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RESEARCH NOTES AND COMMUNICATIONS

HOW MUCH DOES INDUSTRY MATTER? AN ALTERNATIVE EMPIRICAL TEST

THOMAS C. POWELL
Bryant College, Smithfield, Rhode Island, U.S.A.

Empirical studies using Federal Trade Commission Line of Business data have reported that industry membership explains between 17 percent and 20 percent of financial performance variance among firms. This study attempts to replicate these findings using an alternative sample and a methodology based on executives' perceptions. The results support those reported in previous studies, with industry factors explaining about 20 percent of overall performance variance. Moreover, the analysis produces empirically derived industry factors, and examines their relative power in explaining industry performance variance.

Industrial organization economics and strategic management research have traditionally produced competing explanations for the persistence of unequal returns. The former, following the structure–conduct–performance (SCP) model developed by Mason (1939) and Bain (1956), has focused on industry-based explanations such as concentration and entry barriers, whereas strategic management has emphasized within-industry and firm-specific factors. The resource theory of the firm has attracted particular interest in recent years, asserting that unequal returns persist when impediments block the flow of advantage-producing, idiosyncratic resources (Rumelt, 1984; Mahoney and Pandian, 1992; Peteraf, 1993).

Although economics and strategy have shown signs of convergence in recent years (for a review and integration, see Teece, 1990), strategy's firm-level focus remains one of its most distinguishing characteristics. According to Rumelt (1991: 167):

> The field of business strategy offers a contrary view: it holds that the most important impediments *are not the property of collections of firms*, but arise instead from the unique endowments and actions of individual corporations or business-units. If this is true, then industry may not be the most useful level of analysis.

Because monopolies are scarce and closely observed, few firms can claim industry membership as a unique, advantage-producing endowment. Nonetheless, industries do compete with one another for capital and other resources that, under some conditions, may potentially endow incumbents in some industries with sustainable, albeit shared, advantages. Industry's precise role is, of course, an empirical question, and an important one in strategy research. As Rumelt (1991) suggests, 'there should be considerable interest in the relative sizes of inter-industry and intra-industry dispersions in long-term profit rates' (1991: 167).

Just how important is industry membership relative to firm-specific resources? Three well-known studies have examined this issue (Schmalansee, 1985; Wernerfelt and Montgomery, 1988; Rumelt, 1991), and have produced consistent findings, with industry explaining between 17 percent and 20 percent of financial performance variance. Still, this line of research would benefit from additional empirical work, for two reasons. First, the previous studies derived similar results because they applied similar research

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methodologies to the same 1970s Federal Trade Commission Line of Business (FTC LB) data—not only do the studies not represent independent trials, but the FTC LB data base has several nontrivial measurement and external validity problems, as we will show. Second, although the studies did examine interindustry profit dispersions, none of them examined the specific industry factors that may account for whatever power industry may have as an explanatory variable. As such, these studies would benefit from corroboration and elaboration in research using alternative methodologies.

The study reported here employs perceptual industry and performance measures, and a new data base composed of undiversified firms of varying sizes and ownership structures, to investigate both the power of industry factors in explaining firm performance variance, and the contributions of specific industry factors. Despite the methodological differences, the findings here support those reported in the earlier studies, with industry factors explaining about 20 percent of overall performance variance. Moreover, the analysis identifies three independent, empirically derived industry factors, and examines their relative power in explaining industry performance variance.

PRECURSORS

In the early empirical development of industrial organization economics, numerous studies investigated the factors that explain why some industries consistently outperform others (see reviews in Weiss, 1974; and Scherer, 1980). Following the traditional SCP model, these studies assumed that industry factors determined performance and evaluated the relative explanatory power of industry variables such as product differentiability and market concentration. Not until Schmalansee's (1985) study did researchers begin to investigate systematically the extent to which industry factors as a whole explained overall performance variance among firms.

Schmalansee's findings stimulated a reevaluation of the role of industry factors in explaining business performance. Using 1975 FTC LB data, Schmalansee reported that industry membership accounted for 19.6 percent of observed variance in business unit returns. In a follow-up study using 1976 FTC LB data and Tobin's q as a performance measure, Wernerfelt and Montgomery (1988) derived comparable results, with industry effects explaining 19.5 percent and 12.3 percent of total variance, depending on the asset valuation method employed. Using FTC LB data for 1974–77, Rumelt found that industry membership explained 17 percent of business unit returns, but that only about half this proportion was stable from year to year, with long-term industry effects accounting for 8 percent of overall variance.

Schmalansee concluded that his findings supported the traditional industry-centred economic view, since none of the corporate effects he studied explained significant variance in business-unit returns. Nonetheless, the remaining 80 percent of unexplained performance variance suggested the existence of nonindustry variables not explored in his research. Rumelt's longitudinal approach helped to clarify this issue, with 46 percent of the 83 percent unexplained variance in the 4-year FTC data attributable to stable firm-level effects. The author concluded that 'stable business-unit effects are six times more important than stable industry effects' (1991: 168).

Hansen and Wernerfelt (1989), using a sample of 60 *Fortune* 1000 firms, found that 'economic factors'—which included industry, market share, and firm size effects—explained about 18.5 percent of variance in business unit returns. This study also investigated 'organizational factors' such as goal emphasis and human resources emphasis, finding that these factors explained about 38 percent of performance variance, or roughly twice that of the economic variables.

Although these findings generally support the strategic management view, there are sound reasons to seek additional corroboration. First, as noted earlier, the Schmalansee (1985), Wernerfelt and Montgomery (1988), and Rumelt (1991) studies do not represent three independent data points, but one, since they used similar statistical procedures in analyzing the same data—their results varied, but due mainly to adjustments in time periods and performance measures. Since their conclusions rely almost entirely on the integrity of the FTC LB data base, the data base itself merits further scrutiny.

In examining industry phenomena, one might hope to gather reliable financial data from a representative sample of undiversified firms com-

peting in a group of more or less representative and meaningful industries. Unfortunately, the FTC LB data meet none of these criteria, consisting only of very large SBUs held by even larger diversified corporate parents, and excluding from the sample universe the vast majority of firms found in the general population, namely all small firms, all privately held firms, nearly all service firms, and importantly, all freestanding single- and dominant-business firms. Since only freestanding undiversified firms conduct strategy and report performance without corporate entanglement, it is unclear whether a data base that systematically excludes these firms has sufficient external validity, in the absence of further corroboration, to warrant paradigm-level conclusions.

Corporate accounting distortions impede the meaningful interpretation of FTC LB data. The FTC LB reporting program, which began in 1974 as an attempt to enable FTC statisticians to analyze industry aggregates, initially seemed suitable enough for studying industry phenomena, since it provided masses of quantitative financial information organized by 4-digit SIC code. However, the program—which required 450 diversified manufacturers to report detailed financial results for over 4000 SBUs—met with bitter industry resistance, and it remains unclear whether the parent companies have provided information under a standard anywhere approximating generally accepted accounting standards, or even if it was possible for them to do so in light of shared overhead, transfer payments, capitalization of merger costs, and other corporate accounting distortions. According to Scherer (1980: 273):

> When the profits of a corporation are broken out into more narrowly defined industry segments, as for the PIMS data and the Federal Trade Commission Line of Business reporting program, a certain amount of arbitrariness in allocating common costs—e.g. the costs of maintaining a central office, joint sales forces, and broad-ranging basic research—is inescapable. Distortions may also arise through the setting of arbitrary interdivisional transfer prices.

Another problem in analyzing FTC LB data concerns potentially significant inconsistencies between accounting and economic rates of return. The justifications for industry-based performance variances are essentially economic—long-run differences in economic return rates should vanish in the absence of market power. However, ratios derived from firms' financial statements do not necessarily serve as proxies for the economic rate of return, i.e., the discount rate that equates the present value of the firm's net revenue stream to its initial outlay. According to Fisher and McGowan (1983: 83):

> Only by accident will accounting rates of return be in one-to-one correspondence with economic rates of return. . .The theoretical effects are not so small that they can be neglected in practice. Indeed, they are very large. A ranking of firms by accounting rates of return can easily invert a ranking by economic rates of return.

A further problem in analyzing the FTC LB data concerns interindustry comparisons of accounting-based performance measures. Aside from the debate over whether accounting profits measure economic rents, industry-based contextual factors and accounting conventions—including industry age and maturity (e.g., industries with valuable real assets carried at historic cost), industry-standard depreciation and inventory valuation methods, industry capital intensity, and industry advertising and R&D intensities—make accounting-based return on assets measures nearly impossible to compare meaningfully across industries. This problem is compounded further by intraindustry inconsistencies in accounting policies and practices.

The FTC LB data also suffer from the problems inherent in defining industries using 4-digit SIC codes. Some 4-digit codes identify exceedingly narrow industry niches. More often, they aggregate firms that do not compete at all, sharing little in common save having been classified together, often under 4-digit 'NEC' codes, i.e., not elsewhere classified. As such, there is little consistency in breadth or definition from one code to the next, with only a few codes corresponding with any informed person's notion of actual industry competition. Although these data might suffice for some researchers' purposes, they seem problematic for research where industry effects are themselves the subjects of investigation. Schmalansee and Rumelt apparently recognized this problem, excluding 16 SIC 'industries' that, according to Schmalansee (1985: 345) 'seemed unlikely to correspond even approximately to meaningful markets.' But the samples still included 242 of the 261 FTC manufacturing classifications.

The previous studies did not create the FTC data base and are not responsible for its problems, nor are these critiques intended to challenge these studies' obvious importance in strategy research. The critiques do, however, call into question the external validity of the FTC LB data base, and suggest that the problems justify empirical replications using alternative methodologies and samples more nearly representative of the U.S. business landscape.

HYPOTHESES

This study employs a methodology based on executives' perceptions of industry factors and financial performance. Perceptually based research is rare in industry studies, but executive perceptions have been used extensively in organizational research, and their use has been justified elsewhere (e.g., Lawrence and Lorsch, 1967; Powell, 1992). Although executives' perceptions do not necessarily parallel objective measures of corresponding phenomena (Tosi, Aldag, and Storey, 1973), perceptions may be more discriminating than objective measures (Reger and Huff, 1993), and they almost certainly have more influence on executive decisions (Starbuck and Milliken, 1988). In a study comparing economically and perceptually derived strategic groups, Reger and Huff (1993: 120) concluded that 'Managers group firms in subtle ways not captured by economically-oriented research,' and found not only a strong uniformity of strategic groupings by executives across firms, but also that these perceptual groups explained significant performance differences.

Because executives' perceptions influence organizational behavior, they are an important organizational variable in and of themselves. Of course, executives do make mistakes and perceive the same phenomena differently (Starbuck, 1985), but 'perception' does not necessarily equate with 'bias.' Indeed, one could argue that executives' biases do not exceed those embodied in accounting reports or 4-digit SIC codes, which contain the incontrovertible biases and distortions previously discussed. Moreover, executives have the greater motivation for accuracy, given the stakes involved in understanding their own relative performance and competitive positioning.

The hypotheses in this study address differences in financial performance across industries, and were derived from the studies by Schmalansee (1985), Wernerfelt and Montgomery (1988) and Rumelt (1991). This research does not investigate corporate-level or SBU-level effects, as in some earlier studies, but addresses specifically the partitioning of financial performance variance across industries. As such, the first two hypotheses predict, based on the earlier studies, that all industry factors combined will explain a significant proportion of overall financial performance variance, separating the components into their main and interaction effects:

> *Hypothesis 1: Industry factors (main effects) explain a significant proportion of overall financial performance variance.*

> *Hypothesis 2: Interactions among industry factors explain a significant proportion of overall financial performance variance.*

The earlier studies found that, although industry differences explained significant performance variance, they left at least 80 percent of total performance variance unexplained. Therefore, notwithstanding H1 and H2, the third hypothesis predicts that industry factors will leave more variance unexplained than explained:

> *Hypothesis 3: Industry factors leave more financial performance variance unexplained than explained.*

SAMPLE

The researchers designed a survey- and interview-based methodology intended to measure executives' perceptions of industry factors and financial performance. The research proceeded in two phases. In the first phase, the researchers developed and pretested industry and financial performance measurement scales and, using guidelines established in Dillman's (1978) Total Design Method, sent a mail survey to the top executives of all single-business firms with 50 or more employees headquartered within selected zip codes in the northeastern U.S.A., a total of 143 firms. Three follow-up mailings were sent to each firm. In the second phase, the researchers selected 23 additional single-business firms, located out-

side the original zip codes but within the northeastern U.S.A., for in-depth personal interviews and site visits. Although the firms in this convenience sample were chosen partly based on proximity to the researchers, they were not chosen as to industry, and competed in a variety of manufacturing and service industries. The CEOs of these firms were contacted personally and, during these interviews, were asked to complete and return the survey.

Of the 143 surveys mailed in the first phase, 40 were returned, 36 of which were complete, for a usable response rate of 25.2 percent, compared with response rates of 28 percent in two recent studies using survey methodologies (Gomez-Mejia, 1992; Zahra and Covin, 1993). Of the 23 surveys distributed during the second phase, 19 were returned, 18 of which were complete, for a usable response rate of 78.3 percent. The response rate was higher in the second phase because the CEOs had been asked personally to return the surveys. The combined usable response rate for both phases of the research was 32.5 percent (54 responses from 166 surveys), and the sample size is comparable to that obtained by Hansen and Wernerfelt (1989).

Of the 54 respondents, 15 were publicly held (28 percent), which slightly overrepresented publicly held firms among all firms located in the selected zip codes. Exactly half of all respondents (i.e., 27) were manufacturers and the other half service firms, and the industries represented included computers, consumer products, semiconductors, industrial products, insurance, retail, health care, and telecommunications. Annual median sales among sample firms was $136 million, and the median number of employees was 750. Although median firm size in the sample was larger than the median among all firms in the selected zip codes, this result had been expected due to the artificial size minimum employed in the sampling procedure. These medians closely approximated those reported by Powell (1992) and Zahra and Covin (1993) using similar sampling procedures but, as expected, were significantly smaller than those found in data bases that include diversified corporations (such as the *Fortune 1000*), or include only SBUs (such as PIMS and the FTC LB data base).

In the cover letter, the researchers requested that the survey be completed either by the CEO or another senior executive. All of the personal, on-site interviews included either CEOs or other senior executives and, in follow-up phone calls to a random group of 10 survey respondents, all 10 surveys had been completed by CEOs or senior executives.

During the site visits, six firms were asked to complete two surveys per firm to establish interrater reliability, and four firms responded. Among these respondents, the intrafirm correlations for the 92 survey items ranged between 0.65 and 0.82, with a mean correlation of 0.74, compared to a mean of 0.22 for interfirm responses. Moreover, 76 percent of all intrafirm responses (210 of 276) fell within a single point of one another on the 5- and 6-point scales employed, compared with the 55 percent (152 of 276) that would be expected by chance. Although the firm sample was small, these statistics supported a presumption of interrater reliability in the surveys.

MEASURES

To measure industry effects, the researchers developed an initial list of factors based on Porter's (1980) industry analysis framework, and Scherer's (1980) reviews of empirical findings in industrial organization economics. The list was modified and refined through further discussions with economists and strategic management scholars, resulting in a final list of 16 variables. This list included direct measures for the five industry forces cited by Porter (entry barriers, competitive rivalry, etc.), plus subvariables identified by Porter as potential influences on these forces (e.g., industry maturity and excess capacity, which impact competitive rivalry), and measures for the industry variables most frequently studied in the economics literature (e.g., industry concentration, advertising intensity and R&D intensity).

These 16 variables were then framed as survey questions, as shown in Appendix 1. (Their intercorrelations are shown in Appendix 2.) A factor analysis of the responses to these 16 survey items produced six industry factors with eigenvalues exceeding one. Based on the underlying component variables, the researchers labeled these factors Industry Maturity, Entry Barriers, Competitive Power, Switching Costs, Technological Change, and Competitive Rivalry. The loadings and eigenvalues for these factors are shown in

Table 1. Cronbach alpha coefficients (Cronbach, 1951) were then computed to test the reliability of the resulting scales. Although no precise ranges exist to evaluate Cronbach's alpha, Van de Ven and Ferry (1979) recommended an acceptable range of 0.35–0.90, depending on the breadth and complexity of the variable. The coefficients for the first three industry factors fell between 0.65 and 0.75, which, given the breadth of the factors, were taken as adequate to constitute meaningful industry factors. However, the coefficients for factors four and five fell below 0.60 and alpha could not be computed for the single-item factor six. A scree curve analysis (Kachigan, 1982) suggested that the eigenvalues and explained variance began to level after the third factor. Factors four through six were therefore incorporated into the first three factors based on their second-best factor loadings (producing the same result as if three factors had been forced in the original factor computations). The Cronbach coefficients were then recomputed for the first three factors, and were found to be acceptable, as shown in Table 1. The final three factors—labeled Industry Maturity, Entry Barriers, and Competitive Power—were used in the subsequent hypothesis testing.

Overall financial performance was measured using three survey questions (and a Likert-type 1–5 scale), addressing 3-year profitability, sales growth, and overall financial performance. Subjective performance measures are widely used in organizational research (Dess, 1987; Powell, 1992) and, as noted earlier, provide an alternative to the accounting measures employed in earlier

Table 1. Factor analysis

Rotated factor matrix: Varimax

		1	2	3	4	5	6
X_1	Entry barriers	0.06	**0.83**	0.12	0.09	−0.02	−0.09
X_2	Incumbent advantages	0.03	**0.85**	0.15	0.02	−0.22	−0.08
X_3	Economies of scale	0.41	0.43	0.27	**0.48**	−0.34	0.30
X_4	Industry concentration	−0.08	**0.50**	−0.22	0.02	0.20	0.44
X_5	Customer loyalty	0.13	0.32	0.20	**0.74**	0.04	−0.09
X_6	Intensity of competition	−0.02	−0.04	−0.30	−0.06	0.07	**0.85**
X_7	Advertising intensity	0.30	0.35	0.03	**0.71**	−0.32	0.16
X_8	Demand growth	**−0.79**	0.21	0.19	0.25	0.44	0.08
X_9	Innovation/R&D intensity	−0.46	−0.23	−0.02	−0.37	**0.48**	0.16
X_{10}	Excess capacity	0.31	−0.27	**−0.58**	0.00	0.12	0.08
X_{11}	Industry maturity	**0.81**	−0.08	0.05	0.12	−0.43	0.11
X_{12}	Rate of technological change	**−0.65**	−0.15	−0.07	0.07	0.59	0.08
X_{13}	Power re. suppliers	0.24	0.13	**0.57**	−0.05	−0.05	0.02
X_{14}	Power re. customers	0.07	−0.21	**0.59**	0.18	0.08	−0.28
X_{15}	Threat of substitutes	0.30	−0.18	**−0.71**	0.39	0.00	0.09
X_{16}	Industry stability	0.34	0.12	−0.03	−0.09	**−0.85**	−0.09
Eigenvalues		2.76	2.45	1.58	1.49	1.31	1.18
Proportion of variance explained		0.164	0.144	0.093	0.088	0.077	0.070
Cumulative variance explained		0.164	0.308	0.401	0.489	0.566	0.636

Initial factors

1 Industry maturity: $X_{11}(+)$, $X_8(-)$, $X_{12}(-)$
2 Entry barriers: $X_2(+)$, $X_1(+)$, $X_4(+)$
3 Competitive power: $X_{15}(-)$, $X_{14}(+)$, $X_{10}(-)$, $X_{13}(+)$
4 Switching costs: $X_5(+)$, $X_7(+)$, $X_3(+)$
5 Technological change: $X_{16}(-)$, $X_9(+)$
6 Competitive rivalry: $X_6(+)$

Factors for hypothesis testing

$f1$ Industry Maturity ($\alpha = 0.69$): $X_8(-)$, $X_9(-)$, $X_{11}(+)$, $X_{12}(-)$, $X_{16}(+)$
$f2$ Entry Barriers ($\alpha = 0.65$): $X_1(+)$, $X_2(+)$, $X_3(+)$, $X_4(+)$, $X_5(+)$, $X_7(+)$
$f3$ Competitive Power ($\alpha = 0.60$): $X_6(-)$, $X_{10}(-)$, $X_{13}(+)$, $X_{14}(+)$, $X_{15}(-)$

studies. Perceptual measures not only facilitate performance comparisons across industries without distortions based on capital structures and accounting conventions, but also enable researchers to study privately held firms, many of which do not release accounting data as a matter of policy.

The Cronbach alpha reliability coefficient was computed for the performance scale and, at $\alpha = 0.89$, fell within generally accepted limits. Also, as a test of the convergent validity of the total performance measure, accounting performance measures were obtained for 15 publicly held survey participants. In this subsample, return on sales, a commonly used measure of financial performance in strategy research (e.g., Cool and Dierickx, 1993; Zahra and Covin, 1993), correlated significantly with the subjectively derived total performance measure ($r = 0.64$; $p \leq 0.01$), suggesting that, although the accounting and subjective measures were not identical, the accounting measures constituted a key element of the respondents' subjective assessments.

RESULTS

Table 2 presents the descriptive statistics and intercorrelations for the three industry factors and for three financial performance measures. The correlation matrix shows that two of the three industry factors correlated significantly with the overall performance measure, with all three correlating with all performance measures in the expected directions. Moreover, the matrix indicates that the three industry factors are statistically independent, with none of the intercorrelations significant at $p \leq 0.10$.

Table 3 presents the hypothesis tests, along with additional results based on industry sector. Using adjusted R^2, which estimates the proportion of total variance explained in the population based on sample degrees of freedom, Table 3 shows that the three industry factors combined to explain an estimated 15 percent of overall performance variance in the population, 10 percent of profitability variance, and 19 percent of sales growth variance. Using a hierarchical regression procedure in the second step (see Cohen and Cohen, 1983), main effects and two-way interactions combined to explain an estimated 20 percent of overall performance variance in the population, 17 percent of profitability variance, and 25 percent of sales growth variance.

Table 3 shows that industry maturity was the only main effect that did not explain a significant proportion of overall performance variance. This, perhaps, is not surprising since strategy research gives us no reason to expect a direct, systematic relationship between maturity and overall performance, although Porter's framework does suggest that industry maturity may increase competitive rivalry which may, in turn, reduce relative industry returns. However, the results in Table 3 do not indicate that competitive power moderates the industry maturity–performance relationship in that direction (the significant relationship between profitability and the maturity–competitive power interaction was not replicated in the other performance measures). The results do suggest a negative and significant relationship between performance and the interaction between industry maturity and entry barriers, suggesting that entry barriers may moderate the industry maturity–performance relationship. Further analysis suggested the interpretation that, although growth industries

Table 2. Descriptive statistics and correlations

($N = 54$)	Mean	S.D.	*f*1	*f*2	*f*3	*P*	*S*	*O*
*f*1: Industry maturity	3.11	0.85	1.00					
*f*2: Entry barriers	3.00	0.86	0.11	1.00				
*f*3: Competitive power	2.96	0.66	–0.06	0.22	1.00			
P: Profitability	3.02	1.19	–0.15	0.32*	0.17	1.00		
S: Sales growth	2.80	1.27	–0.16	0.25†	0.42**	0.64	1.00	
O: Overall financial perf.	2.98	1.15	–0.13	0.32*	0.35**	0.92***	0.85***	1.00

Table 3. Results of regression analysis

	Dependent variables		
($N = 54$)	Overall perf.	Profitability	Sales growth
Step 1: Main effects	β	β	β
*f*1: Industry Maturity	−0.14	−0.19	−0.17
*f*2: Entry Barriers	0.26†	0.32*	0.20
*f*3: Competitive Power	0.27†	0.10	0.38**
R^2	0.20**	0.15*	0.24**
R^2, adjusted	0.15**	0.10*	0.19**
Step 2: Two-way interactions	ΔR^2	ΔR^2	ΔR^2
*f*4: *f*1 × *f*2	0.07*(−)	0.05 n.s.(−)	0.07*(−)
*f*5: *f*1 × *f*3	0.02	0.06†(+)	0.00
*f*6: *f*2 × *f*3	0.00	0.01	0.00
Total ΔR^2	0.09	0.12†	0.07
Total R^2, adjusted	0.20**	0.17*	0.25**
Step 3: Industry sector effects	ΔR^2	ΔR^2	ΔR^2
*f*7: Industry sector	0.01	0.00	0.01
*f*8: *f*7 × *f*1	0.00	0.01	0.01
*f*9: *f*7 × *f*2	0.00	0.00	0.01
*f*10: *f*7 × *f*3	0.00	0.01	0.01
*f*11: *f*7 × *f*4	0.00	0.00	0.01
*f*12: *f*7 × *f*5	0.02	0.02	0.02
*f*13: *f*7 × *f*6	0.10**(−)	0.08*(−)	0.11**(−)
Total ΔR^2	0.13	0.12	0.18†
Total R^2, adjusted	0.25†	0.19	0.35*

β values are standardized regression coefficients, ΔR^2 are incremental R^2 changes.
For all *t*- and *F*-tests: †$p \leq 0.10$; *$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$.
Industry sector is a dummy variable: 0 = service, 1 = manufacturing.
Parentheses indicate directions of relationships between interactions and dependent variables.

did not generally outperform mature ones, they did receive a unique performance boost from entry barriers, with the combination of growth and high entry barriers explaining performance variance over and above the significant entry barrier main effect. This was not a hypothesized effect, and the results are tentative; in these data at least, the maturity–entry barrier interaction represented the only link between industry maturity and performance.

Table 3 shows that the industry factors impacted the profitability and sales growth performance measures similarly, with the notable exception of Competitive Power, which had a greater impact on sales growth than on profitability. A closer examination of the five variables that comprise the Competitive Power factor showed that the excess capacity variable explains much of the difference, correlating significantly with growth ($r = 0.40$) but not with profitability ($r = 0.20$). One provisional explanation is that undercapacity is more likely to spur expansion and new entry than to increase profitability of incumbents, although both may occur. This growth effect is not inconsistent with either Porter's framework or neoclassical economic theory, but it was not hypothesized in advance and would merit further investigation.

The researchers also proposed no hypotheses concerning results by industry sector, but the data did permit a comparison between manufacturing and service firms. These results are presented in step three of Table 3, and show that industry sector did not moderate the relationships between performance and the industry factors, with one notable exception—the relationship between per-

formance and the interaction between entry barriers and competitive power. Further analysis of this negative, significant interaction showed, in the service sector, a large, positive partial correlation ($pr = 0.55$; $p \leq 0.01$) between overall performance and the interaction between entry barriers and competitive power, but, in the manufacturing sector, a negative and nonsignificant correlation ($pr = -0.20$). Analysis in the service sector suggested further that, although the service firms in industries protected by high entry barriers did outperform those with low entry barriers, the performance effect was entirely due to extraordinary performance when entry barriers were combined with high competitive power. Put differently, service firms competing with high competitive power and high entry barriers derived significant performance advantages, over and above any advantages gained from the main effects of those factors, but manufacturers did not.

A provisional explanation for this result might be founded on the notion that, because service industries rely more heavily on human capital, performance stems from firm-specific know-how, capabilities, processes and relationships, rather than from structurally based advantages that accrue to physical assets. Under those conditions, only a very profound structural effect, such as the combined effects of entry barriers and competitive power, would suffice to produce performance advantages. This conclusion would be consistent with the resource-based emphasis on intangibles (Hall, 1993), and suggests that the reach of industry structure may extend even to contexts where firm-specific intangible resources are at their most essential.

CONCLUSIONS

The findings support those reported in earlier studies, but from a different methodological perspective. To address shortcomings in the earlier studies, the methodology included personal interviews with CEOs, a sample composed of undiversified firms competing in a wide variety of industry sectors, and analyses of specific industry factors. That the findings converge despite the divergent methods lends further credibility to the earlier results, and provides additional support for the firm-level strategic management perspective.

Of course, not all of the 80 percent of unexplained performance variance is attributable to idiosyncratic, firm-specific resources, since some will also be attributable to shared generic strategies, strategic group membership, other shared resources, or chance. However, these empirical results do support the earlier studies' findings that industry membership explains in the neighborhood of 20 percent of firm performance variance. The remaining 80 percent, which includes both shared and firm-specific factors, provides strategy researchers with a significant and challenging field of inquiry.

Although Porter's *Competitive Strategy* (1980) is by far the most widely cited publication in the strategy literature (Hambrick, 1990), the book's central feature—the industry framework—has attracted little empirical attention. In this study, Porter's five factors reduced empirically into three independent factors—industry maturity, entry barriers, and competitive power—with rivalry, the threat of substitutes, power relative to customers, and power relative to suppliers collapsing into a single variable. Only the entry barrier and competitive power main effects explained significant performance variance, with industry maturity impacting performance through its statistical interaction with entry barriers. In addition, the industry sector tests suggested tentatively that industry factors impact manufacturing and service industries differently, with service sector impacts stemming almost entirely from the interaction between entry barriers and competitive power. These findings, though preliminary, may shed some light on empirical interdependencies among Porter's five forces, and on their relationships with financial performance in different contexts. On the other hand, we are reluctant to generalize these findings beyond the present sample given the relatively small sample size relative to the number of variables in the factor analysis.

The researchers recognize several additional methodological limitations that deserve comment. First, the executives were not asked to define industries, but merely to answer questions that referred to them—the questions assumed that the respondents had meaningful organizational sets in mind. Although this approach enables researchers to listen to executives' perceptions on their own terms, it also leaves us without secure interpretations for the findings. For example, executives may interpret 'industry' to mean roughly what strategy researchers call 'strategic group.' If so,

the results may overstate the industry effect. Based on Reger and Huff's (1993) research at the strategic group level, the researchers believe executives' assumptions about industry composition do have significance independent of their relationship with other industry measures, and may even correspond reasonably well with more objectively derived groupings, but we recognize the difficulties in interpretation.

Moreover, this study brings us no closer than the earlier studies to an accurate partitioning of economic rates of return. The perceptual measures differ from accounting performance measures, and executives clearly regard profitability and sales growth as important, but we cannot show that these measures more closely approximate economic return rates than do the accounting measures. Since economic return rates are notoriously difficult to measure, we merely offer the perceptual measures as additional evidence using an alternative methodology.

Another problem in this study is that explaining performance using industry factors, rather than industry membership itself, may have produced an underestimate of industry effects. Other industry factors may influence performance (e.g., industry-wide cooperation through benchmarking or lobbying) and, to the extent that the three industry factors do not fully represent industry effects, actual industry effects may exceed those derived in the study. Also, the study does not distinguish stable from unstable industry effects. Although the research design addressed this issue by asking executives to report 3-year performance, the study was still cross-sectional, and judgmental errors may have produced a near-term focus.

A final weakness is that neither this study, nor those by Schmalansee, Wernerfelt and Montgomery, or Rumelt, has observed the impacts of any firm-specific resource, and this is the obvious next step for empirical researchers. Resource-based research must do more than merely document inadequacies of industry-based performance explanations. Although a few resource-based empirical studies have moved in the right direction (e.g., Hansen and Wernerfelt, 1989; Powell, 1992), the resource-based view remains essentially theoretical and would benefit from a deeper empirical base to support its claims, including further studies of firm-specific resources such as culture, relationships, leadership, and capabilities.

Despite these concerns, the researchers believe the study contains findings useful both to practicing managers and to strategy researchers, offering an independent empirical examination of relationships fundamental to strategic management theory, and producing empirically derived industry factors. Ultimately, the findings corroborate the conclusion expressed in Rumelt's study (1991: 168):

> The classical focus on industry analysis is mistaken because these industries are too heterogeneous to support classical theory. It is also mistaken because the most important impediments to the equilibration of long-run rates of return are not associated with industry, but with the unique endowments, positions, and strategies of individual businesses.

It is hoped that this study stimulates additional debate and research on these important issues, particularly from resource-based researchers interested in the relative power of idiosyncratic, firm-specific strategic resources.

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APPENDIX 1: INDUSTRY MEASURES

Participants were asked to circle the best response to each statement on a 1 to 5 scale (5 = agree strongly, 1 = disagree strongly). The variables measured are indicated in parentheses for all scales, but were not so indicated in the surveys.

X_1 (Entry barriers): Our industry is very difficult for new firms to enter successfully.
X_2 (Incumbent Advantages): In our business, existing firms have insurmountable advantages over new entrants.
X_3 (Economies of scale): Large firms have definite cost advantages in our industry.
X_4 (Industry concentration): Our industry is dominated by a few large competitors.
X_5 (Customer loyalty): In our industry, customers are loyal—they rarely switch to new firms or competitors.
X_6 (Intensity of competition): Compared to other industries, rivalry in our industry is extremely intense.
X_7 (Advertising intensity): Firms in our industry advertise heavily compared to other industries.
X_8 (Demand growth): Demand in our industry has been growing rapidly in the past 3 years.
X_9 (Innovation/R&D intensity): Innovation and R&D are more prevalent in our industry than in most industries.
X_{10} (Excess capacity): We have a serious excess capacity problem in our industry.
X_{11} (Industry maturity): Our industry is still in early growth and infancy.
X_{12} (Rate of technological change): Our industry would be characterized as a high-technology

industry.

X_{13} (Power relative to suppliers): In our industry, firms are at the mercy of powerful suppliers.

X_{14} (Power relative to customers): In our industry, firms are at the mercy of powerful customers.

X_{15} (Threat of substitutes): Competing substitute products or services are a serious problem in our industry.

X_{16} (Industry stability): Our industry is more unstable than most, changing more quickly and unpredictably.

APPENDIX 2: INTERCORRELATIONS OF INDUSTRY VARIABLES

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}	X_{16}
X_1: Entry barriers	1.00															
X_2: Incumbent advantages	0.59	1.00														
X_3: Economies of scale	0.17	0.26	1.00													
X_4: Industry concentration	0.41	0.19	0.16	1.00												
X_5: Customer loyalty	0.19	0.18	0.19	0.01	1.00											
X_6: Intensity of competition	−0.16	−0.16	0.14	0.14	−0.09	1.00										
X_7: Advertising intensity	−0.08	−0.07	0.29	−0.13	0.30	0.01	1.00									
X_8: Demand growth	0.02	0.10	−0.01	0.14	0.17	0.05	−0.12	1.00								
X_9: Innovation/ R&D	−0.10	−0.07	−0.36	−0.04	−0.22	0.18	−0.19	0.17	1.00							
X_{10}: Excess capacity	−0.12	−0.16	−0.22	−0.10	−0.04	0.22	−0.08	−0.38	−0.04	1.00						
X_{11}: Ind. maturity	0.00	0.01	0.24	0.01	0.06	−0.01	0.39	−0.57	−0.24	0.32	1.00					
X_{12}: Tech. change	−0.13	−0.20	−0.33	0.11	0.06	0.04	−0.22	0.48	0.49	0.01	−0.43	1.00				
X_{13}: Power re. suppliers	0.20	0.17	0.23	0.10	0.01	−0.15	0.17	−0.20	0.00	−0.15	0.26	−0.08	1.00			
X_{14}: Power re. customers	0.08	−0.08	0.04	−0.16	0.07	−0.16	0.16	0.08	−0.02	−0.15	0.12	−0.05	0.29	1.00		
X_{15}: Threat of substitutes	−0.14	−0.19	−0.11	−0.03	0.10	0.15	0.15	−0.19	−0.18	0.38	0.10	−0.07	−0.22	−0.18	1.00	
X_{16}: Ind. stability	0.09	−0.17	0.05	0.17	−0.06	−0.09	−0.09	−0.11	−0.18	−0.10	0.15	−0.24	0.12	0.03	0.00	1.00