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Integration of the sales force: an empirical examination

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This article develops and tests a model of integration of a marketing function, personal selling. The model, derived from transaction cost analysis as developed principally by Williamson, is formulated as a logistic function, which is estimated with data from the electronic components industry. As expected, integration is associated with increasing levels of asset specificity, difficulty of performance evaluation, and the combination of these two factors. Contrary to the transaction cost model, neither frequency of transactions nor interaction of specificity and environmental uncertainty is significantly related to integration. The transaction cost model improves significantly upon the fit of a simple model relating integration to company size alone. These results suggest that for studying transactions of this kind, it is fruitful to view the firm as a governance structure.

1. Introduction

■ In recent years considerable attention has been paid to the question of when vertical integration takes place (Williamson, 1979; Klein, Crawford, and Alchian, 1978; Holmstrom, 1979). These approaches consider contracts in far more detail than their predecessors did; and, at least implicitly, they recognize the behavioral phenomena of bounded rationality and opportunism and make allowances for the environmental phenomenon of uncertainty. But these and other recent treatments have been subject to little empirical testing other than by selected case studies.[1]

Discussions of vertical integration typically focus on manufacturing. This leads to emphasis on the valuation of physical assets, which may or may not be specialized to the user. Although it has been recognized that human assets are also relevant (Williamson, 1981b; Monteverde and Teece, 1982), less attention has been paid to their role. We focus on the integration of a particular marketing function, personal selling (as opposed to

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[1] Two exceptions are Monteverde and Teece (1982) and Teece (1980).

mass communications). The issue is whether to use a manufacturers' representative or a "direct" (employee) salesperson to sell a product line. The resolution of this issue turns on human assets, if only because differences in physical assets are negligible in this setting.

Section 2 further develops this issue and presents a transaction-cost explanation based on the work of Williamson (1975, 1979, 1981a,b), from which we develop a theoretical model. Section 3 discusses collection of field data from 172 sales managers for 16 electronic component manufacturers. Estimation of the logistic function is the subject of Section 4, and the results are presented in Section 5. Section 6 discusses the implications of these exploratory findings.

2. Relevant transaction costs

■ A manufacturers' representative ("rep") is an independent business entity that offers selling services to a manufacturer ("principal") in return for a commission on any sales realized. A typical rep agency consists of several salespeople and office staff and operates like the sales department of a firm. The agency, however, represents a number of noncompeting manufacturers whose products fit to form a sales package (e.g., office supplies from one maker, typewriters from another). Reps usually bear all sales expenses and are the principal's exclusive salespeople for a defined set of customers (e.g., office products stores in Southern California). Thus, reps are what we shall refer to as the market governance mode. In contrast, "direct" sales people are employees of one manufacturer, typically paid by salary or salary plus incentives. Hence, direct salespeople are the integrated (hierarchical) governance mode.[2]

As of 1974, 50% of all U.S. manufacturers used reps, either alone or in conjunction with a direct sales force (Research Institute of America, 1975). Yet, as of 1977, only 10% of U.S. dollar volume in 15 major industrial categories was conducted through reps (Taylor, 1981). Apparently, the market mode is less often used than the integrated mode, although this varies considerably across product categories.

Williamson (1975, 1979, 1981a,b) has developed a transaction-cost theory of integration. Klein, Crawford, and Alchian (1978) offer a closely related treatment. The logic and concepts of Williamson's approach are readily transferable to the rep/direct choice and provide a framework for our exploratory analysis of this issue.

Asset specificity arises when durable assets become customized to the user. When assets are fungible, market contracting is preferable since the agent pooling several firms' demands more fully exhausts scale economies and risk-pooling benefits. At the same time, the threat of ready replacement disciplines performance. In contrast, if assets become specialized to a relationship, the parties are locked into bilateral exchange. The result is that opportunism and maladaptation are unchecked by market forces.[3] In such circumstances, integration enables the firm to dampen opportunism and inflexibility because integration carries with it access, audit, and incentive advantages. Other things equal, reps should be more efficient (and presumably chosen more often) when assets are nonspecific and direct salespeople should be more efficient and chosen more often when assets are highly specific.

A salesperson or sales force possesses physical and human assets. Physical assets (cars, offices, etc.) are unspecialized, and hence may be disregarded in our analysis. Of

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[2] Markets and hierarchies are really endpoints on a continuum from a completely independent external entity to a completely dependent internal entity. Rep and direct sales forces may fall at different points along the continuum; however, for purposes of exploratory analysis, we simplify into rep (external) and direct (internal).

[3] Although in theory a sufficiently complex contingent claims contract might produce the same effect, in practice bounded rationality, uncertainty, and the derivative condition of information impactedness render this solution infeasible.

the human assets (knowledge/ability and relationships), those which are specialized relate to the principal (company) and the customer. The relevant specialized knowledge and relationships can be described as follows.

Consider the salesperson experienced in a given industry who begins to represent Company *A*. The salesperson's industry skills are all that is necessary—unless *A* is a distinctive firm. Suppose that Company *A* has its own particular operating procedures, formal and informal, which our salesperson must learn. To get Company *A* to act effectively (e.g., to rectify a customer complaint quickly), our salesperson must have built relationships within the firm (e.g., with production personnel or design engineers). Further, if *A*'s products are not standard, it is necessary to learn their distinctive features and applications. Finally, our salesperson may acquire sensitive information to perform his tasks. The knowledge and relationships our salesperson eventually acquires about *A* are assets specific to *A*. The more these assets affect the salesperson's performance, the higher their value and the more the selling task is characterized by asset specificity.

This scenario may be repeated on the customer side. *A*'s customers may be distinctive in their ways of doing things and in their orientations and needs. The importance of these features is magnified when *A*'s sales are concentrated in critical "key" accounts: for these accounts it pays to learn every customer idiosyncracy. Further, with some accounts relationships cultivated may become so important that the customer exhibits loyalty to the salesperson—not to the principal.[4] Thus, where customers are distinctive, where sales are concentrated in key accounts, and where relationships matter (especially where loyalty to the salesperson may arise), asset specificity is high.

A major proposition follows: the greater the total value of company-specific assets (on the company and customer sides), the greater the likelihood of vertical integration in the form of a direct sales force.

□ **Uncertainty.** Williamson (1979) highlights one form of environmental uncertainty, that of environmental unpredictability. This complicates writing and enforcing contingent claims contracts since the environment shifts in unforeseen ways. The market mode is still advantageous, but transactions will be completed less smoothly than in more certain environments. Thus, the presumption of market superiority is undisturbed—*unless* assets are specific to a nontrivial degree.

The shifting environment forces renegotiation, which may lead to delays. This poses a fundamental problem under the market mode because even the best contracts are incomplete. The integrated firm is better able to cope because adaptations can be made as needed without revising formal agreements between independent parties (Williamson, 1979). Hence, the likelihood of integration is expected to increase, given nontrivial asset specificity, with increasing uncertainty.

Williamson's later writings (1981a) recognize a second form of uncertainty, which he calls "internal." Alchian and Demsetz (1972) highlight the same concept, which they call the difficulty with which individual productivity can be metered. We refer to this second form of uncertainty as the difficulty of evaluating performance. It occurs in the selling function for three reasons. First, it may be infeasible to record each salesperson's results accurately. For example, in selling air freight services, records are kept at the warehouse level, while salespeople operate at the customer level. Second, responsibility for a sale may not be assignable to an individual. This occurs when team sales are involved or when customers may place an order with someone other than the salesperson

[4] This asset is especially potent. It is specific in that it grows while the salesperson represents that principal and is particularly beneficial to the principal while the transaction continues. But this asset may be transferred to another principal should the transaction end, which makes the threat of opportunism acute.

who makes the presentation. Third, "performance" may not be a simple, readily measurable scalar. It may be a vector of indicators, the relative importance of each being hard to ascertain and the value of each being difficult to measure (e.g., satisfaction of prospects approached, value of market intelligence provided).

When performance is difficult to evaluate, imperfect input measures and a manager's subjective judgment are preferable to defective (simple, observable) output measures. Integration is not essential, since monitoring and judgmental evaluation of individual performance can be done by managers of a firm that contracts to provide service to another. Nevertheless, the evaluators must be evaluated themselves, and simple output measures of the contractor's performance are often inadequate when underlying individual results are difficult to assess.

Accordingly, the likelihood of integration should increase with the difficulty of monitoring performance.

□ **Making the tradeoff: frequency.** The transaction costs imposed by specific assets (especially in combination with environmental unpredictability) and by monitoring difficulty make vertical integration more appealing. But a specialized governance mechanism involves significant setup and maintenance costs. For rarely occurring transactions, losses from opportunism and inflexibility are likely to be lower than the integrated firm's incremental overhead. As a transaction recurs more frequently, however, integration becomes more desirable since potential losses from not integrating outweigh the overhead costs of integration.

The issue is whether a firm can at least break even on the fixed cost of an integrated function. Although the idea is logically appealing, it is difficult to express empirically. Fixed costs are difficult to estimate and the breakeven point (over an arbitrary time span) is unclear. Nonetheless, one does see rules of thumb used to approximate this minimum scale notion. For example, we were told by two sales managers in the electronic components industry that a common heuristic involves drawing a geographical territory that a salesperson could physically cover and estimating its maximum attainable sales potential. If less than $1,000,000 is at stake, the territory is too "sparse" or "thin" to be covered by a direct salesperson. Density, then, is an analogue of frequency in the selling setting and may be thought of as the ratio of attainable potential to required travel in a territory. Since the desirability of integration increases as density increases (though the breakeven point is unascertainable), we expect to see more use of a direct sales force as density increases.

Scherer (1980, p. 84) suggests that firm size is also a very important factor. Since large firms achieve economies of scale in finding, holding, and utilizing management skills, a large firm "may be able to get more mileage out of its expenditures on a field sales force and other marketing instruments." Scale economies are likely to play an important role in virtually all integration decisions. More generally, size is widely regarded as a pervasive influence on firm behavior (Miles, 1980) and on firm and industry performance for reasons of scale and scope economy, market power aspirations, and the ability to aggregate inputs (Scherer, 1980). Thus, our model includes company size, in addition to asset specificity, uncertainty, and frequency.

3. Data from the electronic components industry

■ The above hypotheses were tested on survey data from the electronic components industry. We selected one industry, rather than several, to detect real differences in practice that might otherwise be confounded with industry-specific effects. This limits the generalizability of results, but does allow us to establish internal validity. The electronic components industry was chosen because its variety makes it a microcosm of American

business, as can be seen in the following industry description (Electronic Industries Association, 1981).

Electronics concerns the conduction of electricity through a material such that the electrons' flow is influenced. The ability to influence electron flows (rather than simply to carry them) is what distinguishes electronic equipment from electrical equipment. In 1980, the electronic components industry posted factory sales in the United States of over 25 billion dollars. The many component producers (including some non-American companies) cover a broad spectrum. Generally, they sell to original equipment manufacturers (OEM's), though many OEM's (e.g., Texas Instruments) are themselves integrated backward into production of certain components.

Most components are categorized as "active" or "passive." Active components (such as semiconductors) contribute to signal energy in a circuit, whereas passive components do not. This distinction is important because the passive sector is more mature ("low tech"), with less product differentiation and more intense price competition. A capacitor (passive component) may sell for a few cents a pound and be treated as a commodity, whereas an integrated circuit (active component) may be engineering intensive, customized to the user's application, and treated as a highly differentiated product. Component producers vary not only in their products, but also in their strategies (e.g., low-cost producer vs. high-cost innovator), sizes, management styles, and distribution methods.

Component distribution proceeds through three different channels. The first two, company salespeople and manufacturers' representatives, involve no transfer of title to goods. Of these, reps are becoming increasingly popular. The third option is industrial distributors, independent wholesalers who purchase components for resale. Because distributors take title, they are less subject to the manufacturers' influence (particularly on pricing) than either direct salespeople or reps. Nonetheless, distributors are also becoming more popular. Many firms use all three, restricting each mode to certain product lines and customers. For example, a full line manufacturer may use distributors to sell passive components to small customers; reps to sell passive and active components to medium customers and active components to small customers; and direct salespeople to sell passive and active components to large customers. This study tests a transaction cost explanation for these assignments in cases where title stays with the manufacturer (i.e., reps vs. direct salespeople).

Sixteen recognized electronic component manufacturers participated in the study. Only recognized firms were included to permit a contrast between what might be presumed to be well-run direct sales forces and well-run reps.[5] The unit of analysis was the product line of a given company in a given territory or set of territories. A "territory" (defined by the firm) is a subset of customers covered by a sales force (rep or direct) reporting to a sales manager. Since most companies keep records and assign managers at the product-line-in-territory level, this unit of analysis facilitates data gathering.

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[5] A list of recognized firms was generated from the *1980 Audit of Brand Recognition,* a survey in which purchasers of a given electronic component (e.g., switching diodes) listed the three manufacturers they would consider as suppliers. For all major categories of components, we selected every manufacturer mentioned by at least 10% of the purchasers. This procedure generated a very long list of recognized firms, many of which were on the West Coast. For convenience, non-West Coast firms were eliminated. With the endorsement of the EIA (Electronic Industries Association), the vice presidents of sales of 21 firms were contacted. Eleven have participated. In addition, nine recognized firms (none from the West Coast) suggested by EIA were contacted and five have participated. In total, 16 of 30 companies cooperated. To assess the seriousness of nonresponse bias, the 16 respondents and 14 nonrespondents were compared as to size, the sophistication of their product line, and whether they were rep or direct. The nonparticipants have little in common on these grounds. Since these three variables are important descriptors of electronic component manufacturers, the threat of nonresponse bias does not appear serious, although doubtless it is present.

The survey respondents were territory sales managers, who are in an excellent position to know both the selling environment and the firm's environment. Each manager is a boundary spanner, a person on both sides of the boundary between the firm and the customer in a particular territory. To be a sales manager, especially in this industry, one needs to have been a salesperson. Managers also know their territories, since the median length of time served in the territory is six years.[6]

Each sales manager was directed by top sales management to fill out a questionnaire and to return it directly to the research team. This questionnaire was extensively pretested and in total, 145 completely usable responses (of 172 questionnaires returned) are available.[7] The response rate per company is virtually 100% because company personnel followed up missing questionnaires.

4. The logistic response function

■ This section describes our specific model for the decision to use reps vs. a direct salesforce. Following the order in which the concepts described in Section 2 were introduced, the variables listed below are hypothesized to affect the likelihood of using a direct salesforce.

□ Measurement of variables.

Transaction specificity of assets (TSA). This is the average of six (standardized) variables representing managers' perceptions of:

(i) nature of the company: difficulty of a salesperson's learning the ins and outs of their company which are needed for success. Managers indicated their perception by circling a number from 1 to 7 on the following semantic differential scale:

1	2	3	4	5	6	7
Disagree						Agree

in response to the statement, "It's difficult to learn all the ins and outs of our company that a salesperson needs to know to be effective."

(ii) nature of the product: amount of extra training needed in this firm by a new salesperson who has experience in the product class (answer indicated in number of weeks of training).

(iii) confidential information: measured as a semantic differential in response to the statement, "An experienced salesperson's inside information could do us a lot of damage if it got out."

(iv) nature of the customer: measured as a semantic differential in response to the statement, "To be effective, the salesperson has to take a lot of time to get to know our accounts."

(v) importance of key accounts: percent of accounts given special attention.

(vi) customer loyalty: influence of personal relationships between salespeople and accounts on sales. Greater loyalty is measured as disagreement with the statement, "Personal relationships between our salespeople and accounts have little influence on sales of our product line."

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[6] The median manager spends 35% of working time in the field, observing first-hand how the territory operates. Of the managers who supervise reps, one of every five has a representative's council, a forum for regular exchange between reps and managers. Such a forum increases the likelihood that managers know well the territories for which they report.

[7] The questionnaire itself was designed in accordance with the guidelines of the "key informant" literature (Campbell, 1955; Seidler, 1974). All questions that were not answered by at least 95% of the respondents were eliminated as having been overly difficult. The result, we believe, is a data set of high quality.

Uncertainty as environmental unpredictability (UEU). Expected deviation between forecast and actual sales in the next year, expressed as a percentage (plus or minus).

Uncertainty as difficulty of evaluating performance (UDEP). Perceived difficulty of measuring the results of individual salespeople equitably. Measured as semantic differential in response to "It is very difficult to measure equitably the results of individual salespeople."

Territory density (TD). Negative of the percentage of salespersons' time spent driving or flying, i.e., the less time spent traveling, the more dense the territory.

Company size (SIZE). 1980 company assets in dollars (Gupta, 1980).

On the basis of the motivation in Section 2, all of the variables above are hypothesized to have a positive effect on the likelihood of using a direct sales force. To account for differences in scale—semantic differential, percentages, dollars—each of these variables was standardized before estimating the response function. Specifically, each observation was transformed by subtracting the variable's mean and then by dividing by the standard deviation. Thus, standardized variables have a mean of zero and a standard deviation of one, and the magnitudes of response function coefficients may be directly compared.

In addition to these main effects, two interactions were also considered. As noted earlier, the effects of both types of uncertainty—environmental unpredictability and the difficulty of evaluating performance—are expected to be greater when transaction specificity of assets is high. This necessitates using multiplicative interaction terms.[8] The specificity/unpredictability interaction is denoted *ZUEUTSA,* and the specificity/difficulty of evaluating performance interaction is *ZUDEPTSA.*

Because of the binary dependent variable, the logistic response function is used to represent the impact of the five main effects and two interactions on the probability of going direct. Letting $X_{1j}, X_{2j}, \ldots, X_{7j} \equiv X_j$ stand for the seven factors described above for subject j, we have

$$P[D_j = 1|X_j] = \frac{e^{\beta_0 + \sum_{i=1}^{7} \beta_i X_{ij}}}{1 + e^{\beta_0 + \sum_{i=1}^{7} \beta_i X_{ij}}}, \tag{1}$$

where

$$D_j \equiv \begin{cases} 0 \text{ if manufacturers' reps are used, or} \\ 1 \text{ if a direct sales force is used,} \end{cases}$$

and $P[D_j = 1|X_j]$ is the probability that a firm with company and market characteristics X_j uses a direct sales force. Taking the natural logarithm of both sides in (1) yields the (linear) relation between the factors and the logit or log odds ratio:

$$\ln\left(\frac{P[D_j = 1|X_j]}{1 - P[D_j = 1|X_j]}\right) = \beta_0 + \sum_{i=1}^{7} \beta_i X_{ij}. \tag{2}$$

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[8] Since all three of these variables are standardized, the interactions cannot logically be formed by simply multiplying two of them. Cooper and Nakanishi (1982) provide a solution to this problem using the zeta-squared transform:

$$\zeta^2(X) = \begin{cases} 1 + X^2 & \text{if} \quad X \geq 0 \\ (1 + X^2)^{-1} & \text{if} \quad X \leq 0. \end{cases}$$

Then the two desired interaction terms can be meaningfully constructed as

$$ZUEUTSA \equiv \zeta^2(UEU)\zeta^2(TSA)$$

and

$$ZUDEPTSA \equiv \zeta^2(UDEP)\zeta^2(TSA).$$

After being computed by these definitions, *ZUEUTSA* and *ZUDEPTSA* were also standardized before the response function was estimated.

The coefficients were estimated by maximizing the likelihood function:

$$L(D_j|X_j; \beta) = \prod_{j=1}^{N} P[D_j = 1|X_j]^{D_j}(1 - P[D_j = 1|X_j])^{1-D_j}, \quad (3)$$

where N is the number of subjects on which data have been collected. Maximization of (3) was accomplished with the Gauss-Newton nonlinear least squares method used by the BMD program BMDPLR (Dixon, 1981). The next section reports the results when this model (1) and measurement method were applied to the sales force integration data.

5. Empirical results

■ **Parameter estimates.** Case 1 of Table 1 gives the parameter estimates and their asymptotic standard errors for the seven hypothesized determinants of sales force integration. The most significant factors, based on the ratio of coefficient ÷ standard error, are difficulty of evaluating performance (*UDEP*), company size (*SIZE*), and transaction specificity of assets (*TSA*). All three have the hypothesized (positive) effect on the probability of using a direct sales force. With our sample of 145, the remaining four variables are not significant and have negative coefficients, which are inconsistent with the hypotheses.

The instantaneous rate of change of the probability of going direct with respect to a variable X_{ij} is

$$\frac{\partial P[D_j = 1|X_j]}{\partial X_{ij}} = \beta_i P[D_j = 1|X_j](1 - P[D_j = 1|X_j]) \quad (4)$$

(Domencich and McFadden, 1975, p. 84). Examining this derivative for the values of β_i in Table 1 leads to two conclusions. First, the variables that, at the mean (i.e., for $X_j = 0$) have the largest estimated effect on the probability of going direct, are *UDEP*, *TSA*, and *SIZE*. Second, in the neighborhood of the mean, each variable's impact on the probability of using a direct sales force is reasonably linear.

TABLE 1 Parameter Estimates for Logistic Response Function

Effect	Coefficient	Asymptotic Standard Error	Coefficient ÷ Standard Error
Case 1: All Hypothesized Effects			
TSA	.616	.285	2.159
UEU	−.053	.276	−.193
UDEP	.782	.287	2.728
TD	−.172	.198	−.871
ZUEUTSA	−.027	.282	−.097
ZUDEPTSA	−.381	.295	−1.292
SIZE	.470	.204	2.307
Constant β_0	−.434	.188	−2.306
Case 2: Transaction Cost Effects Omitted			
SIZE	.547	.174	3.140
Constant β_0	−.405	.176	−2.302

l^* ≡ logarithm of maximized likelihood.
Case 1: $l^* = -85.60$.
Case 2: $l^* = -92.87$.

□ **Importance of transaction-cost variables.** To evaluate the contribution of the set of transaction-cost variables over and above the results that could be obtained by using company size alone, we performed a logit analysis using only the latter factor. The estimated coefficients are listed as Case 2 in Table 1.[9]

The incremental benefit from including transaction costs in the analysis can be evaluated in two ways: statistical significance and predictive effectiveness. The logarithm of the maximized likelihood function is reported in Table 1 for the two models—the one including transaction cost effects and the one excluding them. The likelihood ratio test statistic is $c = 2(-85.60 + 92.87) = 14.54$. Under the null hypothesis that $\beta_i = 0$ for all of the transaction-cost variables, c has the χ^2 distribution with 6 degrees of freedom. Since the critical value for χ^2 at the .05 level is

$$\chi^2_{(6)} = 12.6,$$

the null hypothesis is rejected.

Alternately, the contribution of the transaction-cost variables can be examined in terms of predictive effectiveness. One index of effectiveness for comparing models estimated by maximum likelihood is Akaike's Information Criterion (Akaike, 1974):

$$AIC = -2(l^* - n), \tag{5}$$

where l^* is the logarithm of the maximized likelihood and n is the number of estimated parameters. This approach penalizes models having a large number of parameters, since the model with the smallest value of AIC is preferred.[10] In our application, the values of AIC for the two and eight parameter models are 189.74 and 187.20, respectively. Hence, the more complex model is again preferred. This result shows that the set of transaction-cost variables are not just statistically significant; one would also expect them to aid in predicting the degree of sales force integration for firms which are not included in the estimation sample.

6. Conclusion

■ Our estimated logistic function, with three significant parameters, provides support for our model of the appearance of integrated and nonintegrated sales forces. The significant predictor variables have the expected sign, which indicates support for the theoretical rationales underlying them. Although several expected effects were not observed, those transaction-cost effects that do appear improve upon a simple company-size model of integration.

Williamson (1979) argues that transaction-specific assets are the single most important determinant of vertical integration, followed by uncertainty. In our results, however, the order is reversed. Internal uncertainty, i.e., how difficult it is to evaluate individual performance, is strongly associated with the use of a direct sales force. Specificity, although strongly associated, has somewhat less of an effect. A likely explanation is that in this setting, the provision of a marketing service, the specificity of three of the four categories of assets—physical, site, and dedicated—is either minor or implausible. Where human

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[9] Since the β-values have the same sign here as they did in Case 1, there is some evidence that multicollinearity between the set of transaction-cost variables and company size is not overly high.

[10] The statistic has been used for measuring predictive ability in a wide variety of settings including regression, time series analysis, multidimensional scaling, and cluster analysis (Rust and Schmittlein, 1982). Stone (1977) showed that using AIC to compare models is asymptotically equivalent to using the cross-validated likelihood function. For the logistic response function, Rust and Schmittlein (1982) also found AIC and cross validation to be very close in small samples (i.e., 10–12 observations per estimated parameter).

assets assume a prominent role, internal uncertainty is likely to assume considerable importance (Ouchi, 1979).

Contrary to the implications of Williamson's framework, the expected specificity/uncertainty interactions were not found; in this setting it appears that specificity and uncertainty have no incremental effect when they appear in combination. Further, frequency (density) appears to have no impact. Considerable difficulties are associated with measuring variables related to territorial density, e.g., workload, concentration of accounts, geographical dispersion, potential (Ryans and Weinberg, 1979). We suggest that measurement error might account for the weakness of our density measure. Recall that our measure of travel time is intended as a proxy for the ratio of potential to geographical dispersion. Had we been able to measure both potential and dispersion directly, the likelihood of error would have been much smaller.

Size of firm, the only nonterritory level variable, proves to be a powerful covariate. As expected, the larger the firm, the more likely it is to fill a territory with direct personnel.

These findings are for one type of integration (a marketing service) and one industry; hence, their generality remains to be established. Nonetheless, the results are encouraging, particularly to those who view the firm as an intendedly but imperfectly rational governance structure. Traditionally, economists have focused on production costs to the exclusion of transaction costs. Consequently, technological costs are viewed as the principal determinant of integration. The dominance of this paradigm led Coase (1972) to lament the state of affairs in industrial organization research at that date and to call for a more direct approach focusing on governance features. Our model is such an approach, and our results suggest that transaction-costs considerations are important determinants of integration.

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