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SEEING THE BIG PICTURE: THE INFLUENCE OF INDUSTRY, DIVERSIFICATION, AND BUSINESS STRATEGY ON PERFORMANCE

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Much of the strategic management literature separates industry, corporate, and business levels of analysis, and empirical studies tend to examine these levels independently, not addressing how industry context influences diversification and how diversification strategy might influence business strategies. This article examines the interactions of industry characteristics, diversification, and business strategy in an integrated framework and offers a comprehensive model illustrating how these factors combine to influence performance. We tested the model using data from a sample of *Fortune* 500 firms.

> I would say going back one, two, or three years ago, that due to the constraints of the profit-sharing and the incentive program for the divisions, we probably underinvested in our two growth businesses . . .
>
> We were doing very well but we were underinvesting in what turned out to be a very high-growth industry. We weren't putting in the marketing dollars and we weren't putting in the R&D dollars. We were growing . . . at close to 20 percent, however, the semiconductor market was growing at 30 percent. So we were losing market share and didn't know it.
>
> From *The Dexter Corporation* (White, 1979: 12–13)

The above excerpt from a well-known case study published by the Harvard Business School suggests the complexities associated with the management of large diversified firms. In this particular case, the Dexter Corporation had diversified into profitable coating and molding powder businesses that served the rapidly expanding semiconductor market but failed to make adequate investments in these businesses. As a result, Dexter's market share declined, and the company's overall performance no doubt suffered.

The strategic management literature provides less than definitive prescriptions for Dexter's managers and the managers of other diversified firms.

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Many researchers have examined the impact of diversification on firm performance (Datta, Rajagopalan, & Rasheed, 1991; Hoskisson & Hitt, 1990; Ramanujam & Varadarajan, 1989); others have studied the relationship between business strategy and firm performance (Dess, Gupta, Hennart, & Hill, 1995); and still others have sought to assess the relative contributions of industry membership, diversification, and business strategy on business-unit performance (Rumelt, 1991; Schmalensee, 1985; Wernerfelt & Montgomery, 1988). Yet none of these research streams has produced conclusive findings. We argue that definitive findings remain elusive because strategic management researchers have created a false separation among the industry, corporate, and business levels of analysis. Thus, studies fail to consider how industry context influences diversification decisions and whether or how diversification strategy might influence the formulation and implementation of business strategy.

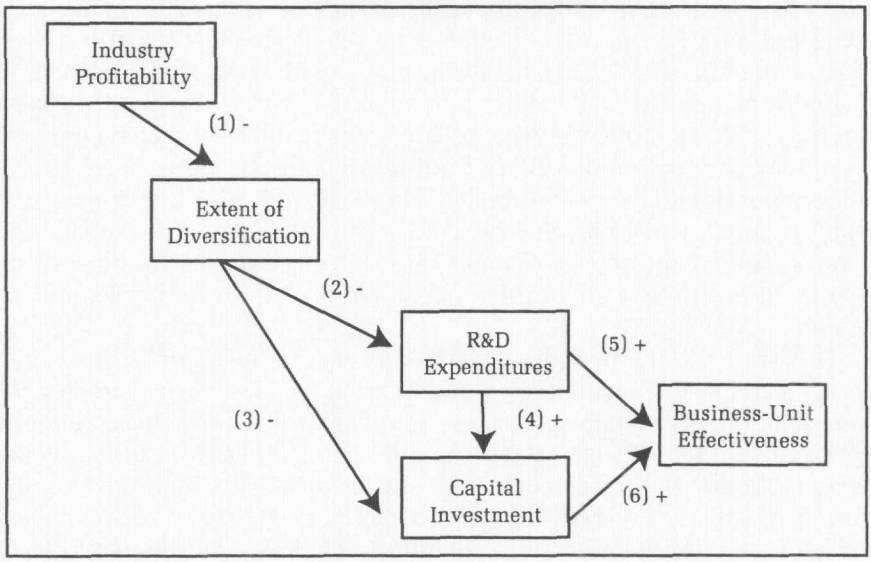
This study therefore addresses a critical gap in the strategy literature by offering a comprehensive framework that integrates industry characteristics, diversification, and business strategy and examining how these factors influence each other and overall performance levels. Like Dess and colleagues (1995), we argue that researchers can gain new insights by examining how industry contexts, diversification, and business strategy are interrelated. This approach has the advantages of addressing how environmental factors influence decisions about corporate diversification and of also recognizing that diversification strategies are likely to influence strategic decision making at the business level.

The major contribution of this study is that it explicitly addresses indirect influences on performance outcomes. For example, many studies have examined the influence of industry membership and diversification on performance outcomes, but few studies have considered or empirically tested the possibility that these factors might also have important indirect influences on performance because of their effects on the formulation and implementation of corporate and business strategies. Such an integrated perspective is consistent, however, with the conclusions of Grant, Jammine, and Thomas (1988) and of Dess and colleagues, who recently argued that most studies have examined "the relationship between strategy and performance without considering the role played by corporate strategy in creating and sustaining competitive advantage at the business level" (1995: 358).

RESEARCH MODEL

In this study, we sought to go beyond showing statistical associations among variables. Instead, we sought to explain how industry, diversification, business strategy, and performance variables are related and why certain decision and performance patterns are found. The model therefore integrates industry, diversification, and business strategy variables in a path-analytic framework (James & Brett, 1984). Figure 1 illustrates the model, and the next several sections describe the hypothesized relationships.

FIGURE 1
Research Model Showing Hypothesized Relationships among the Variables[a]



[a] Numbers in parentheses refer to hypothesized relationships.

How Industry Context Influences Diversification Strategy

Early industrial organization researchers concluded that differences in profitability across firms could be largely explained by industry membership and that industry performance levels could be explained by barriers to entry and other structural characteristics (Bain, 1956; Scherer, 1980). The most noteworthy expression of this perspective is found in an article by Schmalensee (1985) that assessed the relative influences of industry, firm, and market share effects on business unit profitability. Using cross-sectional data from the 1975 Federal Trade Commission Line of Business database, Schmalensee concluded that industry membership exerted considerable influence on profitability, but that market share and firm effects were either negligible or nonexistent.

The strategic implications of Schmalensee's findings would appear to be straightforward: Firm performance is a function of operating in profitable industries, and the way for firms to improve performance is to diversify into more profitable industries. Such a prescription certainly has some merit, and industry selection surely has the potential to exert considerable influence on performance. But Schmalensee relied on cross-sectional data analysis, so he could not consider the impact that industry profitability might have on firm-specific strategic decision making *over time*. A strategic choice perspective would suggest that firms are likely to respond to industry conditions by

adopting unique strategies and that the choice of specific strategies and the effectiveness of their implementation will lead to wide differences in firm performance outcomes, even among firms in the same industry or industries. Rumelt's (1987, 1991) research supports this view. After analyzing the rates of return of 1,292 U.S. corporations over a 20-year period, he found that "the variance in long-run profitability within industries is three to five times larger than the variance across industries" (1987: 141).

Newer thinking in industrial organization economics has begun to embrace the view that industry structure and profitability will influence firms to pursue strategies aimed at changing their competitive contexts (Cowling & Waterson, 1976; Jacquemin, 1987; Kwoka & Ravenscraft, 1986; Seth & Thomas, 1994). According to this perspective, firm strategies may actually be quite proactive. Jacquemin (1990) concluded, for example, that mergers and acquisitions should be viewed as strategies for changing market structure and improving performance and that firms will pursue these diversification activities when they confront greater competitive pressures. In an early diversification study, Christensen and Montgomery (1981) suggested that firms located in markets that constrain their growth or profitability are likely to pursue more diversification activity. Such a view echoes a hypothesis originally proposed by Rumelt, that "for a great many firms, diversification is the means employed to escape from declining prospects in their original business area. Poor absolute performance is often the result of participation in a highly competitive noninnovative slow growth industry" (1974: 82).

Rumelt's "escape hypothesis" has received very little empirical study. Some studies have examined how firm performance, rather than industry profitability, influences diversification activity. For example, Grant and colleagues (1988) concluded that low firm performance in an initial time period is associated with higher levels of diversification in subsequent time periods. Similarly, Chang and Thomas (1989) found that firms that are performing poorly tend to engage in more diversification activity but that this activity does not necessarily improve their performance.

Our first hypothesis examines the view originally articulated by Rumelt (1974) and also suggested by Christensen and Montgomery (1981) that low industry profitability will lead to more extensive diversification.

> *Hypothesis 1. The profitability of the industries in which firms compete will have a negative influence on the extent of firm diversification.*

Direct and Indirect Influences of Diversification Strategy on Performance

As the prior section suggests, few researchers have examined the question of why firms diversify or studied the direction and rate of diversification activity. Ansoff (1965) proposed that firms expand along a particular growth vector, seeking to broaden markets for existing products, develop new products for existing markets, or diversify into totally new product markets, depending on the opportunities associated with these different options. Dess

and colleagues (1995) reviewed the theoretical literature and identified four potential sources of economic benefits for diversified firms, including economies of scope, superior internal governance mechanisms, the transfer of core competencies across businesses, and the joining of complementary assets. They noted, however, that few researchers have specifically examined the benefits associated with various diversification strategies or sought to understand how diversification influences strategic decision making at the business level.

Instead, most diversification research has followed the lead of Rumelt's (1974) landmark study, examining the relationship between diversification strategy and performance. Rumelt concluded that firms pursuing related diversification strategies enjoy higher levels of performance than firms pursuing unrelated diversification strategies, and many subsequent studies have supported this finding (Bettis, 1981; Christensen & Montgomery, 1981; Gahlon & Stover, 1979; Mason & Goudzwaard, 1976; Melicher & Rush, 1973; Rumelt, 1982). These empirical studies lend support to theoretical arguments suggesting that a limited amount of diversification into related businesses can have a positive impact on performance by allowing firms to make better use of the resources of a core business (Penrose, 1959; Rumelt, 1974, 1982) or to share resources across businesses (Chatterjee & Wernerfelt, 1991; Teece, 1982; Wernerfelt, 1984; Wernerfelt & Montgomery, 1986, 1988). This line of reasoning also suggests, however, that diversification beyond some point yields fewer opportunities to achieve synergies, and extensive diversification is assumed to have a detrimental impact on firm performance. A recent study by Comment and Jarrell (1995) supports this view; those authors found that widely diversified firms that "de-diversified" enjoyed subsequent improvements in stock market performance.

Grant and his coauthors (1988) specifically hypothesized that high levels of diversification would be associated with high firm performance but that beyond some point, increasing levels of diversification would be associated with lower firm performance. Lubatkin and Chatterjee (1991, 1994) tested similar models, suggesting that single-business and unrelated diversification strategies would be associated with less attractive risk and return profiles but that related or constrained diversification strategies would be associated with more attractive risk and return profiles. These studies showed some support for the predicted curvilinear relationship between diversification strategy and firm performance. Lubatkin and Chatterjee also concluded that these relationships were temporally stable through swings in business economic cycles. Grant and colleagues noted, however, that the importance of findings about the diversification-performance relationship is tempered by the fact that diversification strategy variables tend to account for only "a small proportion of interfirm differences in profitability" (1988: 795)—a finding common to nearly all studies that have examined the relationship between diversification and firm performance (Prahalad & Bettis, 1986; Wernerfelt & Montgomery, 1988).

In spite of considerable study, however, no theoretical perspective on

the relationship between diversification strategy and performance has received unequivocal support. Although many studies have shown at least limited support for negative or curvilinear relationships between diversification and firm performance, many other studies (Bettis & Hall, 1982; Lubatkin, 1987; Michel & Shaked, 1974; Weston, Smith, & Shrieves, 1972) have shown that extensive or unrelated diversification can be more, or certainly no less, advantageous than related diversification.

Thus, the literature has so far failed to provide a definitive explanation of the relationship between strategic decision making at the corporate level and performance outcomes. Some reviews of the literature have suggested that methodological issues can explain inconsistencies in research findings. For example, Bettis and Hall (1982) concluded that Rumelt's (1974) findings may have been influenced by the high returns of the pharmaceutical firms in his sample, many of which were pursuing related diversification strategies. Subsequent studies that have controlled for industry membership have, however, revealed few new insights (Grant et al., 1988; Rumelt, 1982). Other reviews have suggested that differences in the operational definition of diversification strategy across studies may be responsible for inconsistent findings; yet regardless of the diversification measure employed, no study has demonstrated that diversification strategy explains much variation in firm performance.

A more plausible explanation for the inconsistencies among research findings may be the failure of empirical studies to explicitly address the indirect influences of diversification on performance outcomes. Many authors have implied that diversification affects performance through its impact on intervening variables, but only a few studies have incorporated such variables (Bettis, 1981; Christensen & Montgomery, 1981), and no study develops a framework or model that describes the relationships among diversification strategy, intervening variables, and performance. In short, most empirical studies have either ignored or failed to address how diversification strategy affects performance outcomes.

A key theme in the conceptual literature is the suggestion that diversification may influence performance indirectly by increasing administrative complexity and bureaucratic costs. Sutherland (1980) and Jones and Hill (1988) argued that the diseconomies associated with administrative complexity grow so quickly that they can soon overwhelm any potential economies of scale or scope offered by diversification. Moreover, as firms diversify further away from their core businesses, managers are less likely to have an intimate understanding of their firms' disparate businesses or markets. Poor decision making can follow, with lower performance levels an inevitable result. This perspective is best summarized by Grant and his coauthors, who argued that "firms face constraints on the amount of product diversity they can successfully manage" (1988: 793).

Furthermore, the financial controls employed by diversified firms may instill in business-unit managers a short-term orientation that discourages risk taking, research and development activities, and investment in new

plant and equipment (Hoskisson & Hitt, 1988). The possibility that diversification might foster a short-term, low-risk orientation has been recognized for some time now. More than 20 years ago, Bower noted that

> the risks to the division manager of a major innovation can be considerable if he is measured on short-run, year-to-year, earnings performance. The result is a tendency to avoid big risky bets . . . new developments are, with few exceptions, made outside the major firms in the industry [and] the diversified companies give us a steady diet of small incremental change (1970: 194).

The combination of administrative complexity, poor strategic decision making, and the financial controls employed by large diversified firms may lead to poor management of business units, or to underinvestment in business opportunities, or to both (Loescher, 1984). Any of these outcomes will hurt the competitiveness of a firm's business units. The scenario described here intimately links corporate and business strategies, illustrating how a firm's diversification decisions may have important impacts on the way its businesses are managed and operated.

The excerpts from the Dexter Corporation case found at the beginning of this article reflect this possibility. In this Harvard Business School case, Dexter's financial controls required all divisions to be self-supporting, and the company's incentive bonus system rewarded division managers largely on the basis of their divisions' returns on assets. Thus, division managers had almost no access to capital from outside their divisions, and every dollar spent on marketing and R&D would lead to lower bonus payments. These controls and incentives almost certainly discouraged investment in the company's high-growth businesses.

A few research studies have examined the relationship between diversification and strategic decision making at the business level. For example, Bettis (1981) and Bettis and Mahajan (1985) found that firms pursuing related diversification strategies had higher levels of advertising, R&D expense, and capital investment. Similarly, Hoskisson and Hitt (1988) found that single-business firms and firms with dominant businesses had higher levels of R&D than firms pursuing either related or unrelated diversification strategies. Hill and Snell (1989) also concluded that lower levels of diversification were associated with higher levels of R&D expense.

Thus, although most empirical studies have focused on the direct relationship between diversification strategy and performance, the conceptual literature and a few empirical studies make a strong case for focusing more attention on how diversification strategy influences decisions made at the business-unit level (Dess et al., 1995). Diversification will have a significant indirect and negative impact on performance if, as some researchers have suggested, it leads to underinvestment in new product and process technologies, thereby reducing effectiveness and competitiveness at the business level. This important possibility may well be implied in many diversification studies, but it has failed to receive adequate empirical study. To exam-

ine the possibility that diversification might have an indirect influence on performance by affecting other strategic decisions, we offer two hypotheses:

> *Hypothesis 2. The extent of diversification will have a negative influence on the level of R&D expenditures.*
>
> *Hypothesis 3. The extent of diversification will have a negative influence on the level of capital investment.*

The Influence of Business Strategy on Business-Unit Effectiveness

Success can be achieved in many ways and through the pursuit of many different strategies. For example, firms often seek to gain major market share positions in attractive industries to enhance their market power. Similarly, firms that are concerned about the long-run viability of their current markets will view diversification strategies that reduce their reliance on those markets as successful. Although the composition of a firm's portfolio of businesses may exert considerable influence on its performance, a firm's overall success will almost certainly be influenced by the effectiveness of its businesses relative to the effectiveness of their rivals. If, when compared with their rivals, a firm's businesses achieve "the greatest output for the least input" (Mott, 1972: 17; Mueller, 1990), then these businesses are likely to enjoy a considerable advantage over their less competitive rivals (Drucker, 1986).

Hayes and Abernathy (1980) and Melman (1983) argued that an emphasis on business-unit effectiveness was once deeply ingrained into American management practices. In the short run, this emphasis took the form of managing assets as efficiently as possible. In the longer run, this emphasis encouraged managers to increase labor productivity by investing in capital equipment, while also focusing on the development of new products and processes that would open new markets and reinvigorate existing ones (Hayes & Abernathy, 1980: 68). Hayes and Abernathy argued persuasively, however, that management practices in the post–World War II era, and especially during the 1960s and 1970s, tended to focus on acquisition and divestment activity and financial control and portfolio management techniques, while either ignoring or giving short shrift to effectiveness considerations.

Nearly all of the studies examining business effectiveness underscore the importance of R&D spending and capital investment in the development of new product and process technologies (Franko, 1989; Griliches, 1986; Hill & Snell, 1989). Furthermore, studies have shown wide variations in R&D spending across firms, industries, and national contexts (Hayes & Abernathy, 1980; Melman, 1983). Research suggests that although many firms tend to see R&D as a discretionary expense to be cut when sales fall below expectations, other firms see R&D as an important driver of product and process innovation. Comments by a managing director of Kawasaki Steel's research labs indicating that "we won't cut R&D unless there's absolutely

nothing else left to cut" illustrate the commitment to R&D spending among these more progressive firms (Yoder, 1987).

Griliches (1986) examined R&D spending in the United States, and Bacon and Eltis (1978) studied the impact of R&D spending on the British economy; these authors concluded that R&D, and especially spending for basic research, contributed significantly to business competitiveness. Griliches summarized his findings by noting that "the overall slowdown in the growth of R&D and the absolute decline in basic research in industry which occurred in the 1970s may turn out to have been very costly to the economy in terms of foregone growth opportunities" (1986: 153).

In what is probably the most comprehensive analysis of the relationship between R&D spending and business performance, Franko studied the competitiveness of businesses in six industries and concluded that "commercially oriented R&D activity, funded out of corporations' own resources, is an important determinant of . . . performance relative to competition in a broad range of industries" (1989: 470). He also concluded that many U.S. businesses lost their shares of worldwide markets by failing to match their Japanese and European competitors' commitment to R&D.

A number of empirical studies have examined the link between R&D spending and the development of new product and process technologies, and all of these studies have provided support for a causal relationship indicating that R&D spending generates new product and process improvements (Branch, 1973; Franko, 1989; Leonard, 1971; Mansfield, 1968; Scherer, 1976). Capital investments are then required so that firms can exploit new technologies and bring promising product innovations to market or implement cost-reducing production processes.

Investments that result in new products or improvements in production methods allow businesses to charge higher prices or enjoy lower costs than their rivals; in either case, these businesses are more effective. Process R&D and investments and improvements in production processes should lead to lower unit costs. Product R&D and investments in the development and marketing of new products and services should allow firms to charge higher prices. Thus, both cost leadership and differentiation strategies can be effective; the former increase profit margins by lowering costs, and the latter increase profit margins by allowing firms to charge higher prices for products that are perceived as unique. In fact, many different business strategies can be effective so long as they provide business units with advantages over their rivals. Furthermore, defining business-unit performance in relative terms provides a way to compare the effectiveness of cost leadership, differentiation, and other business strategies.

A perfect analogy is found in the ready-to-eat breakfast cereal industry. Kellogg and General Mills currently are often able to command prices of $4 per box or more, while comparable store brands often sell for less than $2 per box. Kellogg and General Mills probably incur higher unit costs than the store brands to pay for advertising and promotion, higher-quality packaging, and overhead (though Kellogg and General Mills probably also enjoy econo-

mies of scale that offset at least some of these higher costs). Yet the differentiation strategy pursued by both firms remains effective because the ratio of outputs to inputs generated by this strategy exceeds the ratio achieved by the store brands pursuing their low-cost strategy.

Although R&D and capital investment may not be the only two factors that contribute to business-unit effectiveness, the literature has emphasized their importance and also suggested links between diversification and these two factors. Furthermore, our framework suggests that these two factors could be the links through which diversification affects performance outcomes indirectly. We summarize relationships among strategic decision making at the business level and business-unit effectiveness in three hypotheses:

Hypothesis 4. The level of R&D expenditures will have a positive influence on the level of capital investment.

Hypothesis 5. The level of R&D expenditures will have a positive influence on business-unit effectiveness.

Hypothesis 6. The level of capital investment will have a positive influence on business-unit effectiveness.

METHODS

Time Frame and Variables

Previous studies that have examined relationships among diversification, business strategies, and performance have typically used measures that were three-, four-, or five-year averages (Bettis, 1981; Christensen & Montgomery, 1981; Palepu, 1985). However, our path-analytic framework and its hypothesized causal relationships suggested the need to test a lagged model. One disadvantage of a lagged model is that it can introduce unwanted noise into an analysis (since, as is widely known, R&D expenditures and capital investment are highly influenced by business cycles in the macroeconomic environment). Accordingly, to examine lagged effects while also minimizing the influence of business cycle fluctuations, we chose the years 1984 through 1987 as the time frame for our study. Furthermore, although much of the existing diversification literature draws on data from the 1970s—a period of business and economic volatility—the time frame covered in this study (the mid-1980s) was marked by continuous economic expansion and an absence of wide cyclical and inflationary variation. By incorporating data from a period of economic growth and relative price stability, this study provides an important addition to the strategy literature.[1]

[1] Between 1973 and 1980, sluggish economic growth held average annual increases in the gross national product (GNP) and the industrial production index to 2.3 percent and 2.9 percent, respectively. During this same period, the producer price index rose at an average annual rate of 13.8 percent. In contrast, the time frame of this study (the mid-1980s) saw GNP and the industrial production index grow at average annual rates of 4.8 percent and 4.7 percent, respectively, and the producer price index grew at an average annual rate of only about 1.0 percent.

The influence of industry membership is represented in our study by average industry return on assets for the year 1984. Our measure of industry profitability was a weighted average of the profitability of all of the industries in which our sample firms participated and was calculated as:

$$\textit{Average industry return on assets} = \sum m_{ij4} ROA_{j4},$$

where m_{ij4} is the proportion of firm i's sales in four-digit industry j and ROA_{j4} is the return on assets in four-digit industry j.

Diversification was assessed by an entropy measure used by Palepu (1985), Davis and Duhaime (1992), and many others. This continuous measure uses Standard Industrial Classification (SIC) codes to identify and evaluate the extent of diversification, and tests of its validity have supported its use (Hoskisson, Hitt, Johnson, & Moesel, 1993). The extent of diversification, assessed for the year 1985, was calculated as:

$$\textit{Diversification} = \sum [(m_{ij4}/m_{ij2})\ln(m_{ij2}/m_{ij4})]m_{ij4} + \sum m_{ij4}\ln(1/m_{ij4}),$$

where m_{ij4} is the proportion of firm i's sales in four-digit industry j and m_{ij2} is the proportion of firm i's sales in two-digit industry j.

The data used to measure R&D expense and capital investment were from the year 1986. Because R&D and investment levels differ widely across industries, we controlled for these industry differences (Dess, Ireland, & Hitt, 1990); the respective formulas for assessing levels of R&D and capital investment were the following:

$$\textit{R\&D expenditures} = R\&D_i - \sum m_{ij4} R\&D_{j4}$$

and

$$\textit{Capital investment} = \textit{capital investment}_i - \sum m_{ij4}\ \textit{capital investment}_{j4},$$

where $R\&D_i$ and $\textit{capital investment}_i$ are the ratios of R&D expense and capital investment to sales for each firm i, m_{ij4} is the proportion of firm i's sales in four-digit industry j, and $R\&D_{j4}$ and $\textit{capital investment}_{j4}$ are the mean ratios of R&D expense and capital investment to sales in four-digit industry j.

To assess business-unit effectiveness, we needed a relative measure that would not only allow evaluation of businesses' prices and costs (i.e., the value of outputs and the value of inputs), but would also address the performance of business units relative to their rivals. Because margins can vary widely across industries and because we were interested in the performance of business units relative to their rivals, we assessed business-unit effectiveness by calculating a weighted average of the operating margins of each firm's business units adjusted for industry membership:

$$\textit{Effectiveness} = \sum m_{ij4}\ (\textit{operating margin}_{ij4} - \textit{operating margin}_{j4}),$$

where m_{ij4} is the proportion of firm i's sales in four-digit industry j in 1987, $\textit{operating margin}_{ij4}$ is the operating margin for each of firm i's business units in 1987, and operating margin_{j4} is the operating margin in four-digit industry j in 1987.

Many of the variables used in this study were either industry means or were adjusted using industry means. Past studies requiring industry means have used the industry average of firms' primary or largest business units. Since conditions and performance levels can vary widely across the industries in which multibusiness firms compete, such averages are incomplete and possibly misleading for multibusiness firms. Because we constructed composite industry means that were weighted averages of all of the industries in which the sampled multibusiness firms competed, we consider our variables to more accurately reflect how our sample firms competed and performed relative to industry rivals.

Sample and Data

For the sample, we identified firms in the 1989 *Fortune* 500, eliminating firms that were privately held, acquired, or taken private during the time period of the study. Complete data were available for 160 firms. Although samples drawn from the *Fortune* 500 are certainly not representative of the entire population of business enterprises, these firms do account for very large shares of total business activity and the total population of diversified U.S.-based firms. Throughout the 1980s, the sales revenues of *Fortune* 500 firms accounted for over 40 percent of the total U.S. gross national product (Abelson & Jacob, 1989). As a result, an interest in the factors influencing the strategic decisions and performance outcomes of these large firms is certainly warranted.

We gathered all data from the COMPUSTAT database, thus insuring that industry, company, and business-unit data were comparable (Davis & Duhaime, 1992). COMPUSTAT, which is compiled by Standard & Poor's and includes accounting and financial data for over 6,000 public corporations that have their shares traded on the New York, American, NASDAQ, and over-the-counter (OTC) stock exchanges, provides aggregate data for nearly 300 industries defined by four-digit SIC code. We realize that industry is an elusive concept and that any definition is likely to have both advantages and limitations. Defining industry by four-digit SIC code does, however, avoid the pitfalls of defining industries more broadly. For the research questions raised in this study, a more narrow definition of industry provided a more conservative test of predictions than a broader definition.

The COMPUSTAT database also includes financial data on firms' business units as required by the Financial Accounting Standards Board (FASB). FASB's statement number 14, "Financial Reporting for Segments of a Business Enterprise," requires firms to report financial data on the operations of any distinct business units that represent 10 percent of the firms' overall sales revenues, operating incomes, or total assets. The 160 firms in our sample reported results for an average of approximately 750 business units during the period of this study. Standard & Poor's assigns primary and secondary four-digit SIC codes to each business unit, eliminating the arbitrariness that might be associated with researchers assigning business units to

industries for comparison purposes (for an assessment of the accuracy of these SIC code assignments, see Davis and Duhaime [1992: 512–513]).

In their evaluation of various archival data sources, Davis and Duhaime (1992) concluded that the COMPUSTAT database was a very useful but underexploited source of archival financial data for studying business and corporate strategies as well as for conducting industry analyses. Though not offering as many variables as the Profit Impact of Market Strategies (PIMS) database, COMPUSTAT does include data on a larger and more comprehensive set of firms, and by offering data for every year since 1978, it is more complete than the TRINET database. Furthermore, COMPUSTAT has the additional advantage of offering comparable data at the business, firm, and industry levels that are of interest in this study.

RESULTS

Table 1 shows summary statistics and correlations among the variables. To test the hypothesized relationships in our path-analytic framework, we employed LISREL (Anderson & Gerbing, 1988; Jöreskog & Sörbom, 1986). LISREL provides a chi-square value and three additional indices that assess the fit of path models, the goodness-of-fit index (GFI), the adjusted goodness-of-fit index (AGFI), and the confirmatory fit index (CFI). LISREL also analyzes hypothesized relationships, calculating parameter estimates and standard errors that can be used to test statistical significance.

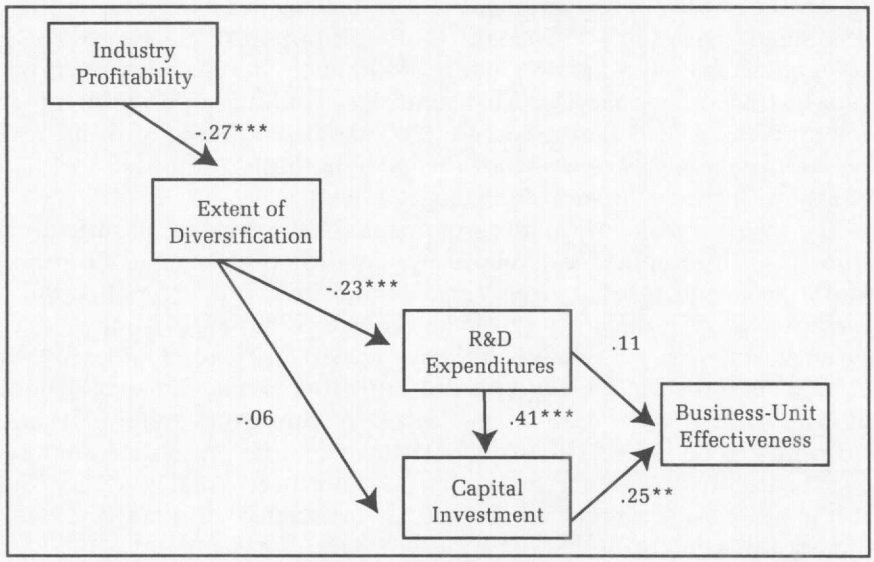
Working with observed, single-indicator variables, we proceeded to model testing directly (Bolen, 1989). The first model that was tested examined all of our study's hypothesized relationships, and the LISREL analysis of this first model produced a nonsignificant chi-square of 2.12 ($df = 4$, $p = .71$). In addition to this chi-square value, the various goodness-of-fit indices also suggested a very good fit (GFI = .99, AGFI = .98, CFI = 1.00). The analysis also provided support for four of the study's six hypotheses. Figure 2 reports parameter estimates from the analysis of this model, and Table 2 summarizes additional results of this analysis.

TABLE 1
Means, Standard Deviations, and Correlations

Variable	Mean	Standard Deviation	1	2	3	4
1. Average industry return on assets	.06	.03				
2. Diversification	.65	.47	−.26***			
3. R&D expenditures	.00	.02	.05	−.23**		
4. Capital investment	−.00	.03	.13	−.16*	.42***	
5. Effectiveness	.01	.04	.03	−.07	.21	.30***

* $p < .05$
** $p < .01$
*** $p < .001$

FIGURE 2
Path Analysis Results[a]



[a] Standardized estimates of the path coefficients are shown.
* $p < .05$
** $p < .01$
*** $p < .001$

Using the theory-trimming techniques suggested by James, Mulaik, and Brett (1982), we reanalyzed our model after removing the hypothesized relationships that were not statistically significant in the first analysis. Subsequent analysis of this revised model and its associated goodness-of-fit statistics again suggested an excellent fit ($\chi^2 = 4.43$, $df = 6$, $p = .62$; GFI = .99, AGFI = .97, CFI = 1.00).

TABLE 2
Standardized Path Estimates

Hypothesized Relationships				
Hypothesis	**Variables**	**Sign**	***b***	**s.e.**
1	Industry profitability *and* Diversification	–	–.27***	.07
2	Diversification *and* R&D expenditures	–	–.23**	.08
3	Diversification *and* Capital investment	–	–.06	.07
4	R&D expenditures *and* Capital investment	+	.41***	.07
5	R&D expenditures *and* Business-unit effectiveness	+	.11	.09
6	Capital expenditures *and* Business-unit effectiveness	+	.25**	.08

* $p < .05$
** $p < .01$
*** $p < .001$

The results provide strong support for our path-analytic model. Supporting Hypothesis 1, industry profitability exerts a strong, negative influence on the extent of diversification. The managers of firms operating in profitable industries may have many profitable opportunities to grow within these markets, but participation in less profitable industries prompts firms to diversify into other markets. This empirical finding supports arguments made by Penrose (1959) and Teece (1982) about the timing of firms' diversification decisions, as well as the "escape hypothesis" proposed by Rumelt (1974) and Christensen and Montgomery (1981).

The results also confirm our arguments for the need to empirically examine the indirect effects of diversification on firm performance. Confirming Hypothesis 2, the results suggest that higher levels of diversification are associated with significantly lower levels of R&D expense. Though the results suggest a negative relationship between diversification and capital investment (as proposed by Hypothesis 3), this link is not statistically significant. The strong, positive influence of R&D spending on capital investment (confirming Hypothesis 4) does suggest, however, that diversification has an indirect, negative influence on capital expenditures. Analyses also found that higher levels of capital investment are associated with higher levels of business-unit effectiveness, thus supporting Hypothesis 6.

Overall, the results provide very strong support for the study's path-analytic framework, according to which diversification indirectly influences performance outcomes by influencing strategic decision making at the business level. Our framework specifically implies that diversified firms may suffer lower levels of performance because they fail to make strategic investments in the development and implementation of new product and process technologies that increase business-unit effectiveness.

To offer additional support for the hypothesized indirect influence of diversification on business-unit effectiveness, as well as to test for the existence of any possible direct effects of diversification on business-unit effectiveness, we also analyzed a third model. This third model included the hypothesized indirect effects illustrated in Figure 1 but also included a direct effect of diversification on business-unit effectiveness. This model produced a good fit ($\chi^2 = 2.11$, $df = 3$, $p = .55$, GFI = .99, AGFI = .97, CFI = 1.00), but the direct effect of diversification on business-unit effectiveness was not statistically significant.

DISCUSSION

Limitations and Methodological Issues

Before discussing the contributions and implications of the study's findings, we must acknowledge its limitations. We have already described both the strengths and the shortcomings of our data and variables. Though we tried to refine and improve on past operational definitions, many of the measures still relied on SIC classifications of industries that may not reflect managers' understandings of industry boundaries. Similarly, though our di-

versification measure has been widely used in past studies, it is computed from SIC codes and sales data. Both we and other researchers (Nayyar, 1992; Prahalad & Bettis, 1986; Stimpert & Duhaime, 1997) have argued that diversification measures computed from archival SIC and accounting data may not adequately assess managers' perceptions of relatedness.

Furthermore, many of the variables in the study are difference scores, a type of computation that raises potential methodological issues. Edwards (1993) and others have described the methodological problems that can be associated with difference scores—measures created by subtracting one value from another. Expressed most plainly, the major concern with difference scores is that a researcher finding a significant relationship between a difference score and another variable cannot be sure which component of the difference score is driving the relationship.

To address this concern, we performed two additional sets of analyses to examine the impact that our differencing methods might be having on our study's results. The first test involved reanalyzing our data using unadjusted variables (i.e., R&D expense, capital investment, and operating margin rather than R&D expense, capital investment, and operating margin adjusted for industry membership). In these additional analyses, all of our study's original results were supported.

Second, using regression analysis, we focused specifically on how the separate components of our difference scores influenced other variables in our model. We first examined the hypothesized positive relationship between R&D spending and capital investment, and we then examined the hypothesized positive relationship between capital investment and our effectiveness measure. Results of these analyses indicated a positive relationship between R&D spending and capital investment and a negative relationship between industry R&D spending and capital investment. Also, we found a very highly significant and positive relationship between capital investment and margin and a positive but nonsignificant relationship between industry capital investment and margin. Thus, we were able to conclude that business-level rather than industry-level effects were the source of the support found for our hypothesized relationships.

Our own additional analyses and the work of Edwards and others suggest at least two recommendations for future strategy research. First, instead of using difference scores, strategy researchers might consider adopting the approach suggested by Edwards, which is to include both components of the difference score (e.g., a business- or firm-level variable and the industry-level variable) and an interaction term in their analyses.

Another recommendation suggested by our additional analyses is for strategic management researchers to question the customary use of difference scores. Because spending on R&D and capital investment differs widely across industries, strategy researchers have assumed that they should control for these industry differences by using difference scores (Dess et al., 1990). Our own additional analyses suggested, however, that absolute business- or firm-level values, and not industry-adjusted measures, actually influenced

outcomes. Our additional analyses suggested that absolute business- or firm-level spending on R&D may be more important and of greater interest than R&D spending adjusted for industry R&D spending. For example, a business could spend more than the industry average on R&D and look very impressive if its spending were assessed by a difference score. Yet the R&D spending of this business might be very low in absolute terms—too low, in fact, to have any significant impact on the effectiveness of the business.

Contributions

In addition to its methodological limitations and contributions, our study offers a number of significant theoretical insights. The most important contribution of this research is its empirical demonstration of how diversification strategy indirectly influences performance. The study suggests that greater diversity can lead to lower levels of R&D spending, which can lead to lower levels of capital investment. The study suggests that if unchecked, this scenario can reduce business-unit effectiveness. These results also suggest why extensive study has so far failed to find a definitive relationship between diversification and performance: The relationship between diversification strategy and performance outcomes is complex, and most empirical studies that have examined this relationship in the past have not employed models that assess the complex interactions between industry, diversification, business strategies, and performance (Dess et al., 1995; Hoskisson & Hitt, 1990: 499). We suggest, however, that the research framework offered in this article goes a long way toward providing a more complete picture of how industry characteristics, diversification, business strategy, and performance are related. Here, we offer a number of additional observations about our study's findings that we deem noteworthy.

Industry influences. First, this study provides empirical confirmation of the long-standing hypothesis that industry profitability is an important influence on firms' diversification decisions. The study finds that firms operating in less profitable industries are likely to become more diversified. Firms operating in such industries may conclude that they have no choice but to diversify, and such a strategy would seem difficult to criticize.

One of the article's reviewers reminded us that the study by Bettis and Hall (1982) determined that Rumelt's original (1974) findings may have been biased by the presence of pharmaceutical firms in his sample. This reviewer questioned whether our findings might also be influenced by industry membership, specifically, whether our results would differ for more and less capital-intensive industries. To address this issue, we calculated a fixed-to-total-assets ratio for the firms in our sample to distinguish between more and less capital-intensive firms. We found that the mean fixed-to-total-assets ratio for the firms in our sample was .51. We then split our sample firms into two subsamples, one composed of firms with fixed-to-total-assets ratios above the mean and the other composed of firms with fixed-to-total-assets ratios below the mean, and analyzed the data for each subsample.

The results of these analyses were interesting in two respects. First, all

the relationships supported by analyses of our complete sample were also supported in the analyses of the two subsamples, allowing us to conclude that our findings were generalizable across the population of the largest industrial firms. At the same time, however, the relationships were stronger in the subsample of less capital-intensive firms, those with fixed-to-total-assets ratios below the mean. This finding suggests that an interesting avenue for future investigation would be to study how more and less capital-intensive firms differ, especially in terms of the factors that influence decisions about R&D and capital investment.

The factors influencing performance outcomes. Schmalensee (1985), Wernerfelt and Montgomery (1988), Rumelt (1991), and McGahan and Porter (1996) all examined the relative influence of industry membership, diversification (or corporate effects), and business strategy on business-unit performance outcomes. The more recent studies by Rumelt (1991) and McGahan and Porter (1996) demonstrated that much of the variance in overall performance levels could be traced to business-level effects and that industry membership and corporate parentage had significantly less impact on performance outcomes.

The current study's results provide additional support for a strong relationship between business-unit strategy and effectiveness, but the study also suggests that researchers cannot consider industry membership, diversification, and business strategy influences on performance in isolation without also considering how these factors are interrelated. Our findings suggest that performance is more likely to be a function of relationships among factors found at multiple levels of analysis and less likely to be a function of any single influence or set of influences.

Indeed, by considering how factors at various levels of analysis are interrelated, this study helps to reconcile some of the conflicting results of previous diversification studies. As already noted, a number of studies have found that firms pursuing related diversification strategies enjoy higher performance than firms pursuing unrelated diversification strategies. Yet other researchers have demonstrated that many widely diversified firms are very successful.

Instead of focusing on the direct relationship between diversification strategy and performance, our study suggests the importance of embracing a third perspective: that diversification influences performance indirectly by influencing strategic decision making at the business level. Such a perspective could go a long way toward explaining inconsistencies in studies examining the relationship between diversification strategy and performance and the failure of any study to demonstrate that diversification strategy is a major direct influence (either positive or negative) on performance (Prahalad & Bettis, 1986). This perspective is also consistent with the conclusion of Dundas and Richardson (1982) that successful diversified firms employ "critical contingencies," including policies governing acquisition, divestment, and other decisions, that contribute to successful implementation of their diversification strategies. In addition to the policies described by Dun-

das and Richardson, do these successful, highly diversified firms also defy the trends observed in this study and spend more on R&D and invest more in product and process technologies? Are higher levels of R&D and capital investment key success factors for both highly diversified and less diversified firms? These are questions to be addressed by future research.

The relationship between diversification and R&D spending. Another important question this study raises is why higher levels of diversification are associated with lower levels of R&D spending. As already noted, Hoskisson and Hitt (1988) argued that the structural characteristics of large diversified firms contribute to a short-term, low-risk orientation among managers. Such an orientation focuses more resources on sure bets than on riskier projects with less predictable outcomes. Yet the choice of organizational structure does not offer an entirely satisfying explanation for lower levels of R&D spending. We see little evidence suggesting, for example, that multidivisional structures or conglomerate organizations negatively influence the levels of R&D spending and capital investment among Japanese firms, even though nearly all diversified Japanese firms have adopted the multidivisional structure (Suzuki, 1980). Ito (1995) suggested that Japanese firms may cope with the challenges of managing diversification by spinning off businesses that are incompatible with their parent firms. He reasoned that once divorced from their parent companies, these spin-offs may be quite effective at developing competencies and competing in their respective markets. Ito concluded that Japanese firms appear to be less interested than Western firms in developing collections of different competencies and may seek instead to create families of companies, each with its own R&D program, competencies, and supporting resources.

An important extension of our study would be a test of our model in an international context in which the effects of both product-market and international diversification on business strategy and firm performance are considered. Such a study would not only extend the findings of our investigation, but would also help to link its findings with the studies of Grant and his coauthors (1988), Suzuki (1980), Franko (1989), and Ito (1995), all of whom considered many related issues in an international context.

The role of research and development. That R&D is positively associated with a firm's level of capital investment (supporting Hypothesis 4) but is not directly associated with business-unit effectiveness (therefore failing to support Hypothesis 5) seems reasonable in retrospect. Research and development is speculative; many ideas may be investigated, but only a few become viable investment opportunities. Although R&D is clearly needed to identify these viable investment opportunities, not all R&D activity will lead to improvements in business-unit effectiveness. Those projects that do receive capital investment should, however, lead to improvements in effectiveness. This line of reasoning raises provocative questions about the productivity of R&D activities and how this productivity can be improved.

Hambrick and MacMillan (1985) examined the factors that promote the conversion of product R&D spending into near-term new product sales. They

found that a number of contextual factors, including the rate of growth in the market for a new product and firms' past experiences in innovative contexts, contribute to R&D productivity. They also found that market share and R&D productivity are inversely related. Their study and the results of our study invite further research. For example, Hambrick and MacMillan's study did not address why firms with larger market shares are less innovative, nor did it address the factors that contribute to the success of process R&D efforts.

The importance of business-unit effectiveness. Finally, this study suggests that the relationships among R&D, capital investment, and business-unit effectiveness deserve more attention from researchers and managers. The results of this study suggest that the failure to make continuous improvements in business-unit effectiveness may be at the heart of many firms' problems with competitiveness, and these concerns may be even more significant for the large diversified firms that dominate the economic landscape. Yet, in spite of this importance, few studies in the strategic management literature investigate business-unit effectiveness issues.

CONCLUSION

In conclusion, this study suggests that the sources of competitive advantage that are responsible for high performance may lie more in the complex relationships among factors found at multiple levels of analysis than in any single factor or set of factors found at only one level of analysis. This study supports the view that competitive advantage results from a series of connected decisions (Grant et al., 1988). Industry characteristics influence the selection of a particular product-market portfolio, which in turn influences the acquisition of strategic factors that result from R&D expenditures and capital investments (Barney, 1986; Dierickx & Cool, 1989).

Over time, a successful firm may decide to participate in certain market segments and then proceed to develop unique stocks of strategic assets that provide for and sustain the firm's competitive advantage in those markets. This study suggests that more extensive diversification is associated with reductions in R&D spending that in turn lead to lower levels of capital investment and business-unit effectiveness. As a consequence, diversification may thwart the process of asset stock accumulation that is associated with the development of competitive advantage and high levels of performance. A very worthwhile challenge for future research is to develop a richer explanation of how streams of decisions about industry membership, diversification, and business strategy converge and interact to influence performance outcomes.

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