

RESEARCH NOTES

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STRATEGIES FOR INTRAFIRM TRANSFERS AND OUTSIDE SOURCING

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Make or buy? This simple phrase masks the complexities of firms' decisions concerning vertical integration strategies. One such decision is whether certain strategic business units (SBUs) should produce goods or services that they could either sell to other SBUs in their firms, or could buy from other SBUs. Another such decision concerns how much of their component requirements business units should purchase from in-house suppliers. Yet another is how much of their outputs they should sell to, or through, sister business units. Although transfer pricing rules based upon fair market values can help firms cope with such issues, there are no comparison markets for some goods and services (Williamson, 1971, 1975). Moreover, there may be strategic reasons for firms to encourage their business units to buy and sell in-house, even if such intrafirm transfers do not appear to make economic sense.

This paper explores the proposition that firms' policies regarding internal purchases and sales of goods and services vary in a systematic pattern that can be related to competitive conditions and corporate climate. Using the Profit Impact of Market Strategies (PIMS) data base, it partially replicates results obtained from field interviews (Harrigan, 1985a). Generally stated, the hypotheses tested herein are: (1) Firms are likely to undertake more intrafirm transfers within settings of competitive stability and low demand uncertainty than they will in other settings. (2) Firms that make many internal transfers in other settings do so either (a) because they lack the bargaining power needed to persuade outside suppliers or distributors to assume the risks they had hoped to avoid themselves, or (b) because vertical integration fits their parents' corporate strategy needs.

LITERATURE REVIEW

Vertical integration describes a variety of make-or-buy arrangements firms might use to obtain ready supplies of raw materials and services and ready markets for their outputs. It encompasses the coordination of vertical relationships between SBUs. Vertical integration is often necessary where markets cannot allocate resources in a manner that alleviates uncertainty

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(Williamson, 1971, 1975). It can also be a means of avoiding search, negotiation, and regulatory costs (Coase, 1937; Wiek, 1969), especially where firms are highly dependent upon stable supplies of resources (Pfeffer & Salancik, 1978). Vertical integration can propel firms into businesses very different from their strategic core activities, as in the example of a motion picture studio entering the pay-cable television business.

Although strategy researchers have recognized vertical integration as one of the oldest and most frequently embraced growth strategies (Chandler, 1977), they have just begun to understand its complexities. Findings concerning whether or not it is a profitable strategy have been significantly diverse (Buzzell, 1983; Hawks, 1984; Lubatkin, 1982; Rumelt, 1974), and there have been a variety of opinions concerning how to use it effectively. For example, Porter (1980) cautioned firms that undertaking backward or forward integration is a strategic decision that firms can make but once. In contrast, my previous work (Harrigan, 1983) has argued that the several dimensions that characterize vertical integration can provide firms with substantially greater opportunities to fine-tune this strategy than had been recognized previously.

MEASURES OF INTEGRATION

Part of the confusion surrounding the effective use of vertical integration may arise from differences in the phenomena under study. Economists have used aggregated industry averages, rather than observations of firms or business units (Bork, 1954; Kaysen & Turner, 1959). Usually these aggregates are sectoral or industry-level measures. One such measure is average industry value-added as a percentage of sales (Adelman, 1955; Gort, 1962). Another example is use of input-output tables to estimate industry-wide vertical integration (Clevenger & Campbell, 1977). Although some scholars of strategic management have examined vertical integration trends by comparing aggregate industry differences (Wernerfelt & Balakrishnan, 1984), others have looked at value-added within strategic business units (MacMillan, Hambrick, & Pennings, 1982) or at the relationships between SBUs (Harrigan, 1983).

To use vertical integration effectively, a firm may need to intervene to force commerce, or may even need to arrange temporary subsidy of one vertical stage that will benefit the total firm. For example, pioneering manufacturers of personal computers like Texas Instruments and Commodore invested at considerable expense in consumer electronics stores in the mid-1970s to demonstrate their products to wary and risk-averse consumers. When buyers had become familiar with personal computer products, the electronics firms ended their retailing activities. Such vertical arrangements are of great financial and strategic importance, and have been found to be important in earlier studies of corporate strategy.¹ Consequently, clarity regarding whether researchers have examined make-or-buy decisions (1) within one business unit's transformation stage or (2) between two business units at

¹ See Harrigan (1983) for a lengthy bibliography.

different processing stages in their research is desirable if we are to understand the implications of their findings.

This study gave special attention to the measures of vertical integration contained in the PIMS data base, an important data source that researchers have used to explore many questions of strategy and performance (Anderson & Zeithaml, 1984; Hambrick, 1983a, 1983b; Hambrick, MacMillan, & Day, 1962). PIMS measures, percentage of business unit purchases from other corporate units, and percentage of business unit sales to other corporate units were used to capture the intra-SBU relationship that a previous study (Harrigan, 1983) called degree of internal transfers. This approach differs from that of an earlier inquiry (MacMillan et al., 1982) that applied concepts of interorganizational dependence to explain firms' motives for integrating vertically. The present approach also should clarify some misunderstandings perpetuated by the misnaming of the variable that the PIMS data base calls vertical integration. Briefly, many dimensions of intrafirm activity may characterize vertical integration strategies. Most PIMS measures of vertical integration examine value-added in business units, not in firms. The variable PIMS calls vertical integration represents SBUs' value-added margins, or the differences between SBUs' purchase and selling prices for units processed within their boundaries of operations. This variable does not involve inter-SBU transfers at all.²

HYPOTHESES

The proportions of an SBU's requirements that will be obtained from upstream SBUs will vary with the maturity and competitive volatility of its industry. The proportion of its outputs transferred to downstream SBUs will also vary with industry maturity and competitive volatility. Relatively few internal transfers are expected where industry-wide demand is highly uncertain—before customer acceptance becomes widespread, for instance, or where demand is declining. More internal transfers are expected where demand appears to be growing. There should be a relatively low percentage of internal transfers where uncertainty concerning technologies and infrastructures—buyer-seller relationships, for instance—is high. This is for the same reason that low degrees of internal purchases and sales are expected if competition is intense. In short, this study hypothesized that inflexible positions involving assets and other resources that vertical integration often creates may imperil the strategic flexibility of firms.

Another hypothesis is that pioneering firms are exceptions. They are expected to use vertical integration to build infrastructures and educate customers about products' uses, as in the example of personal computers that appeared earlier in this paper. High degrees of interfirm transfers undertaken early will exacerbate the inherent riskiness of pioneering strategies.

²Previous studies of vertical integration (Harrigan, 1983, 1985a) created a specific dimension to capture differences in how firms define the boundaries of their SBUs; it was called breadth of activity per stage of processing.

Effective use of vertical integration to join industries whose plants vary in minimum efficient scale should be difficult; policies of high degrees of internal transfers could exacerbate capacity imbalances. Furthermore, firms that have bargaining power over upstream or downstream entities will not rely as heavily upon internal transfers in unfavorable industry settings as firms that lack bargaining power must. The major exceptions to this pattern should arise where firms can pursue strategies of cost leadership successfully. Under such circumstances, economies from vertical integration should provide cost leaders with benefits that will surpass the costs of excess capacity.

VARIABLES

Demand and Competitive Volatility

This study used PIMS variables to test the relationships sketched above. A long-term industry growth rate, based on four-digit Standard Industrial Classification (SIC) levels, represented industry wide demand outlooks. Expectations were that internal sales would be high where uncertainty concerning demand was low, and that the sign on this variable would be positive. An instability index, representing the range of changes in market share among competitors, measured competitive volatility; measures of investment intensity and the proportion of total SBU plants devoted to continuous process technologies also captured competitive volatility. Where the instability index was high, few internal transfers and a negative beta coefficient were expected. Investment intensity approximated the effects of high exit barriers. It captured the hypothesized riskiness of high capital intensity in SBUs' strategic postures when competition is volatile. A negative sign was also expected on this variable, since firms in volatile industries would undertake relatively few internal transfers. Continuous process technologies, which are often also connected with upstream or downstream stages of processing, represent stabilizing forces. A positive sign was hypothesized because more internal transfers seemed likely in tranquil settings than in volatile ones.

Bargaining Power

The proportion of total requirements an SBU purchased from its three largest suppliers represented upstream resource dependency. Percentages of SBUs' sales earned from single distribution channels represented dependence on those channels. Customers' dependence upon the SBUs under study was represented by the proportions of customer purchases that those SBUs represented. Porter (1976) used these variables to indicate the strength of an SBU's bargaining power over upstream and downstream entities. In this research, more internal purchases and a positive sign were expected where SBUs depended heavily on concentrated groups of suppliers. Fewer internal sales and a negative sign were expected where the outputs of the SBUs under study represented significant proportions of customers' purchases. A negative sign, denoting less vertical integration, was expected

because where such bargaining power was high, SBUs could sell their outputs advantageously through outsiders.

Corporate Strategies

This research tested two types of corporate strategy variables: (1) those representing the synergies that vertical integration is often hypothesized to embody, and (2) those representing corporate personalities. It was assumed that strong, corporate-wide policies to some extent influenced SBUs' managers, and thus affected how business units tended to compete. Measures of shared facilities and supervisors represented synergies arising from the scale economies of shared resources. Positive signs were expected, since intrafirm transfers might be undertaken to capture the synergies of such arrangements.

A set of dummy variables noted whether the parents of SBUs under study tended to embrace more or less vertical integration than their competitors. These dummy variables were transformed into an ordinal scale. Measures of relative price levels and cost structures—price-cost margins—were added to capture the SBUs' strategic postures. Positive signs, denoting high degrees of intrafirm transfers, were expected where firms tended to be more vertically integrated than their competitors. This expectation implies that SBUs' make-or-buy decisions reflect corporate policies. Negative signs, denoting relatively low degrees of internal purchases and sales, were expected where SBUs' prices were higher than those of their rivals.³ Negative signs were also expected for price-cost margins, reflecting the reality that there is not much sense in firms pursuing vertical integration if they cannot capture large value-added margins in doing so.

RESEARCH METHODS

Table 1 shows the dependent and independent variables that the models used, and summarizes hypotheses and expected signs. Table 1 also compares these variables with those used in a field study (Harrigan, 1983, 1985a). Ordinary least-squares regression equations served to test models of the percentages of internal purchases and sales.

Examination of degrees of intrafirm transfers used the PIMS data base, maintained by the Strategic Planning Institute. The business units in PIMS often belong to firms on the cutting edge of strategic planning practice. Although scholars have often criticized its confidential data tracking SBUs' behavior and performance (e.g., Anderson & Paine, 1980), PIMS remains an important resource for studies of competitive strategy. Moreover, although the discussion earlier in this paper indicated that many PIMS variables are not appropriate for researching most questions of corporate strategy—like vertical integration—the dependent variables selected for this study were adequate to test its hypotheses. The sample contained 1,280 observations

³As stated in the Hypotheses section, vertical integration is expected where there is effective cost leadership.

TABLE 1
A Comparison of Variables Used to Test Vertical Integration Strategy Hypotheses

Sample Based on Field Interviews	PIMS Construction	Hypothesis	Sample from PIMS Database
Dependent variables			Dependent variables
Percentage internal purchases	Percentage purchased from sister SBUs	PIMS variable matches Harrigan's (1985) degree of upstream internal transfers variable.	Percentage internal purchases
Percentage internal sales	Percentage sold to sister SBUs	PIMS variable matches Harrigan's (1985) degree of downstream internal transfers variable.	Percentage internal sales
Independent variables			Independent variables
Uncertainty variables			Uncertainty variables
Demand and technological uncertainty	SIC-group growth rate (percentage)	(+) Positive growth rates are expected to encourage intrafirm purchases and sales or resources.	Long term growth rates (SIC-group)
Competitive volatility variables			Competitive volatility variables
Height of economic exit barriers	No comparable PIMS variable	(-) Indicates stability of expected returns; the presence of high exit barriers makes competition more volatile (Porter, 1980).	--
--	SIC-group index of market share instability (summation of percentage changes)	(-) Would be unimportant to pioneers who would forward integrate notwithstanding the uncertainties and turmoil.	Industry instability index (SIC-group)
--	Percentage continuous technology employed by SBU	(+) Continuous process technologies and accompanying physical interconnection expected to create more stable competitive environments, both conditions encouraging intrafirm transfers.	Percentage continuous technology

Table 1 (continued)

Sample Based on Field Interviews	PIMS Construction	Hypothesis	Sample from PIMS Database
Competitive volatility variables (cont.) --	Average book value divided by sales, plus value added at SBU level, both weighted by average net income	(-) High value-added inside SBUs reduces the value added obtained through vertical controls.	Investment intensity
Bargaining power variables			Bargaining power variables
Availability of alternate suppliers	Percentage indicates bilateral bargaining power	(+) Few alternate suppliers reduces upstream bargaining power and increases need for internal transfers.	Percentage of purchases from three largest suppliers
Availability of alternate distributors (or customers)	Percentage indicates bilateral bargaining power	(-) Few alternate distributors (or customers) reduces downstream bargaining power and increases potential need for internal transfers.	End user dependence
--	Percentage is another way to estimate power	(+) Heavy dependence upon a particular customer group reduces bargaining power and increases potential need for countervailing internal integration.	Percentage of revenues earned from distribution facility sales

Table 1 (continued)

Sample Based on Field Interviews	PIMS Construction	Hypothesis	Sample from PIMS Database
Corporate strategy variables			Corporate strategy variables
Synergies with upstream businesses	Percentage shared facilities with upstream SBUs	(+) High synergies expected to increase the attractiveness of vertical integration.	Shared facilities
Synergies with downstream businesses	Percentage shared facilities with downstream SBUs	(+) High synergies expected to increase the attractiveness of vertical integration.	Shared supervisors
--	Dummy variables indicating whether corporations tended to be more integrated than competitors	(+) Presence of tradition of higher vertical integration within parents would likely translate into higher internal transfers among sister SBUs.	More corporate integration
--	Ratio of SBUs' prices to competitors' prices	(-) A proxy for SBU's strategic postures; relatively low prices are more likely to be associated with cost leadership strategies and greater vertical transfers.	Price differential
--	Selling price growth less weighted cost growth	(-) Dwindling opportunities to capture value-added expected to reduce attractiveness of integration.	Price-cost margin

from 64 industries; these included food processing, textiles, paper, plastics, organic chemicals, fabricated metal products, electronic devices, and wholesaling. The SBUs obtained none, some, or as much as 90 percent of their supplies internally, and they made up to 50 percent of their sales internally. A few SBUs (14%) reported both upstream purchases and downstream sales. However, for most SBUs that transferred any resources in-house, the proportion of their resource requirements purchased in-house exceeded the proportion of outputs sold to in-house customers. Correlations among independent variables were not significant at the .05 level.

RESULTS

Table 2 reports standardized regression coefficients instead of natural coefficients in order to indicate the amount by which the coefficient of multiple determination would be reduced if a variable were eliminated from the regression. Coefficients' signs were as expected and they were statistically significant in most cases. In the model of purchases from upstream SBUs, the negative signs on the variables representing volatile competition suggest that firms would not sustain losses from high internal transfers in volatile settings, lest they incur excess capacity, high exit barriers, and other damages from too much vertical integration. The positive sign on the supplier power variable, percentage of purchases from three largest suppliers, suggests that where a few outside suppliers possessed bargaining power over SBUs, because there were few alternative vendors perhaps, defensive backward integration became likely. The positive signs on the shared resources variables suggest that more internal transfers occurred where synergies from sharing were available than where they were not. The positive sign of the relative level of corporate vertical integration variable suggests that where corporate cultures encouraged vertical integration, relatively high degrees of intrafirm transfers were likely to occur. The negative sign of the price-differential variable, indicating relative price levels, suggests that business units selling differentiated, premium-priced goods appealed to smaller volumes of customers than firms need if they are to enjoy integration economies. The negative sign on the variable for price-cost margins suggests that falling price-cost margins exerted pressures upon SBUs to eliminate those arrangements, such as vertical integration, that penalize their profitability. This result may also suggest that falling margins decrease the attractiveness of intrafirm transfers because there is less value-added to capture.

Testing the model of internal sales yielded many of the same results, as Table 2 shows. The positive sign of the variable for long-term growth rate suggests that when sales growth trends are positive, more downstream integration is likely to occur. The positive sign on the variable for continuous process manufacturing technology suggests that physical interconnection of vertically related stages of activity could stabilize competition because of the high switching cost barriers such arrangements create. The positive sign on the customer importance variable, percentage of revenues earned from distribution facility sales, suggests that defensive vertical integration may be

TABLE 2
Results of Regression Equations on Internal Transfers
between Sister Business Units^a

Independent Variables	Dependent Variables	
	Percentages of Internal Purchases	Percentages of Internal Sales
Uncertainty		
Long term growth rate	—	.035
Industry volatility		
Industry instability index	-.080**	—
Percentage of continuous process technology	—	.043*
Investment intensity	-.133**	—
Bargaining power		
Percentage of purchases from three largest suppliers	.109**	—
End user dependence upon the SBU under study	—	-.110**
Percentage of revenues earned from distribution sales	—	.075**
Corporate strategy		
Shared facilities	.040	—
Shared supervisors	.337**	.350**
More corporate integration than competitors	.204**	.194**
Price differential relative to competitors	-.050*	-.102**
Price-cost margin	-.056*	—
Coefficient of multiple determination ^b	.213	.207
F-statistic	38.17**	39.38**
(degrees of freedom)	(3,1271)	(7,1272)
Mean value of dependent variable	11.6	4.0

^aData are from the PIMS data base; standardized beta coefficients are reported.

^bCorrected R²

*p<.05

**p<.01

used to counter the bargaining power of concentrated and powerful outsiders. The negative sign on the customer dependence variable suggests that where end users are strongly tied to the business unit, perhaps by high switching costs or lack of viable alternative vendors, those SBUs can use outsiders advantageously; hence, internal transfers will be low.

CONCLUSIONS

These results offered additional evidence that vertical integration is not a homogeneous strategy that all firms use in the same manner under all circumstances. The results generally agree with those previous studies (Harrigan, 1983, 1985a) that tested the same hypotheses with field data. Relationships exist among uncertainty, competitive conditions, bargaining

power, and the types of internal transfers that firms' corporate strategies might deem necessary. This partial replication of previous results suggests that PIMS variables offer acceptable measures of degrees of internal transfers between upstream and downstream business units, two of the several dimensions that characterize firms' vertical integration strategies.

Care must be taken in interpreting these results and those of other studies concerning vertical integration strategies. Such interpretations rely on whether the variables used to measure the relationships can adequately capture the synergies, integration economies, and other attributes of vertical integration strategies. Since some researchers have obtained results suggesting that vertical integration is not rewarding, it would seem that more research on the problem of measuring intrafirm transactions, benefits, and costs is needed in order to determine whether the values of the alleged synergies of vertical integration have been overrated.

Finally, these results suggest that managers should consider the natures of their industries' structures, competitive behaviors, and ways of maximizing their bargaining power when evaluating make-or-buy decisions. SBUs that are vertically related to each other need not have buyer-supplier relationships unless having them makes economic or strategic sense. Since SBUs' bargaining powers can attenuate with time, it is useful to recognize when vertical integration is especially advantageous to firms' corporate purposes and when economic considerations alone justify its use. Although firms that cultivate vertical relationships often do so to control their needs for certainty, these results suggest that low internal integration can be more appropriate than high where firms' internal attributes or environments are not suited to highly integrated strategies.

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