant variables. The signs of the coefficients and the group means for the items give further insight to the practical implications of the findings. They indicate the manner in which environments and strategies of the companies associated with the two performance levels are different. For example, it is shown that high performance companies tend to be financially more liquid. This might be so because liquidity gives these companies the flexibility to more readily take advantage of new profitable opportunities and

Table 4-12. Standard Discriminant Function Coefficients
for the Environment - Strategy Model

Item Name	Standard Discriminant Function Coefficient	Standardized Item Mean for Each Performance Group	
		Low	High
Firm Liquidity Ratio	-0.98206	-0.33027	0.42463
Firm Capital Intensity	0.75358	0.16002	-0.20574
% Production Capacity Utilized	-0.69036	-0.14913	0.19174
Industry Product Differentiation via Advertising	0.86529	0.31414	-0.40390
Production-and-Operations Expansion	0.51496	0.09604	-0.12348
Canonical Discriminant Function Evaluated at Group Means (Group Centroids)		0.90940	-1.16923

ventures. Liquidity is also a measure of the margin of safety that management maintains in order to allow for the inevitable unevenness in the flow of funds through the current asset and liability accounts. Liquidity indicates the size of the buffer that assures management of being able to pay its bills when they come due.

Production capacity utilization is also found to be an important contributor to profitability. This is a finding also supported by Jauch, Osborn & Glueck (1980) in their research. Obviously, while greater capacity utilization reduces fixed costs per unit of products, idle capacity undermines efficient use of company investment.

The three remaining discriminant variables seem to be negatively related to economic performance. For instance, the companies in their high-performance group are less capital intensive than those in the low performance group. In theory, capital intensiveness is assumed to create barriers to competition and thus to be positively associated with profit. Empirical tests of the relationship, however, have proven controversial. Winn's (1975) study, for example, has shown the expected positive relationship. Whereas, a PIMS research (Schoeffler et. al., 1974) and re-examinations of it (e.g., Zeithaml, 1981) have con-

sistently found a negative association, explaining about 40 percent of the variation of the profitability of their sample businesses. Our data, obviously, corroborates and is consistent with the results of the latter group of studies.

Production capacity utilization is found to be positively related to profitability. However, attempts to expand production and operations apparently have the opposite relationship with profitability. Clearly, the two results do not pose any inconsistencies. Capacity utilization is an index of a company's relative competitive position at the present time. It is therefore reflected in the firm's short-run profitability picture. On the other hand, emphasis on expansion is an attempt to enhance one's future position. It is a costly move in the short-run, particularly in the period of its implementation. Its true profit impact can be only revealed in the long run, for which longitudinal research is required.

Finally, high performance businesses tend to operate in industries associated with relatively lower degrees of product differentiation via advertising. This finding does not lend support to the IO theoretical arguments.

Buzzell and Farris (1977) who reported results similar to those found here offer two possible explanations. First, high levels of advertising product differentiation might reflect intense competitive rivalries in which profits are dissipated. Secondly, this variable may reflect a battle for market share among competitors. And as Buzzell, Gale, and Sultan (1975: 103) discovered, "expanding share is almost always expensive in the short run." The second explanation is clearly supported by our results reported in Table 4-9 (a significant positive correlation, $r=0.30$, between firms' perceived importance of market share expansion and industry product differentiation via advertising).

The last step in the analysis of the data in this section is validation of the discriminant function. Although the chi-square test presented in Table 4-11 determines the significance of the discriminant function, in reality it is a weak test and means very little (Hair et al., 1979: 96-97). So, a classification matrix is developed to further evaluate the predictive accuracy of the model. By classification, is meant the process of classifying the likely group membership of a firm when the only information known is the firm's values on the discri-

minating variables. The result of this process is presented in Table 4-13. The overall "Hit Ratio" (the proportion of firms correctly classified into the two performance groups by the function) is a good indicator of the discriminating power of the function. However, percent hit ratio reported by the SPSS program (in this case 85.42) only reflects the success of the function in correctly classifying the companies present in the sample. It does not show the predictive accuracy of the function in classifying similar companies not present in the sample. This is so, because an upward bias always occurs if the subjects used in developing the classification matrix are the same as those used in computing the function (Hair et al., 1979; Klecka, 1980). One way to adjust for this upward bias, is the "jackknifed classification" option available in the BMDP statistical package. This procedure, in fact, creates a rotating "hold out" sample to test the predictive accuracy of the discriminant function (Jennrich and Sampson, 1979). The jackknifed classification using the BMDP program is, thus, presented in Table 4-14. The hit ratio reported (77.08%) is clearly higher than the proportional chance criterion (50.78%). The

Table 4-13. Classification Matrix for the Environment -
Strategy Discriminant Function

Actual Group	Actual Number of Cases	Predicted Group Membership	
		Low Performance	High Performance
Low Performance	27	24 88.9%	3 11.1%
High Performance	21	4 19.0%	17 81.0%
Total	48	28	20
Hit Ratio (Percent of cases correctly classified):			85.42%

latter item refers to the percent of firm that can be classified correctly by chance, and was computed as follows (Hair et al., 1979: 102):

$$P.C.C. = p^2 + (1 - p)^2 = \left(\frac{27}{48}\right)^2 + \left(\frac{21}{48}\right)^2 = 50.78\%$$

Where P = the proportion of firms in high performance group.

1-P = the proportion of firms in low performance group.

In short, the research data supports proposition I-6 in that the combination of environmental and strategic profile of high performing firms is indeed different from that of low performing companies. Putting it differently, the external competitive environment and competitive strategies followed by companies, both, have significant impacts on levels of economic performance realized by business enterprises. As such, theoretical and research approaches aimed at integration and simultaneous examination of both of these classes of variables are of great predictive and explanatory value. After all, understanding, explaining, and predicting is what scientific inquiry is all about (Kerlinger, 1973).

II. ENVIRONMENT - STRUCTURE- PERFORMANCE:

The Analysis of this set of relationships will begin

Table 4-14. Jackknifed Classification for the Environment -
Strategy Discriminant Function

Actual Group	Actual Number of Cases	Predicted Group Membership	
		Low Performance	High Performance
Low Performance	27	21 77.8%	6 22.2%
High Performance	21	5 23.8%	16 76.2%
Total	48	26	22
Hit Ratio (Percent of cases correctly classified):			77.08%
Proportional chance criterion:			50.78%

with inspecting the manner in which certain structural dimensions of the sample companies are associated with the external environments of the firms. This will be then followed by a normative study of the combination of organizational and environmental characteristics that best discriminate between high and low performance firms.

A. Organization Structure and Competitive Environment:

This section is concerned with testing of the propositions II-1 through II-5, formulated in Chapter Two. Specifically, it entails examining the relationships of selected internal structural characteristics of organizations with the competitive contingencies of their external environment. Of particular interest and importance will be the environmental sources of intra-organizational power distribution.

According to Proposition II-1, the more intense overall rivalry is in a firm's industry, the higher will be the organization's decentralization, autonomy, and delegation of authority by the CEO. Based on the correlations of variables reported in Table 4-15, neither the intensity of overall rivalry nor the degree of different

Table 4-15. Product Market Correlations Between Environmental and Organization Structural Measures

ORGANIZATION STRUCTURE	PERCEIVED INTENSITY AND NATURE OF RIVALRY							INDUSTRY STRUCTURE					
	Intensity of Overall Rivalry	Promotional and Advertising Competition	Selling and Distribution Competition	Product Quality and Variety Competition	Price Competition	Rate of Product Innovation	Rate of Process Innovation	4-Firm Concentration	8-Firm Concentration	Scale Economics	Capital Requirement	Advertising Product Differentiation	Industry Growth
Sales and Marketing Influence	0.1552	0.1507	0.1645	0.1708	0.11056	0.04809	-0.09208	0.02969	0.07879	0.0620	0.00728	0.30835**	0.01042
Production Influence	0.29705**	0.05584	0.07977	0.23212	0.37950**	0.02747	0.26697*	-0.19703	-0.25225*	-0.26247*	-0.12319	0.02317	-0.0050
Engineering Influence	-0.04350	-0.34576**	-0.26257*	0.23421	-0.01522	0.09102	0.16667	-0.05573	-0.04164	-0.04311	-0.02854	-0.06666	0.09501
R & D Influence	0.13557	-0.19612	-0.15770	0.20073	-0.09509	0.33143**	0.36557***	-0.05716	-0.06020	-0.02018	0.02753	0.09767	0.11766
Fin. and Acctg. Influence	0.06101	-0.09414	-0.06534	0.25390*	0.17151	-0.15996	0.15839	-0.03417	-0.10275	-0.06723	0.01536	0.10807	-0.04825
CEO Delegation	0.24918*	0.15485	0.25364*	0.21100	0.10688	0.01487	0.14011	-0.10862	-0.02508	-0.11214	-0.05654	-0.09688	-0.03554
Autonomy	0.02366	0.17438	0.07448	0.20488	-0.03013	-0.12942	-0.18491	0.09857	0.14831	0.15212	0.12274	0.02002	0.05232
Formalization	0.09031	-0.10624	-0.09080	0.16039	-0.09405	0.16238	0.27696*	0.21672	0.12233	0.12553	-0.02774	-0.11625	0.19003
CEO Span	0.16925	-0.20068	-0.08873	0.02602	0.09272	0.41869***	0.28950**	-0.23358	-0.09252	-0.03917	-0.01675	-0.06966	0.08353
Decentralization	0.00905	-0.03997	-0.11142	0.22341	0.11167	-0.12971	0.01351	0.26210*	0.26903*	0.33565**	0.26431*	-0.01421	-0.04590
Decent of Operative Decisions	0.05982	0.00596	-0.06125	0.27506*	0.10259	-0.11162	0.03370	0.22148	0.24574*	0.31634**	0.24557*	-0.03885	0.04119
Decent of Marketing Decisions	0.07675	-0.03231	-0.10225	0.23880	0.11335	-0.00460	0.06668	0.12052	0.16574	0.14443	0.04651	0.11034	-0.01721
Decent of Prod/Oper Decisions	-0.14112	-0.04160	-0.09782	-0.04700	0.00416	-0.19510	-0.08940	0.20485***	0.32354**	0.39155***	0.28809**	0.02325	-0.12822

*** < 0.01

** < 0.05

* < 0.10

forms of rivalry are found to be associated with organizational decentralization. Instead, the Table indicates that both overall decentralization of decision making and decentralization of some specific types of decisions are strongly related to objective structural dimensions of the competitive environment. In fact, 11 of the 24 correlations between industry structure variables and different decentralization variables are statistically significant at the $P \leq .10$ level. Index of decentralization of marketing decisions is apparently statistically independent of all the industry structure dimensions considered. The remaining three of the four decentralization indices are, however, shown to be positively correlated with measures of industry concentration and barriers to entry. Of the 28 correlations relating various perceived forms of rivalry with aspects of organizational decentralization, only one is statistically significant.

Two important implications seem to emerge from the foregoing results. First decentralization is more strongly associated with the salient structural characteristics of the industry than with the perceived behavioral characteristics of the competitive environment. Organization theorists' exclusive focus on the managerial

perceptions of rivalry, hence, may have contributed to their inconsistent and contradictory results concerning the effect of competition on decentralization (see for example, Khandwalla, 1973; and Pfeffer and Leblebici, 1973). The following paragraphs are an attempt to explain, from a conceptual standpoint, the rather strong association between industry competitive structure and organizational decentralization, as demonstrated in the present research.

Competition always involves uncertainty, especially in highly fragmented industries (low concentration and entry barriers). Uncertainty alone, however, is not as critical and problematic as when it is combined with dependence (Aldrich, 1979: Ch. 3). Lower concentration and entry barriers signal presence of a larger number of existing and potential competitors, and greater likelihood of lack of market leaders to be in tuned with and depend upon. As such, according to Caves (1977), the individual sellers react mainly to impersonal market forces. The lack of dependence gives organizations increased freedom in their operations. The situation does require a certain amount of attention to competition but not as much as when

concentration and entry barriers are higher. Under the latter conditions, rivalry is among fewer firms. These firms are more likely to recognize the impact of their actions on their rivals, and vice versa. Greater possibility exists for retaliations and efforts to counter one another's moves. As such, firms react to one another in a more direct and personal fashion (Caves, 1977). That is to say that firms are mutually interdependent. As Aldrich (1979: Ch. 5) argues, however, the effect of competitive uncertainty is most strongly felt when it is combined with dependence. The greater decentralization in more oligopolistic environments, therefore, could well be a response to the simultaneous presence of both uncertainty and dependence in such environments.

The second implication of the results is a confirmation of the Grinyer et al.'s (1980) finding that treating decentralization as a unidimensional variable is misleading and might obscure important relationships. Therefore, exploring the variation patterns of specific forms of decentralization under different conditions, as performed here and by Grinyer et al. (1980), is of merit and advisable for future research.

With respect to expected relationship between auto-

onomy and rivalry, the data fails to support the research proposition. This, of course, does not necessarily reject the plausibility of the hypothesized relationship. In fact, autonomy does not show significant correlations with any of the environmental variables. The explanation is obvious from the descriptive statistics on the variable (see the Appendix). With 9-23 as the possible range for the autonomy measure, the mean value and standard deviation for the companies in the sample are 20.67 and 2.86, respectively. Clearly, the very little variation in the autonomy values does not lend itself to testing the proposed relationship. Therefore, the research fails to reject or to confirm the plausibility of a positive association between overall rivalry and organizational autonomy.

As predicted, Table 4-15 shows a positive correlation between CEO delegation and perceived intensity of overall rivalry in the industry ($r=.25$). Environments characterized by more intense rivalry frequently require executives to make timely decisions, and act promptly, in response to the plans and conducts of their competitors. Firms' more flexible and decentralized top management is

likely to be a sign of their CEO's appreciation of such environmental requirements.

Propositions II-2 through II-5 entail the environmental sources of power distribution in organizations.

Organizations, as Hickson et al. (1971: 217) suggest, can be "conceived of as interdepartmental systems in which a major task element is coping with uncertainty."

Uncertainty coping is a critical task in part because it permits the rationalization of organizational activities, while at the same time keeping organizations adaptive to external constraints (Thompson, 1967; Galbraith, 1973).

As such, the power of organizational units is expected to be fundamentally determined by the importance of the units' activities in reducing the major uncertainties facing the organization. Table 4-15 includes the coefficients of correlations of organizational units' influence with behavioral and structural characteristics of their competitive environment.

Proposition II-2 stated that in industries whose dominant environmental requirements center on product differentiation and market development, the power accrued to the functional unit(s) in charge of coping with the output task (i.e., Marketing & Sales) will be greater. In support

of this proposition, influence of sales and marketing functions had a significant correlation of $r=0.31$ with advertising product differentiation. However, the former variable did not display strong and significant relationships with either of the two forms of marketing rivalry in the industry (i.e., promotional/advertising or selling/distribution). From this, it might appear that Proposition II-2 regarding power of sales and marketing units has not received strong support from the data. However, a look at the sample mean of sales and marketing influence (see the Appendix) may prove otherwise. Considering that this variable was measured on a scale of 0 to 5, the very large sample mean of 4.37 suggests that the values of this variable are almost indiscriminately high. That is, the item values vary too little (Std. Dev. = 0.64) to permit any significant correlations with most other variables.

Data from other similar studies involving manufacturing companies also indicate that these firms are overwhelmingly dominated by their sales and marketing departments (Perrow, 1971; Miles and Snow, 1978: Chapter 12). Perrow (1971) argues that since manufacturing firms

must sell their products and since customers "determine the cost, quality, and type of goods that will be produced and distributed," the customer determines the success of these organizations. While all departments in these organizations contribute to customer satisfaction, it is sales that is the main gate between the firm and its customers.

"As gatekeeper, it determines how important will be prompt delivery, quality, product-improvement, or new products, and the cost at which goods can be sold. Sales determines the relative importance of these variables for the other groups and indicates the values which these variables will take.... As the link between the customer and producer, it absorbs most of the uncertainty about the diffuse and changing environment of customers (Perrow, 1971: 65)."

Perrow (1971) proceeds to conclude that, sales as the most critical function in manufacturing companies, therefore, tends to have the most power.

The above explanation together with the negative correlations of engineering influence with promotional and distributional forms of rivalry ($r=-0.35$ and $r=-0.26$, respectively) offer the following conclusion. While sales and marketing unit is highly influential in most situations, engineering loses its power base when the extraorganizational rivalry becomes predominantly marketing oriented.

Proposition II-3 stated that the power of technocratic units increase as rivalry in the industry becomes more product related. The data offers limited support for this proposition. Correlations of product rivalry with influence of all major functional units are consistently positive. However, except for the case of financially oriented units, the size of correlation coefficients are moderate though statistically non-significant. Apparently, in companies faced with greater product rivalry, every major functional area tends to exert somewhat more influence on decisions of strategic importance.

Based on Proposition II-4, price competition should be positively related to power of production and financial units. The proposition is strongly supported with respect to the production unit ($r=0.38$) and moderately, though not significantly, for the financial units ($r=0.17$). So, as firms confront more intense price competition (with external requirement for efficiency and cost control), the power of units that cope with the throughput task increases.

Finally, this study also finds strong support for

proposition II-5. As expected, in companies faced with greater environmental requirement for technological developments and innovations, the functional unit primarily involved in new product/process development (i.e., R & D department) possesses more power and is more influential. This is evidenced by the strong correlations of R & D influence with the rates of product and process innovations in the industry ($r=0.33$ and $r=0.37$, respectively).

In short, the findings of this research are consistent with the tenets of the strategic contingency theory of power, as outlined by prominent organization theorists (e.g., Hickson et al., 1971; Salancik and Pfeffer, 1977; and Pfeffer, 1981). The findings also parallel the observations of the researchers who have in general provided support for the theory (e.g., Crozier, 1964; Hinings, 1974; Hambick, 1980; Hrebiniak and Snow, 1980; and Salancik, Pfeffer and Kelly, 1978). The major thrusts of the underlying theory and findings of this study so perfectly outlined by Salancik et al., (1978: 253), are as follows:

"The influence of a subunit or an individual on a decision is a function of 1) the kind of uncertainty faced by an organization, 2) the particular characteristic or capability which enables reducing organizational uncertainty, and

3) the degree to which a particular subunit possesses this characteristic. As decision-making contexts vary, so do the sources of organizational uncertainty, and consequently, the bases for influence in organizational decision making (Salancik, et al., 1978: 253)."

B. Performance = f (Environment, Organization Structure):

This section focuses on testing on the Proposition II-6. The proposition states that combination of environmental and organizational characteristics associated with high performing firms is significantly different from that associated with low performing companies. That is, membership of the companies in the high or low performance groups can be largely determined by their environmental-organizational profiles. As suggested in Chapter Three, stepwise discriminant analysis was employed to verify the plausibility of this statement. The task involved deriving a weighted linear combination of the variables discriminating the two groups. Since the independent variables involved were not measured on comparable scales, the values of these variables were first standardized. Namely, the raw data was transformed to have means of zero and standard deviations equal to one. Then the SPSS statistical package was used to perform the stepwise discriminant procedure. The required significance level

of the partial F-ratios for entry to or removal from the model were specified to be $P \leq 0.10$. The results derived from the analysis are presented in three tables. Table 4-16 summarizes the stepwise process of item selection. It shows the set of variables that distinguished the two subsamples of companies, along with their corresponding F-ratios. According to Tables 4-16 and 4-17, the discriminant function after the final step consisted of a linear combination of two environmental and three organization structure variables, as follows:

$$D = -0.82810Z_1 + 0.75942Z_2 + 0.65939Z_3 \\ -0.71577Z_4 + 0.49603Z_5$$

Where Z_1 = Industry Advertising Product Differentiation,
 Z_2 = Perceived Promotional Rivalry in the Industry,
 Z_3 = R & D Influence,
 Z_4 = Finance and Accounting Influence,
and Z_5 = Formalization.

The Chi-Square test of the function's overall discriminating power is statistically significant (at $P=0.000$ level). The result, therefore, offers strong support for Proposition II-6. The performance level of the sample companies is indeed a function of both competitive environment and organization structure.

Table 4-16. Results of the Stepwise Discriminant Analysis of Environment and Organization Structure by Firm Performance

Step Number	Name of Item Entered at Each Step	Name of Item Removed at Each Step	Wilks' Lambda	Partial F	Significance Level
1	Industry Product Differentiation via Advertising		0.870418	6.848169	0.0120
2	Perceived Promotional Competition		0.769759	6.729940	0.0028
3	R & D Influence		0.657352	7.645057	0.0003
4	Finance and Accounting Influence		0.563412	8.330179	0.0000
5	Formalization		0.512784	7.981161	0.0000
Chi-Square		Degrees of Freedom		Significance Level	
29.054		5		0.0000	

Table 4-17. Standard Discriminant Function Coefficients
for the Environment-Structure Model

Item Name	Standard Discriminant Function Coefficient	Standardized Item Mean for Each Performance Group	
		Low	High
Industry Product Differentiation via Advertising (Industry Adv. Intensity)	-0.82810	0.31414	-0.40390
Perceived Promotional Competition	0.75942	-0.16432	0.21127
R & D Influence	0.65939	-0.18587	0.23897
Finance and Accounting Influence	-0.71577	0.23356	-0.30029
Formalization	0.49603	-0.27858	0.35817
Canonical Discriminant Function Evaluated at Group Means (Group Centroids)		-0.84155	1.08199

Table 4-17 also gives further insight to the practical implications of the results. It demonstrates the manner in which environment and organization structure of the companies in the two performance categories are different. For example, the signs of the discriminant function coefficients and the variable means for the two groups suggest that higher industry product differentiation (measured by industry advertising intensity) is associated with the low performance companies. However, companies in the high performance category tend to operate in industries characterized by higher promotional rivalry. This outcome is consistent with the earlier findings in sections I-A and I-C of this chapter. The explanation for the result is also offered in the foregoing sections (see pages 90 and 108), and thus not repeated here.

Of the internal structural characteristics of the firms, two dimensions of the organizational power structure, as well as the degree of impersonal bureaucratic controls have emerged as powerful discriminants. R and D departments portrayed a greater degree of influence on matters of strategic importance in the high performing companies. On the other hand, Financial and Accounting

units seem to have more say in the strategic decisions of the low performing businesses:

With respect to formalization, higher values of this variable are related to economically more successful firms in the sample. Apparently a "tighter ship" was needed for the sample companies to achieve high levels of profitability. This is, of course, what Horovitz and Thietart (1982) also discovered for the diversified companies studied in their research.

The next step of the analysis required at this stage is to further validate the derived discriminant function. Table 4-18 shows the related classification matrix constructed and used for this purpose. Obviously, the derived function proves to be quite reliable to the extent that it correctly classifies about 87 percent of the sample firms into their proper performance group. The 87 percent "hit ratio," however, is only an indicator of the internal validity of the results. This ratio must be adjusted downward if it is to be used in assessing the external validity of the findings (Hair et al., 1979; Klecka, 1980). The output of the discriminant-analysis routine of the BMDP statistical program, reflecting the required adjustment, is presented in Table 4-19. The hit

Table 4-18. Classification Matrix for
the Environment-Structure Discriminant Function

Actual Group	Actual Number of Cases	Predicted Group Membership	
		Low Performance	High Performance
Low Performance	27	25 92.6%	2 7.4%
High Performance	21	4 19.0%	17 81.0%
Total	48	29	19
Percent of cases classified correctly (Hit Ratio):			87.50

Table 4-19. Jackknifed Classification for
the Environment-Structure Discriminant Function

Actual Group	Actual Number of Cases	Predicted Group Membership	
		Low Performance	High Performance
Low Performance	27 46.25%	24 88.9%	3 11.1%
High Performance	21 43.75%	5 23.8%	16 76.2%
Total	48	29	19
Hit Ratio (Percent of cases correctly classified):			83.33%
Proportional Chance Criterion:			50.78%

ratio produced by the BMDP's "jackknifed classification" procedure is 83 percent. This is clearly and significantly higher than the "proportional chance criterion" of 50.78 percent* (Hair et al., 1979). The result, therefore, provides sufficient evidence for the strong predictive accuracy of the discriminant model constructed in this section.

In summary, the research data gives strong support to Proposition II-6. As predicted, combination of environmental and organizational profile of high performing firms is indeed different from that of low performing companies. The external competitive environment and internal structure of organizations, both, have significant impact on levels of economic performance realized by businesses. This finding, furthermore, substantiates the call for integrative research models that incorporate concepts from industrial organization economics into the main stream organization theory paradigm, in pursuit of explaining business performance.

*See section I (Page 111) of this chapter for explanation and computation of this value.

The finding also has important implications concerning the two environmental variables in the final discriminant model (function). Of the two, advertising product differentiation has been objectively measured and reflects a structural characteristic of the competitive environment (industry). The other variable (i.e., perceived promotional rivalry), on the other hand, is a perceptual measure indicative of the predominant mode of conduct in the industry. As such, the latter variable represents a behavioral dimension of the competitive arena.

The first implication of the above paragraph is that, in analysis of business performance, objective environmental measures have explanatory power above and beyond that of perceptual measures. Reliance on multiple sources of data and modes of measurement, therefore, should enhance the explanatory and predictive power of the analytic models used by researchers.

The second implication is that, both, structural as well as behavioral dimensions of the competitive environment seem to be important and potentially powerful in analysis of the profitability of business enterprises. Many management researchers unfortunately fail to make distinction between the two, and consequently adopt simplified

and unidimensional concepts of competition (e.g., Neghandi and Prasad, 1971; Pfeffer and Leblebici, 1973). Such simplifications usually produce incomplete and less than adequate representations of the reality, and should be guarded against.

III. STRATEGY - STRUCTURE - PERFORMANCE:

The analysis of this set of relationships will begin with examining the manner in which certain structural dimensions of the sample companies are associated with their competitive strategies. This will be then followed by a normative study of the combination of the firms' strategic and structural characteristics that best discriminate between high and low performance firms.

A. Competitive Strategy and Organization Structure:

The view that strategy guides the choice of organization structure was first explored by Chandler (1962). But this notion has been accepted within the management discipline as an article of faith even though very narrow interpretation of the concepts of strategy and structure were used by Chandler and others following his line of research (e.g., Wrigley, 1970; Rumelt, 1974; Pavan, 1976). In their view, strategy is seen in terms of a firm's

corporate diversification strategy, and structure as the organization's functional configuration.

Fortunately, interest in the business competitive strategy and its relation to a more complete concept of structure has increased over the past several years (Miles and Snow, 1978; Montanari, 1979; Miller and Friesen, 1980). It is now becoming clear that a given business strategy is best served by certain internal organizational patterns that not only support the existing strategy but also tend to perpetuate it (Child, 1972; Miles and Snow, 1978; Bourgeois and Astley, 1979). The overwhelming consensus remains that strategic decisions take on meaning only as they are implemented through organization's structure and processes. Structure is, therefore, conceived of as a mechanism designed to facilitate strategy implementation.

The position assumed and defended in this section of the dissertation is that it is possible to characterize business organizations based on their strategic orientations and to predict with some reliability the structural attributes associated with a chosen strategy. Research propositions III-1 through III-4, advanced in Chapter Two, reflect

this theoretical position. Table 4-20 shows the correlation coefficients that bear upon these propositions.

As predicted in proposition III-1, the more emphasis the companies place on their financial status in coping with the environment, the more influence their production and financially oriented units will have in strategy formulation and deliberation processes ($r = 0.53$ and $r = 0.28$, respectively). Consistent with this set of correlations is also the negative and significant relationship of financial liquidity with the power of the foregoing units ($r = -0.24$ and $r = -0.25$). As one might expect, when companies experience more hardship due to lower financial liquidity, more influence is accrued to those units that are in the position to monitor and/or deal with such a strategic contingency.

The results discussed above confirm proposition III-1 and are in line with the conclusions reached by Miles and Snow (1978) and Hambrick (1980) in their multi-industry studies. Miles and Snow (1978) have developed a typology of firms' competitive strategies. In their typology, Defenders are the companies that compete primarily by efficiently serving a stable domain. Their strategic emphasis is on excelling at the throughout task and improving cost

Figure 4-20. Competitive Strategy-Organization Structure Correlations

	Sales & Marketing Influence	Production Influence	Engineering Influence	R&D Influence	Finance & Accounting Influence	CEO Delegation	Autonomy	Formalization	CEO Span	Decentralization	Dec. of Operative Decisions	Dec. of Marketing Decisions	Dec. of Production Decisions
OBJECTIVE STRATEGY:													
R&D/Sales	0.11248	-0.01810	0.36533**	0.45730***	-0.15579	0.02607	0.25935	0.27315	0.22573	0.05216	-0.01551	0.11670	0.01182
Advertising/Sales	0.29924*	-0.5220	-0.13421	0.11132	-0.10042	-0.12858	0.18648	0.00667	-0.12833	-0.00712	-0.02572	0.04760	0.10992
C. Assets/C. Liabilities (Financial Liquidity)	-0.12465	-0.23665*	-0.00188	0.19127	-0.24576*	-0.13721	0.07260	0.07344	0.19901	-0.32100**	-0.26122*	-0.35495**	-0.17377
Assets/Sales (Capital Intensity)	-0.13613	-0.18218	0.14729	0.09989	-0.05471	-0.12347	-0.23046	0.09402	0.44854***	-0.10191	-0.11232	-0.04430	-0.02302
Collection Period (Credit Policy)	0.09430	-0.10327	0.28456**	0.12234	0.12108	-0.04652	-0.17649	0.20898	0.22398	0.06463	0.08023	0.11909	-0.09200
Plant and Equipment Modernization	0.09753	0.10634	0.31484**	0.15533	-0.08630	0.12818	-0.06422	0.04778	0.03924	-0.13898	-0.14409	-0.12821	-0.06216
% Production Capacity Utilization	-0.04595	0.08249	0.35390**	0.21533	0.00446	0.20689	-0.13312	0.06826	-0.00802	-0.16907	-0.13635	-0.14041	-0.15763
PERCEIVED STRATEGY:													
FACTOR 1. Financial Consciousness	-0.04064	0.52752***	0.09454	0.12228	0.28481*	0.29054**	-0.13832	0.21590	-0.13109	0.13217	0.12313	0.06979	0.12720
FACTOR 2. Customer-service-based strategies	-0.01464	0.30731**	0.23227	0.10245	0.33881**	0.28450*	-0.19076	0.12365	0.08938	0.21702	0.20240	0.16006	0.08286
FACTOR 3. Production-Operations Expansion	-0.25758*	0.43098***	0.33665**	0.10074	0.25724*	0.27215*	-0.06979	-0.12097	0.05291	0.09812	0.16563	-0.06830	-0.01739
FACTOR 4. Promotional Strategies	0.06432	0.06457	-0.19278	-0.13853	0.13179	0.20148	0.18819	0.08124	-0.18428	0.13757	0.14650	0.19892	0.10462
FACTOR 5. Product Specialization	0.27700*	-0.12052	-0.02217	0.04737	-0.11739	0.25432*	0.16922	0.03202	-0.01687	-0.16823	-0.17319	-0.01124	-0.23781
FACTOR 6. Risk Reduction Strategies	0.31090**	0.25920*	-0.00927	0.04295	0.20830	0.04365	0.11266	0.28518*	-0.16659	0.23392	0.17515	0.27898*	0.17700
FACTOR 7. Market Share Expansion	0.45785***	0.26583*	-0.06340	0.10466	0.10077	0.14641	0.07540	0.10742	-0.28908**	-0.21470	-0.20100	-0.05379	-0.22535
FACTOR 8. Product Innovation	-0.03090	0.32755**	0.39437***	0.55823***	0.20144	0.15182	-0.13638	0.30236**	0.26012*	0.01651	0.05462	-0.09150	-0.07532
Low Price	0.23091	0.04117	-0.02184	-0.17626	-0.02960	-0.20124	0.01867	0.04351	-0.07032	0.05918	-0.00348	-0.04097	0.28052*
Strategic Complexity	0.27617*	0.21561	0.22578	0.03739	0.14500	0.38375***	-0.06200	0.28277*	-0.07829*	-0.02356	-0.09692	0.18136	-0.02427
*** $p < 0.01$													
** $p < 0.05$													
* $p < 0.10$													

efficiency. Therefore, consistent with their requirements for strategic success, Defenders' financial and production experts yield considerable power in the firms' dominant coalitions (Miles and Snow, 1978; Hambrick, 1980).

According to table 4-20, the correlations of Financial Consciousness (emphasis on financial factors) with the four measures of decentralization are all positive, though not statistically significant. Financial Consciousness also has a significant positive relationship with CEO Delegation ($r = 0.29$). These results, thus, fail to support the hypothesis that greater emphasis on financial factors is associated with more mechanistically designed organization structures. Moreover, table 4-20 shows another set of interesting relationships with respect to financial liquidity and measures of decentralization. All four of the correlation coefficients between these two sets of variables are negative, and three are also statistically significant. The implication of these results is contrary to what some organization theorists content. Ernest Dale (1967), for example, believes that in times of economic hardship, decision prerogatives become more centralized and company managers place staff under close scrutiny to avoid costly duplication of

functions. The findings of this research, on the other hand, suggest that companies faced with lower financial liquidity capitalize on such advantages of decentralization as unburdening of top managers, faster decision making, and improved decisions by making them closer to the scene of action.

In sum, support for proposition III-1 was mixed. The data did show that greater power of financial and production units was in fact strongly associated with greater financial consciousness of company strategists. On the other hand, the assertion that companies with greater emphasis on financial factors would be more mechanistically structured was not confirmed.

Proposition II-2 posits that the more emphasis a company places on product development and R & D activities, the more its internal structure would become organic, and the greater will be the power its technocratic and management science oriented units. No support is given to the first part of this proposition by the data. If anything, product innovation strategy appears to be associated with greater formalization of activities ($r = 0.30$) and larger CEO span of management, i.e., differentiation at the top of the organizational echelon ($r = 0.26$). The second part of the

proposition, however, receives strong backing from the data. Product innovation is significantly correlated, in the predicted direction, with the power of production, engineering, and most of all, R & D units ($r = 0.33$, $r = 0.39$, and $r = 0.56$, respectively). The trend is further echoed by the strong positive correlation of the objective measure of firms' R & D intensity (i.e., R & D expenses/sales) with the amount of influence accrued to engineering and R & D departments ($r = 0.37$ and $r = 0.46$, respectively).

The above results are strikingly similar to those of Miles and Snow (1978) and Hambrick (1980). In the context of their undertakings, the label "Prospector" describes an organization that competes primarily by engaging in substantial new product (and market) development, but pays relatively little attention to cost efficiency. The strategic requirement for success of such companies is "to attend to the output task--monitoring and adjusting products and markets (Hambrick, 1980:7)". As such, consistent with the strategic contingencies facing them, their executives' involvement in the product and market development functions were found to be positively associated with power (Miles and Snow, 1978; Hambrick, 1980). In general, therefore, a more

product innovation and R & D intensive strategic theme is indeed associated with greater power of technocratic and management science oriented organizational subunits.

Proposition III - 3 postulates that greater reliance on marketing and promotional strategies would go hand-in-hand with more influential marketing oriented functions. In support of this proposition, sales and marketing's power do show a significant and positive relationship with the objective measure of emphasis on marketing and promotional efforts; i.e., advertising expenses/sales ($r = 0.30$). However, the former variable does not correlate with the perceptual measure of the same activities. These mixed results become even more confusing when one notes the significant and positive relationships of the sales and marketing influence with other types of perceived strategies, such as product specialization ($r = 0.31$) and market share expansion ($r = 0.46$). The source of such inconsistencies mainly lies in a characteristic of the data that was also noted in section II-A (page 120) of this chapter. That is, the sample mean value for influence of marketing and sales, measured on a scale of zero to five, amounts to 4.37. As such, there is very little variation in the value of this variable. As a result, the patterns of correlations involving this variable

do not mean much and should be viewed very cautiously. Moreover, it also means that verifying the plausibility of proposition III-3 on the basis of the existing data is problematic. A safe conclusion, however, can be drawn, concerning the extent of the influence of sales and marketing, using the present data. That is that these units are almost indiscriminantly highly influential in the strategy formulation and deliberation processes of the companies that they are a part of. This conclusion is, of course, a reaffirmation of the findings of the similar studies on manufacturing firms* (e.g., Perrow, 1971, Miles and Snow, 1978: ch. 12).

Proposition III-4 states the more strategy emphasizes proliferation of a wider range of products, the wider will be the CEO's span of management and the more decentralized will be the company's structure. To test this proposition, one has to refer to the result of the factor analytic procedure that was applied to the measure of companies' perceived strategies (see pages 71-77).

Notice that in the final factor solutions, firm's emphasis

*See section II-A, page 121, of this manuscript for an explanation offered by Perrow (1971).

on "wide product range" emerged as one component of a broad and diverse strategic package, labeled as "Factor 6 Risk Reduction Strategies" (see Table 4-5, page 76). According to Table 4-20, the correlation coefficient between Factor 6 and CEO span ($r = -0.17$) does not seem to confirm proposition III-4. However, recall that Factor 6 is composed of such very diversified strategic dimensions as emphasis on a wide product range, monitoring and predicting competitors' actions, and mergers (Table 4-5, page 76). Whereas proposition III-4 is exclusively concerned with the first of the above mentioned strategic dimension; namely, proliferation of a wide product range. As such, an exclusive examination of this particular strategic attribute, as it relates to CEO span and structural decentralization is clearly necessary. The correlation coefficients obtained from such a more pertinent analysis is as follows:

	CEO Span	Decentra- lization	Dec. of Operative	Dec. of Marketing	Dec. of Production
Wide Product Range	0.26*	0.28*	0.24*	0.18*	0.17*

* $P < 0.10$

It is obvious from these results that the data does in fact provide support for proposition III-4.

In sum, therefore, the present research reaffirms the prevalent position with regards to the interdependence of strategy and structure. More specifically, the notion of "structure follows strategy" appears to be tentatively generalizable to the previously neglected concepts of business unit strategy and organization's bureaucratic attributes.

A word of caution concerning the analyses and discussions presented above is in order. That is, neither the cross sectional data used, nor the statistical mode of analysis employed in this section allow any causal interpretation of the results. Hence, any such inferences on the basis of this research may only be viewed as tentatively plausible explanations. The importance of this limitation is realized when one notes that for many of the statistically significant relationships found, two completely different scenarios based on opposite causal directions can be constructed (Child, 1972). For instance, on the one hand, a subunit's power may be a reflection of the company's current strategic direction. On the other hand, the current strategy may be reflection of the present or an earlier power pattern in the dominant coalition (Salancik and Pfeffer, 1977; Hambrick, 1980).

As important as the issue of cause and effect relationships is, a more detailed and precise analysis of it is outside the scope of this project.

B. Performance = f (strategy, organization structure):

This section focuses on testing of the proposition III-5. The following question is at the heart of this proposition. Is the strategy-structure profile of the economically successful firms significantly different from that of their less successful counterparts? That is, can membership of the companies to the high and low performance groups be largely predicted on the basis of their strategic and structural characteristics? Stepwise discriminant analysis was used to tackle this question. Specifically, the stepwise discriminant procedure of the SPSS program was applied to the standardized values of the structural and strategic variables (and factor scores). The significance level of the F-ratios for items' entry to and removal from the model was specified to be $P \leq 0.10$. The results are presented in three tables. Based on Tables 4-21 and 4-22, the discriminant function after the final step consists of a linear combination of two strategic and four structural variables, as follows:

$$D = 0.668132_9 - 0.664752_2 + 0.917602_3 - 1.108962_4 + 0.778712_5 - 0.572492_6$$

Table 4-21. Results of the Stepwise Discriminant Analysis of Strategy and Organization Structure by Firm Performance

Step Number	Name of Item Entered at Each Step	Name of Item Removed at Each Step	Wilks' Lambda	Partial F	Significance Level
1	Firm Liquidity Ratio		0.856772	7.689877	0.0080
2	Firm Capital Intensity		0.760476	7.086733	0.0021
3	Formalization		0.660217	7.548267	0.0004
4	Finance and Accounting Influence		0.577086	7.878077	0.0001
5	Production Influence		0.516699	7.857046	0.0000
6	Sales and Marketing Influence		0.439143	8.727279	0.0000
Chi-Square		Degrees of Freedom		Significance Level	
35.386		6		0.0000	

Table 4-22. Standard Discriminant Function Coefficients for the Strategy - Structure Model

Item Name	Standard Discriminant Function Coefficients	Standardized Item Mean for Each Performance Group	
		Low	High
Firm Liquidity Ratio	0.66813	-0.33027	0.42463
Firm Capital Intensity	-0.66475	0.16002	-0.20574
Formalization	0.91760	-0.27858	0.35817
Finance and Accounting Influence	-1.10896	0.23356	-0.30029
Production Influence	0.77871	-0.00520	0.00669
Sales and Marketing Influence	-0.57249	0.16638	-0.21392
Canonical Discriminant Function Evaluated at Group Means (Group Centroids)		-0.97568	1.25445

Where Z_1 = Firm Financial Liquidity Ratio (current assets/
c. liabilities),

Z_2 = Firm Capital Intensity (Assets/Sales),

Z_3 = Formalization,

Z_4 = Finance and Accounting Influence,

Z_5 = Production Influence, and

Z_6 = Sales and Marketing Influence.

The Chi-Square test of the function's overall discriminating power is statistically significant (at $P = 0.001$ level). Additional insight may be gained from table 4-21 with regards to the manner in which the strategic and structural makeup of the companies in the two performance categories are different. For example, the signs of discriminant function coefficients and the item means for the two groups suggest that higher financial liquidity and lower capital intensity are associated with high performance companies. This is precisely what was concluded in an earlier section of this chapter (section I-C, Page 105). Furthermore, as it was discussed in that earlier section, this finding also correlates the results of a number of other empirical studies (e.g. Schoeffler et al., 1974; Zeithaml et al., 1981).

Of the internal structural characteristics of the firms,

here again like in section I-C, the degree of impersonal bureaucratic controls (formalization) and the top management's power structure have emerged as the strongest discriminants. Specifically, higher values of the formalization variable are related to achievement of high levels of profitability. Also, production departments seem to portray a greater degree of influence on matters of strategic importance in the high performance companies. Whereas, the financially oriented subunits apparently have more say in the strategic decisions of the low performing businesses.

At any rate, the discriminant function derived correctly classifies about 85 percent of the sample firms into their proper performance groups (see table 4-23). This "hit ratio" needs to be adjusted downward to assess the external validity of the model (Hair et al., 1979; Klecka, 1980). The adjusted hit ratio produced by the "Jackknifed Classification" procedure of the BMDP program is presented in table 4-24. The adjusted hit ratio of 79 percent is clearly and significantly larger than the "proportional chance criterion" of 50.78 percent* (Hair et al., 1979).

*See section I (Page 111) of this chapter for explanation and computation of this value.

Table 4-23. Classification Matrix for
the Strategy-Structure Discriminant Function

Actual Group	Actual Number of Cases	Predicted Group Membership	
		Low Performance	High Performance
Low Performance	27	24 88.9%	3 11.1%
High Performance	21	4 19.0%	17 81.0%
Total	48	28	20
Hit Ratio (Percent of cases classified correctly):			85.42%

Table 4-24. Jackknifed Classification for the Strategy - Structure Discriminant Function

Actual Group	Actual Number of Cases	Predicted Group Membership	
		Low Performance	High Performance
Low Performance	27	22 81.5%	5 18.5%
High Performance	21	5 23.8%	16 76.2%
Total	48	27	21
Hit Ratio (Percent of cases classified correctly):			79.17%
Proportional Chance Criterion:			50.78%

The results, therefore, provide sufficient evidence for the strong predictive, as well as explanatory, accuracy of the discriminant model constructed.

In conclusion, the research data strongly supports the tenets of proposition III-5. As predicted, combination of strategic and structural profiles of economically successful firms is indeed different from those of less successful ones. The resulting model, therefore, reinforces the idea that business economic performance does not have a single determinant. Instead, it stems from the simultaneous interdependence of firms' strategic postures and appropriately fashioned internal structures.

C. Performance = f (Environment, Strategy, Structure):

This section is primarily concerned with proposition III-6. The first, and principal, question at the heart of this proposition is whether high and low performance firms are distinguished by a combination of their environments, strategies and organization structures. A second question involves the pattern of environmental, strategic and structural interdependencies associated with the two performance levels. To address these issues, stepwise discriminant analysis was used to derive a linear combination of variables that best differentiates the two performance groups. The

procedure was applied to the standardized values of items in all three classes of independent variables. Using the SPSS program, the significance levels of the partial F-values for items' entry to, and removal from, the discriminant function were specified at $P \leq 0.10$. The stepwise process of item selection to derive the most comprehensive model is presented in Table 4-25. According to this table the final discriminant function includes two environmental, five strategic, and four structural items. The Chi-Square test of the function's overall discriminating power is significant (at $P \leq 0.001$ level). The result, therefore, offers support for proposition III-6. As predicted, the environmental, strategic, and structural profiles of high performing firms are indeed different from those of low performing companies. Table 4-26 depicts the manner in which environments, strategies, and structures of the members of the two performance categories are different. It shows that higher values on the following independent variables generally translate into a higher profitability level: firm liquidity ratio, formalization, production capacity utilization, production influence, and industry profitability. That is, high performance firms tend to maintain

Table 4-25. Results of the Stepwise Discriminant Analysis
of Environment, Strategy and Organization Structure
by Firm Performance

Step Number	Name of Item Entered At Each Step	Name of Item Removed At Each Step	Wilks' Lambda	Partial F	Significance Level
1	Firm Liquidity Ratio		0.856772	7.689877	0.0080
2	Industry Advertising Product Differentiation		0.698842	9.696119	0.0003
3	Firm Capital Intensity (Assets/Sales)		0.592185	10.10036	0.0000
4	Formalization		0.519929	9.925897	0.0000
5	% Product Capacity Utilization		0.464790	9.672665	0.0000
6	Finance and Accounting Influence		0.419647	9.450175	0.0000
7	Production Influence		0.380966	9.285171	0.0000
8	Production and Operations Expansio		0.342221	9.370196	0.0000
9	Sales and Marketing Influence		0.294707	10.10462	0.0000
10	Industry Profitability		0.268638	10.07321	0.0000
11	Collection Period (Credit Policy)		0.247645	9.942646	0.0000
Chi-Square			Degrees of Freedom		Significance Level
56.528			11		0.0000

Table 4-26. Standard Discriminant Function
Coefficients for the Environment-Strategy-Structure Model

Item Name	Standard Discriminant Function Coefficient	Standardized Item Mean for Each Performance Group	
		Low	High
Firm Liquidity Ratio	-0.80603	-0.33027	0.42463
Industry Advertising Product Differentiation	0.54786	0.31414	-0.40390
Firm Capital Intensity (Assets/Sales)	0.76963	0.16002	-0.20574
Formalization	-0.70071	-0.27858	0.35817
% Product Capacity Utilization	-0.59450	-0.14913	0.19174
Finance and Accounting Influence	0.84884	0.23356	-0.30029
Production Influence	-1.00760	-0.00520	0.00669
Production and Operations Expansion	0.75903	0.09604	-0.12348
Sales and Marketing Influence	0.63250	0.16638	-0.21392
Industry Profitability	-0.50699	-0.26053	0.33497
Collection Period (Credit Policy)	0.37763	0.24646	-0.31687
Canonical Discriminant Function Evaluation at Group Means (Group Centroids)		1.50481	-1.93476

higher levels of financial liquidity, operate at higher capacity levels, make more use of written rules, regulations and procedures, have more influential technocratic personnel, and belong to more profitable industries.

Additionally, Table 4-26 shows that higher values on another set of internal and external attributes are associated with achievement of lower profit rates. Specifically, less successful companies appear to have the following characteristics. They are more capital intensive and place more emphasis on expansion of their production and operations. They have a less efficient and stringent credit policy. Their financial and accounting units are more influential in matters of strategic importance. Finally, they belong to more advertising intensive industries.

The above findings are, of course, very much consistent with the results obtained in the earlier sections of this chapter. More importantly, they are in agreement with other empirical evidence obtained from studies using similar concepts. For example, Child (1974) has reported a significant positive relationship between firms' return on assets and formalization of procedures for recruiting, training, job definition, performance appraisal, and wage and salary reviews. McMillan, Hambrick, and Day (1982) have recently

examined and confirmed Hofer's (1975) hypothesis that capacity utilization significantly contributes to profitability of businesses in slow growing industries. Over capacity can easily result in "cut throat" measures, such as price rivalry, that can leave the competing parties with lower profitability.

Beard and Dess (1979) found a significant positive association between firm and industry profitability indices. Also, several studies using the PIMS data base have invariably shown an inverse relationship between firm capital intensity and business performance (e.g., Schoeffler et al., 1974; Zeithaml, 1981; McMillan et al., 1982). A possible explanation is that high capital intensity makes the firm highly vulnerable to such adverse environmental trends and events as labor strikes, slower growth of the market, and disruptions of the inflow of raw materials and components. And finally, Buzzell and Farris (1977) provided evidence for the adverse effect of industry advertising intensity on companies' economic success.

Clearly, the present study is a point of convergence for many studies, including those mentioned above, with regards

to the variables under consideration.

The next step in the analysis involves assessment of the discriminatory power of the model developed. Table 4-27 presents the classification matrix constructed on the basis of the discriminant function. Obviously the function is extremely reliable to the extent that it correctly classifies about 98 percent of the sample companies into their proper performance groups.

Finally, to assess the predictive accuracy of the model, the 98 percent hit ratio is adjusted for its upward bias (Hair et al., 1979; Klecka, 1980). The adjusted hit ratio produced by the BMDP "jackknifed classification" procedure (Jennrich and Sampson, 1979) is presented in Table 4-28. The 93 percent adjusted hit ratio is clearly larger than the "Proportional Chance Criterion" of 50.78 percent* (Hair et al., 1979). The results, therefore, provides sufficient evidence for the strong predictive accuracy of the discriminant model.

In conclusion, the research data accentuates the position that neither environment, strategy, nor structure alone

*See section I-C (page 111) of this chapter for description and computation of this value.

Table 4-27. Classification Matrix for the Environment-Strategy-Structure Discriminant Function

Actual Group	Actual Number of Cases	Predicted Group Membership	
		Low Performance	High Performance
Low Performance	27	27 100.0%	0 0.0%
High Performance	21	1 4.8%	20 95.2%
Total	48	28	20
Hit Ratio (Percent of cases correctly classified):			97.92%

Table 4-28. Jackknifed Classification for the Environment-Strategy-Structure Discriminant Function

Actual Group	Actual Number of Cases	Predicted Group Membership	
		Low Performance	High Performance
Low Performance	27	26 96.3%	1 3.7%
High Performance	21	2 9.5%	19 90.5%
Total	48	28	20
Hit Ratio (Percent of cases correctly classified):		93.80%	
Proportional Chance Criterion:		50.78%	

account for difference in levels of business performance. Rather, as some have posited, the key to profitability lies in a complex network of interrelated elements (Preston, 1977; Thorelli, 1977; Caves, 1980; Lenz, 1980 a and b; White and Hammermesh, 1981). The data also challenges the appropriateness of research which employs some subset of the variables (i.e., environment, strategy, or structure) to account for organizational performance. The fields of industrial organizations, organization theory, and business policy have for too long taken separate and independent approaches to studying business organizations. The conceptual framework of each, therefore, has taken into account only a subset of the antecedents of organization performance. As such, their models often offer incomplete and less than adequate representations of the complex organizational realities. Interdisciplinary works aimed at cross-fertilization and widening of boundaries across these research traditions (i.e., IO, OT, and BP) may provide the stepping stones for moving them beyond the deficiencies of their existing models.

CHAPTER FIVE

SUMMARY AND CONCLUSIONS

The question of what determines organizational performance is of common interest to students of economics, organization theory and business policy. An overview of the directions of research in these three fields indicated that while these areas have overlapping and sometimes similar explanatory variables, they have adopted rather independent approaches to studying of organizational performance. These approaches have often encouraged a certain fragmentation in the resulting theories that makes it difficult to detect the cumulative implications of research findings of these various disciplines. It was, therefore, suggested that industrial organization economics, organization theory, and business policy have gone their separate ways for too long. There is clearly a need and considerable opportunity for cross-fertilization across these disciplinary areas. They have a great deal in common and should be exchanging theoretical frameworks and expanding their research boundaries. The study presented in this dissertation is indeed an attempt in that direction. It presented and empirically tested an interdisciplinary model of firms'

economic performance. The major feature of the integrative model of this study is that it views, in a single framework, performance as a function of the interaction of the competitive environment, business strategy, and organization structure. Furthermore, the study incorporates the IO concept of industry structure into management's strategy-structures-performance paradigm, recognizing that industry is the fundamental arena which circumscribes the behavior of business organizations. That is, there are distinguishing characteristics of industries that affect the type of external issues or problems salient to top management and the strategic and operational responses chosen to deal with them.

To designate the sample for this study, a list of 162 manufacturing companies with operations in one or at most two 4-digit SIC categories were selected from the Standard and Poor's COMPUSTAT tapes. From this list, 48 companies agreed to participate in the study and supplied the necessary information. Secondary published sources, questionnaires filled out by the chief operating officers of the companies, and the S&P COMPUSTAT tapes were the primary sources of data for the research. Multivariate statistical techniques (such as factor analysis, cluster analysis, stepwise discriminant analysis) and correlation matrices were used to prepare and analyze the data.

As predicted, it was discovered that there are indeed industry differences in types of challenges and uncertainties confronting top management. For instance, evidence seemed to support the argument that while high industry advertising outlays are instrumental to product differentiation, they may also reflect presence of fierce rivalry for market share among the competitors. As a result, competition in the industry may resemble a zero-sum game, where advertising dollars are aggressively spent to gain larger market share at the cost of competitors.

It was also found that as the structural dimensions of an industry approach characteristics of oligopolies, the dominant mode of rivalry in the industry is likely to become non-price related in general, and of marketing and promotional form in particular. Finally, some theoretical arguments suggest that firms in faster growing industries are less likely to feel competitive pressures than those in slow-growth or stagnating markets (Porter, 1980; Khalilzadeh-Shirazi, 1974). The present research, however, showed the opposite. As Caves (1972) suggests, although potentially more profitable, faster growing industries are sites of more intense rivalry.

The present research also concluded that the strategic responses that different environmental challenges elicit are quite different and vary by industry characteristics. For

example, when the industry is characterized by higher product differentiation, companies operating in it are likely to pursue expansion of their market by monitoring customer needs and tastes, enhancing the image of their product brands and spending more on advertising. Such measures are apparently aimed at increasing customers' awareness of the products and creating and maintaining customer preference and loyalty for the product brands. On the other hand, when competition is perceived to be cut-throat and price related, firms tend to adopt risk averse measures such as proliferation of a wider range of products, monitoring competitors' actions, and placing more weight on competitive pricing component of their strategic package. Faced with such competitive challenges, it is also not surprising that companies perceive promotional activities as costly and unnecessary luxuries. Instead, they tend to emphasize measures that allow them to capitalize on cost advantages that stem from economics of scale, while down playing expensive moves (such as plant and equipment modernization) that may drain the funds and adversely affect their short-term profit picture.

It is also shown by the data that rapid market growth is likely to induce firms to practice price cutting as an attractive strategy that might improve their competitive position and can ultimately lead to greater future profits.

Furthermore, companies in such markets are more R & D intensive and emphasize modernization and expansion strategies to keep up with the diverse and growing needs and demands of their markets.

The data also seems to indicate that environments characterized by more intense rivalry or/and more technological dynamism require companies to stress a more diverse set of strategic options. Apparently, rivalry and technological change imply uncertainty, dynamism, and complexity. And to the extent that dynamic and complex environments are richer in contingencies, they would appear to raise the importance of a larger number of strategic type activities (Khandwalla, 1976).

The research also contended and confirmed that different competitive environments and various strategies beget different organizational responses in terms of their internal structural attributes. The data indicated, for instance, that the degree of organizational decentralization is greater in more oligopolistic industries. It was argued that this could well be a reaction to the simultaneous presence of both uncertainty and dependence in such environments (Aldrich, 1978). As predicted, it was also found that power of organizational units is fundamentally determined by the importance of the units' tasks in dealing with the major environmental and strategic contingencies facing the

organization. This is so because first, such activities facilitate the rationalization of organizational activities while at the same time keeping organizations adaptive to their external constraints (Thompson, 1967; Galbraith, 1973). Secondly, because strategic decisions take on meanings only as they are implemented through organization's structure and processes. In short, the prevalent positions with regards to the interdependencies of environment and structure as well as strategy and structure were reaffirmed by the results.

Last but not least, the research delved into the practical implication of the external and internal characteristics of the businesses with respect to their economic performance. The findings with regards to such relationships were strikingly consistent throughout. Of the environmental variables, while industry advertising intensity and price competition were among the most detrimental, industry average profitability and market growth were the most conducive to profitability. Apparently what Aldrich (1979) calls "environmental capacity" and Pfeffer and Salancik (1978) refer to as environmental "munificence" is in fact an important dimension of organizational environment and its presence does facilitate survival of business organizations.

Of the internal properties of the sample companies, a few consistently stand out as major contributors to

financial success. Production capacity utilization is one of those. Obviously more efficient use of the facilities and equipment results in lower fixed cost per unit of the products. The impact of this variable is likely to be more dramatic in stagnant and declining markets as well as in capital intensive industries where greater utilization of the capacity gives companies a significant competitive edge over the rivals. In line with the foregoing finding and discussion is also the negative impact of capital intensity on profitability. As a barrier to entry and a deterrent to the new competition, high capital intensity was expected to be positively related to performance. However, as a source of vulnerability in hostile environments plagued with such temporary or long lasting trends and incidents as labor strikes, material shortages, and declining demands, capital intensity should have an adverse effect on performance. According to this and other studies (e.g., Schoeffler et al., 1974; Zeithaml et al., 1981), of the two scenarios just presented, the latter supercedes the impact of the former.

Another internal variable found to be strongly related to performance level was firm's financial liquidity. It is plausible to argue that since liquidity is a requirement for short-term survival of business enterprises, it must therefore be a prerequisite to their long-term success also. Such explanations with respect to this relationship, however, are very speculative. It might be just as plausible

to contend that higher liquidity is the effect, rather than cause of higher profitability. That is, relative abundance of slack resources allows more profitable firms to maintain a greatest portion of their assets in liquid forms. Resolution of this issue is beyond the scope of this dissertation and calls for longitudinal studies to deal with it.

Another significant result of this research was also that top management's power structure, as well as the organizational use of impersonal bureaucratic controls emerged as powerful discriminants between low- and high-performance groups of companies. The more technocratically oriented units seem to portray a greater degree of influence on matters of strategic importance in more successful companies. This might be because the sample for this study was strictly composed of manufacturing companies. And effective development, design, and production of products might in general be of the most crucial aspects of the operations in manufacturing industries.

An equally interesting finding was that financially oriented subunits consistently showed more say in the strategic decisions of the low-performing group. This does not necessarily imply that pervasive influence of such units causes more marginal performance. An alternative explanation is that subsequent to their weak performance, these companies become dominated by financially oriented executives who will be in charge of turning them around.

Longitudinal research designs are recommended for future research to clarify the question of causality with respect to the relationships of many of our research variables, including the foregoing two.

Among the groups of variables that need such clarifications, the following stand out. As discussed in the earlier sections, the challenges presented to the organizations by their competitive environments elicit certain strategic responses. However, the strategic options adopted by the companies also tend to change the structure of their competitive environment. For example, mergers and acquisitions on the part of companies tend to increase concentration in the industry. Longitudinal designs are needed to account for such feedback loops if existing conceptual frameworks are to be enriched.

Incorporating theories and concepts from other disciplines such as marketing into our research model is also recommended for future research. Recall that this research did not include concepts such as market share that is held by some marketing literature to be of major significance in explaining business profitability (Schoeffler et al., 1974).

This research reaffirmed the position that the environmental, strategic, and structural profile of high- and low-performing firms are different, and described what sets the two groups apart. The small research sample, the design

of the study and the limited scope of the dissertation, however, did not allow us to examine the specific nature of the "goodness of fit" between environment and strategy (or structure), as implied in the OT and BP literature. That is, this dissertation did not delve into the question of exactly what strategies or structures should be adopted under any specific set of environmental conditions. Future research is recommended to address such questions.

Business Policy and Organization Theory have only recently tapped the extensive literature of Industrial Organizational Economics. Much, however, remains to be done to create and expand rigorous integrative conceptual and empirical frameworks that encompass such relevant economic concepts as barriers to exit, threat of substitute products, power of supplier groups, power of customer groups, and so forth (Porter, 1980).

The list of the variables used in this project for development of multivariate models of firm economic performance is by no means exhaustive. Important factors such as competitive position, top management compensation, and organizational climate were overlooked because of small sample size and in the interest of the depth, as opposed to the scope, of the analysis. Attempts to incorporate such concepts into our future research models will be steps in the right direction.

Finally, firm performance and effectiveness are multi-dimensional concepts, of which profitability represents only one aspect. Further research is needed to investigate the possible implications of companies' environmental, strategic, and structural profiles for other dimensions of their performance including company growth, employee morale, adaptability, social responsiveness, and so forth.

In short, it appears that the study of organizations and their performance is striving toward the sort of synthesis presented here. The primary contribution of this research, despite its limitations, was to help us ride with and hopefully accelerate this trend.

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APPENDIX A

January 11, 1982

Dear M.:

Please take a few minutes to consider an offer you may not wish to refuse.

A research project is being conducted through the Louisiana State University Management Department that is designed to gather and analyze information concerning the competitive nature of manufacturing industries and firms' strategic responses that lead to higher performance and profitability.

If you will thoughtfully fill out the enclosed confidential questionnaire (the data will only be used in aggregate form) we will, in return, provide you with an executive summary of our research analysis and conclusions. We hope you will find the questionnaire thought provoking and the executive summary interesting and useful in your planning efforts.

Thank you for your time and we look forward to your participation in the study.

Sincerely,

Edmund R. Gray
Professor and Chairman

M. Hemmasi
Researcher

ERG:bg

Enclosure

February 5, 1982

Dear Mr.:

We hope you recall receiving a letter from us along with a copy of our Top Management Questionnaire several weeks ago. Although participation in the study has been good so far, we still need more responses to be able to perform a meaningful and objective analysis of the data. If you have not yet returned the completed questionnaire, we strongly urge you to do so. Your participation is crucial to this study and is highly valued. A second copy of the questionnaire is enclosed, just in case the first one has been misplaced. If you have, however, already sent your response, please disregard this letter and accept our gratitude.

We would like to reiterate that your response will be held strictly confidential and that we will mail you an executive summary of the research findings which, we are confident, you will find valuable in your planning efforts.

Thank you for your time and we appreciate your participation in the study.

Sincerely,

Edmund R. Gray
Professor and Chairman

M. Hemmasi
Researcher

ERG:bg

Enclosure

APPENDIX B

PLEASE NOTE:

Copyrighted materials in this document have not been filmed at the request of the author. They are available for consultation, however, in the author's university library.

These consist of pages:

188-190 : Perceived Competitive Pressures

191-193 : Competitive Weapons Questionnaire

194-195 : Autonomy and Decentralization

196-197 : Delegation of Authority

198-199 : Formalization of Role-Definition

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Interdepartmental Strategic Influence

Please rate the degree of influence that each of the following departments (or units) exerts in your company with respect to decisions of strategic importance:

	Has no influence at all			Has extremely high influence	
	1	2	3	4	5
Sales and Marketing Units	1	2	3	4	5
Production Unit	1	2	3	4	5
Engineering Unit	1	2	3	4	5
Research and Development Unit	1	2	3	4	5
Finance and Accounting Units	1	2	3	4	5

APPENDIX C

SELECTED DESCRIPTIVE STATISTICS ON RESEARCH VARIABLES

VARIABLE LABEL:	<u>N</u>	<u>MEAN</u>	<u>STANDARD DEVIATION</u>	<u>MINIMUM VALUE</u>	<u>MAXIMUM VALUE</u>
<u>OBJECTIVE STRATEGY:</u>					
R&D/S	32	3.10750	3.08851	0.00000	10.59000
ADV/S	32	3.05031	3.62420	0.10000	17.15000
C.AS/C.LI	48	2.86649	1.38320	0.91000	9.60000
ASS/S	48	74.16896	23.17490	38.18000	162.88000
COLLECTION PERIOD	48	70.34729	26.62221	8.54000	139.36000
PLANT MODERNIZATION	48	57.88979	13.01192	36.10000	90.23000
% CAPACITY UTILIZATION	48	72.10417	15.10282	30.00000	100.00000
<u>PERCEIVED STRATEGY:</u>					
FIN LIQUIDITY	47	3.68085	1.16295	1.00000	5.00000
NEW FUNDS	47	3.02128	1.05273	1.00000	5.00000
ADV. FREQ.	47	2.91489	0.97423	1.00000	5.00000
ADV QUALITY	47	3.57447	0.97233	1.00000	5.00000
COST REDUCTION	47	4.12766	0.87519	2.00000	5.00000
EMPL EFFICIENCY	47	4.19149	0.68010	3.00000	5.00000
LOW PRICE	47	3.02128	0.96660	1.00000	5.00000
HI PRICE	47	2.95745	1.02060	1.00000	5.00000
BRAND IMAGE	47	3.97872	1.17009	1.00000	5.00000
PROD QLTY	47	4.72340	0.45215	4.00000	5.00000
PRDCT WARRANTY	47	3.27660	1.11710	1.00000	5.00000
CUSTOMER CREDIT	47	3.36170	1.13109	1.00000	5.00000
CUST SERVICE	47	4.46809	0.71782	2.00000	5.00000
WIDE PROD RANGE	47	3.21277	1.04124	1.00000	5.00000
NARROW PROD RANGE	47	2.57447	1.13721	1.00000	5.00000
NEW PROD DEV	47	4.06383	0.89453	1.00000	5.00000
PROD IMPROVEMENT	47	3.63830	0.84508	1.00000	5.00000
BCKWRD INTEGRATION	47	1.95745	1.12206	1.00000	5.00000
FRWRD INTEGRATION	47	2.76596	1.27199	1.00000	5.00000
PREDICTING CUST TASTE	47	3.63830	1.07188	1.00000	5.00000
PRED COPT ACTION	47	3.46809	1.03946	1.00000	5.00000
IMPROVE PROCESS TECH	47	3.59574	0.82514	1.00000	5.00000

	<u>N</u>	<u>MEAN</u>	<u>STANDARD DEVIATION</u>	<u>MINIMUM VALUE</u>	<u>MAXIMUM VALUE</u>
INCREASE CAPACITY USE	47	3.72340	0.97138	1.00000	5.00000
EXPAND CAPACITY	47	3.04255	0.85865	1.00000	4.00000
INCREASE MKT SHRE	47	4.12766	0.74065	2.00000	5.00000
MERGERS	47	2.70213	1.19628	1.00000	5.00000
STRATEGIC COMPLEXITY	47	6.51064	3.64079	0.00000	15.00000
<u>INDUSTRY CHARACTERISTICS:</u>					
INDUSTRY ROA	48	11.05104	2.29561	6.83000	16.30000
4-CONCENTRATION	48	32.10417	17.69270	4.00000	72.00000
8-CONCENTRATION	48	45.70833	18.67067	10.00000	86.00000
SCALE ECONOMIES	48	6.10792	4.99560	0.10000	17.98000
CAPITAL REQUIREMENTS	48	163.40542	308.94087	6.25000	1887.00000
PROD DIFFERENTIATIONS	48	2.33750	2.19144	0.40000	10.20000
% INDUSTRY GROWTH	48	36.33271	21.92582	-20.31000	73.89000
<u>PERCEIVED COMPETITIVE PRESSURES:</u>					
PERCEIVED INTENSITY OF RIVALRY	48	28.52458	4.45870	15.42000	39.44000
PROMOTIONAL COMPETITION	48	3.75958	1.42422	1.41000	7.00000
SELLING AND DIST COMPETITION	48	5.21333	1.19839	2.45000	7.00000
QTY 7 VERTY COMPETITION	48	5.16646	1.15666	1.00000	7.00000
PRICE COMPETITION	48	5.04229	1.30163	1.00000	7.00000
RATE OF PROD INNOVATION	48	4.93042	1.48112	1.00000	7.00000
RATE OF PROCESS INNOVATION	48	4.41187	1.29593	1.00000	7.00000
<u>ORGANIZATION STRUCTURE:</u>					
SALES & MKTG INFLUENCE	48	4.37500	0.63998	3.00000	5.00000
PRODUCTION INFLUENCE	48	3.37500	0.89025	1.00000	5.00000
ENGINEERING INFLUENCE	48	3.18750	1.21439	1.00000	5.00000
R&D INFLUENCE	48	3.45833	1.07106	1.00000	5.00000
FIN & ACCTG INFLUENCE	48	3.35417	1.02084	1.00000	5.00000
CEO DELEGATION	48	27.10417	6.29502	16.00000	50.00000
AUTONOMY	48	20.66667	2.86084	9.00000	23.00000
FORMALIZATION	48	11.83333	3.25729	3.00000	18.00000
CEO SPAN	48	6.37500	2.96522	1.00000	15.00000
DECENTRALIZATION	48	38.85417	11.02606	9.00000	63.00000

	<u>N</u>	<u>MEAN</u>	<u>STANDARD DEVIATION</u>	<u>MINIMUM VALUE</u>	<u>MAXIMUM VALUE</u>
DECENT OF OPERATIVE DECISIONS	48	24.33333	8.16931	6.00000	38.00000
DECENT OF MKTG DECISIONS	48	6.47917	2.43196	0.00000	11.00000
DECENT OF PROD/OPER DECISIONS	48	7.70833	2.64139	3.00000	12.00000
<u>FIRM PERFORMANCE:</u>					
FIRM ROA	48	15.85354	15.81360	-14.73000	80.94000
FIRM ROE	48	24.84229	26.81340	-77.32000	103.76000
FIRM ROSALES	48	10.68229	10.68919	-13.48000	40.22000

APPENDIX D

LIST OF INDUSTRIES REPRESENTED IN THE TARGET AND RESEARCH SAMPLES

<u>SIC CODE</u>	<u>SIC TITLE</u>	No. of companies in the <u>target sample</u>	No. of companies in the <u>research sample</u>
2063	Beet Sugar	1	0
2065	Candy & Other Confectionery Products	2	0
2082	Matt Beverages	1	1
2121	Cigars	1	0
2258	Warp Knit Fabric Mills	1	0
2272	Tufted Carpets and Rugs	4	3
2282	Yarn Texturizing, Twisting and Winding Mills	2	1
2339	Women's, Misses' & Juniors' Outwear, N.E.C.	1	0
2451	Mobile Homes	5	0
2511	Wood Household Furniture, except Upholstered	1	0
2515	Mattresses and Bedsprings	1	0
2522	Metal Office Furniture	1	1
2621	Paper Mills, except Building Paper Mills	1	1
2649	Converted Paper and Paperboard products, N.E.C.	1	1
2721	Periodicals: Publishing, Publishing & Printing	1	0
2731	Books: Publishing, Publishing & Printing	5	2
2752	Commercial Printing, lithographic	1	1
2761	Manifold Business Forms	1	1
2834	Pharmaceutical preparations	5	0
2844	Perfumes, Cosmetic and other toilet preparations	5	2
2869	Industrial organic chemicals, N.E.C.	1	0
2891	Adhesives and Sealants	1	0
2911	Petroleum refining	1	0
2992	Lubricating oils and greases	1	1
3069	Fabricated rubber products, N.E.C.	1	1
3079	Miscellaneous plastics products	7	1
3144	Women's footwear, except athletic	1	0
3221	Glass containers	1	0
3253	Ceramic wall and floor tile	1	1

LIST OF INDUSTRIES REPRESENTED IN THE TARGET AND RESEARCH SAMPLES

<u>SIC CODE</u>	<u>SIC TITLE</u>	No. of companies in the <u>target sample</u>	No. of companies in the <u>research sample</u>
3292	Asbestos products	1	0
3312	Blast furnaces, steelworks, and rolling mills	3	0
3317	Steel pipe and tubes	1	0
3356	Rolling, drawing, and extruding of nonferrous metals	1	1
3369	Nonferrous foundaries (casting), N.E.C.	1	0
3343	Fabricated plat work (boiler shops)	1	1
3449	Miscellaneous metal work	1	0
3452	Bolts, nuts, screws, rivets, and washers	2	0
3494	Valves and pipe fittings	2	0
3499	Fabricated metal products, N.E.C.	2	0
3533	Oil field machinery and equipment	1	1
3559	Special Industry machinery, N.E.C.	2	2
3561	Pumps and pumping equipment	1	1
3573	Electronic computing equipment	17	6
3579	Office machines, N.E.C.	1	0
3589	Service industry machines, N.E.C.	1	0
3622	Industrial controls	1	0
3636	Sewing machines	1	0
3641	Electric lamps	2	0
3651	Radio and TV receiving sets	5	3
3661	Telephone & telegraph apparatus	3	0
3362	Radio & TV transmitting equipment	15	5
3674	Semiconductors and related devices	1	0
3675	Electronic capacitors	1	1
3679	Electronic components, N.E.C.	8	2
3699	Electrical machinery, equipment & supplies	1	0
3714	Motor Vehicle parts & accessories	4	1
3721	Aircraft	1	0
3728	Aircraft parts & auxiliary equipment, N.E.C.	1	0

LIST OF INDUSTRIES REPRESENTED IN THE TARGET AND RESEARCH SAMPLES

<u>SIC CODE</u>	<u>SIC TITLE</u>	No. of companies in the <u>target sample</u>	No. of companies in the <u>research sample</u>
3731	Shipbuilding and repairing	1	0
3811	Engineering, scientific & research instruments	2	0
3823	Industrial instruments for measurement display and control of process variables & related products	2	0
3825	Instruments for measuring & testing of electricity	3	0
3829	Measuring & controlling devices, N.E.C.	1	0
3841	Surgical & medical instruments and apparatus	6	2
3861	Photographic equipment and supplies	5	2
3911	Jewelry, precious metal	2	1
3931	Musical instruments	1	0
3951	Pens, mechanical pencils, and parts	1	1
		<u>162</u>	<u>48</u>

VITA

Masoud Hemmasi was born on November 17, 1951, in Tehran, Iran. He graduated from Tehran Business College in 1974. During his college years, he worked for the Hospital for Addicts in Tehran. He completed a Master of Business Administration degree from North Texas State University on December 1976. He received his Ph.D. from Louisiana State University, where he also taught as a Teaching Assistant and an Instructor from 1978 to 1982.

Dr. Hemmasi and his wife, Mina, and his daughter, Pegah, reside in Normal, Illinois, where he is an Assistant Professor of Management at Illinois State University.

EXAMINATION AND THESIS REPORT

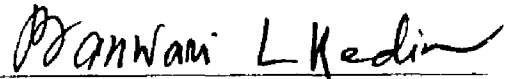
Candidate: Masoud Hemmasi

Major Field: Business Administration

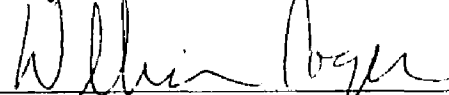
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Structure: An Analysis of Firm Performance

Approved:

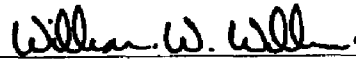


Major Professor and Chairman

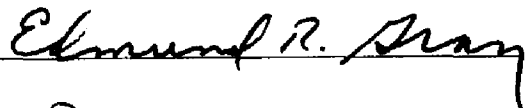


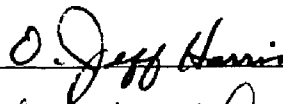
Dean of the Graduate School

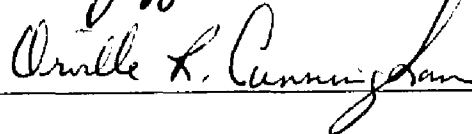
EXAMINING COMMITTEE:











Date of Examination:

April 15, 1983