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Test of A Transaction Cost Model

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Abstract

Vertical electronic integration -- a form of vertical integration achieved through the deployment of dedicated computers and communication systems between the relevant actors in the adjacent stages of the value-chain -- is important to organizational researchers since it provides a new mechanism for managing vertical relationships. Drawing upon research relating to transaction costs, a set of hypotheses on the determinants of the degree of vertical integration and its effects on business efficiency is tested in a sample of 143 insurance agents who are integrated with one focal carrier via dedicated computer-based system. The results did not support the hypotheses, thus raising some theoretical issues on the role of the transaction cost model in situations affected by information technology applications.

Key Words: Information technology; vertical integration; electronic integration; insurance industry.

Introduction

Recent advances in information technology (IT) -- including the development of standards for connectivity, greatly improved hardware price-performance ratios, and progress in the area of expert systems -- have made it economically and technologically feasible to exchange large volumes of complex information between firms with unprecedented ease and rapidity (see for example, Keen, 1986). In this context, the capability offered by advanced information technology to change the pattern of vertical relationships in a marketplace is an important issue for both researchers and practitioners. In recent years, several papers have focused on the general theme that we term as electronic integration among a set of independent firms that begins to change the basis of competition (Barrett and Konsynski, 1982; Cash and Konsynski, 1985; Johnston and Vitale, 1988). Electronic integration is viewed by us as 'the integration of business processes of two or more independent organizations through the exploitation of the capabilities of computers and communication technologies'.[1]

We see electronic integration as a specific form of vertical integration (VI), where the integration mechanisms rely fundamentally on functionalities offered by advanced information technologies. Thus, we build from the extensive body of research on vertical integration, especially pertaining to the transaction cost framework (Williamson, 1975) to derive a model of vertical integration in the context of IT applications. This model, on the determinants and effects of VI, is tested on data collected from a sample of 143 independent agencies handling property and casualty lines of businesses in the US, who are integrated through a

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[1] Electronic integration exploits the functionalities built into interorganizational information systems (IOS), but is distinct from both IOS and from the common technical platform of electronic data interchange (EDI) due to its particular focus on business arrangements. For a good classification of IOS, see Konsynski and Warbelow, 1989.

dedicated IT system. This study aims to contribute to the emerging stream of research in the area of electronic integration (e.g., Bakos, 1987; Clemons and Row, 1989; Malone, Yates, and Benjamin, 1987; Rotemberg & Saloner, 1989; Venkatraman and Zaheer, 1989).

Theoretical Considerations

The Role of Transaction Costs in Vertical Integration Research

Although research on vertical integration has adopted multiple theoretical perspectives (Perry, 1989), the transaction cost model (Williamson, 1975; 1985) is a dominant one (Walker, 1988). In this perspective, the costs arising from information asymmetry due to bounded rationality and environmental complexity, together with opportunism and small numbers exchange, are the key determinants of the decision to select a certain governance structure. This framework has been adopted to relate transactions cost (or its determinants) to the appropriate form of the governance structure in empirical research. For instance, research has examined the determinants of backward integration (Monteverde and Teece, 1982; Masten, 1984) sales force integration (Anderson, 1985; Anderson and Schmittlein, 1984), and make versus buy in components (Walker and Weber, 1984) using the underlying concepts from the transaction cost model. Further, research on the pattern of vertical integration (Levy, 1985) as well as its implications for contract duration (Joskow, 1987) and for joint ventures (Pisano, 1989) has been rooted in this framework.

Transaction Costs and Information Technology

Within the transaction cost model, costs arise from search and information-gathering, and from writing, monitoring and enforcing contracts in an exchange relationship. These costs, exacerbated by increased asset specificity and environmental complexity, determine the transactional efficiency of a relationship between two organizations in a marketplace. An evaluation of the transactional

efficiency of one governance structure versus another at a different level of vertical integration suggests the most appropriate location of the transaction.

Efficiency is compromised by information impactedness and coordination costs (Williamson, 1975), which are fundamentally influenced by the capabilities of computers and advanced communication technologies (i.e., information technology). This has resulted in the emergence of a stream of research on the application of the transaction cost model for explaining the pattern of governance in the marketplace affected by advanced information technologies (Malone, Yates, and Benjamin, 1987; Clemons and Row, 1989).

Malone *et al* (1987) argue that information technology reduces the costs of communication while expanding the reach, in terms of the number of economic agents that can be contacted. In other words, there is reduction in search costs in the marketplace through lower transmission cost while reaching a higher number and quality of alternative suppliers. These effects lead to lowered costs of coordination between organizations in a market, thus reducing the transaction costs of exchange. Malone *et al* suggest that the lowering of transaction costs in market modes, relative to hierarchical modes, may lead to an overall shift from hierarchies to markets. However, it is not clear that reduced coordination costs alone can impact transaction costs sufficiently to propel governance structures toward market modes. In an analysis of transaction costs, the possible counteracting influence of an increase in asset specificity must also be considered, as must the influence of technology on lowering transaction costs within hierarchies.

Thus, we derive a set of hypotheses on the determinants and effects of VI rooted in the transaction cost model, and empirically test them in a sample of independent insurance agents electronically-interfaced through a dedicated IT system in the property and casualty segment of the insurance industry.

Research Model

In this section, we translate the general concepts discussed above to the specific research setting. We describe the particular nature of vertical integration and identify its determinants and effects on firm efficiency, and develop a research model and a set of testable hypotheses.

The research model reflects our attempt to incorporate relevant theoretical considerations into the research setting, characterized by the use of a dedicated, proprietary *electronic interfacing system* (EIS) between an insurance firm (i.e., focal carrier) and several independent agencies. This system has been installed at the agency locations by the focal carrier (at no cost to the agents). This enables greater efficiency of communication with the focal carrier relative to other carriers as well as automated policy processing, endorsements, and claims handling with this carrier -- all carried out via electronic interfacing.

Table 1: Transaction Cost Determinants and the Functionalities of EIS

Transaction Cost Determinants	Impact of EIS on the Determinants of Transaction Cost
Bounded Rationality	Ease of information processing through the system mitigates bounded rationality
Complexity	Risk evaluation capability allows the handling of products of greater complexity
Information Impactedness	Better information access; quicker, easier communication, thus reducing information impactedness
Opportunistic Behavior	Superior monitoring capabilities act to countervail opportunism
Asset Specificity	Dedication of human assets and procedures increases asset specificity

The interfacing also embodies significant expert systems capabilities to evaluate risks and allow the agency to quote in response to customer requests with far greater speed and accuracy than earlier. These characteristics have a profound impact on the information-processing attributes of the transactions between the

carrier (insurance company) and the agency. Table 1 links the theoretical framework to the specific system functionalities.

Degree of Vertical Integration

The question of the appropriate degree of vertical integration in the distribution channel has occupied researchers in marketing (Stern and El-Ansary, 1977; John and Weitz, 1988) and economics (Perry, 1989). As noted earlier, we are interested in one particular form of vertical integration, namely electronic integration.

Following Williamson (1985) and Thorelli (1986), we recognize the existence of governance mechanisms *between* markets and hierarchies. Specifically, in the insurance industry, these include: direct writers (i.e., independent organizations dealing exclusively with one carrier[1]) or independent agencies dealing with multiple insurance carriers. In most cases, direct writers have no ownership rights of renewal over policies (Etgar, 1976). Some major insurance carriers rely largely on either direct writing agencies or independent agencies, while others use a combination of both. The choices made by the carriers in this regard are fundamental to their business strategies. Thus, issues relating to the determinants and effects of vertical integration are important in this industry. Etgar (1976) tested the relative efficiency of more and less vertically integrated insurance agents, with efficiency expressed in terms of reduced duplication of activities and the intra-system speed of communication. His study found that the more highly integrated dyads were generally more efficient. However, it did not focus on the role of IT applications in vertical integration.

In the last decade, insurance carriers are increasingly exploiting information technology capabilities to become electronically interfaced with independent

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[2]We exclude those direct writers that are company employees since they are part of the hierarchy.

agencies. One estimate is that in 1988, over 25% of all independent agencies were electronically interfaced with at least one insurance carrier[2]. In this study, we consider a focal carrier who has deployed a dedicated IT platform for interfacing with a set of independent insurance agencies. The specific capabilities available via this interfacing include: improved information flows; better monitoring and control capabilities; and reduction in costs of administering the policy processing activities. Thus, this form of interfacing allows the focal carrier to be electronically integrated with the agencies.

Asset Specificity

Asset specificity is one of the primary sources of transaction costs since it transforms the transaction context into a small numbers bargaining situation. Of the various sources of asset specificity that Williamson (1985) identifies, human asset specificity, exemplified by specialized training and learning, can be regarded as a potent form of asset specificity in a service industry such as insurance. Anderson (1985) considered specialized human knowledge as a form of asset specificity, while another manifestation of humans asset specificity relates to the extent of carrier-specific procedures for electronic interfacing. John and Weitz (1988) in their research on distribution channels noted that the critical asset specificity is the level of training and experience specific to the product-line, again emphasizing human asset specificity.

Indeed, as noted by Malone et al (1987; p.492), in the case of the well-known American Hospital Supply, there are "features built into the ASAP system to customize the system to a particular hospital's needs, in effect creating a *procedural asset specificity* in the relationships between the buyer and seller" (emphasis added). Thus, we expect this type of asset specificity to have a significant positive effect on

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[3] Adolf, *Independent Agent*, August 1987; p.25.

the degree of vertical integration. In other cases, the terminals and other peripherals could be carrier-specific, thus enhancing technological asset specificity. However, since the study focuses on only those agents that are interfaced with this particular system, there is no variance in the technological dimension of asset specificity, and we focus on the human asset specificity.

Since asset specificity is one of the key determinants of transaction costs, we expect the carrier has minimized the impact of transaction costs by having a more vertically-integrated relationship with agents with higher asset specificity. Formally, the hypothesis is:

H1: Asset Specificity will be positively related to the degree of vertical integration.

Product Complexity

A major element of complexity in the transaction cost context is the level of complexity of the product (Anderson, 1985; Malone *et al* 1987; Masten, 1984). Product complexity in the property and casualty insurance context is different between personal lines and commercial lines. In comparison with commercial lines, personal lines are relatively standardized, partly due to regulation, and partly due to intrinsic features (such as limited number of options on auto insurance). The commercial lines segment, which deals with businesses, has a multiplicity of products and options, with several hundreds of thousands of variations of coverage.

Products of high complexity require more information exchange between organizations or units involved in the transaction. As Malone *et al* (1987) noted, "buyers of products with complex descriptions are more likely to work with a single supplier, in a close, hierarchical relationship.." (p.487). Theoretically, due to relatively high transaction costs, such complexity as embodied in the commercial lines' product is more efficiently handled within a hierarchy than a market under *ceteris paribus* conditions. Thus, our hypothesis is:

> **H2:** Product complexity will be positively related to the degree of vertical integration.

Trust

One of the major underlying behavioral dimensions in the transaction cost perspective is opportunism, defined as 'self-interest seeking with guile' (Williamson, 1975, 1985). Williamson (1975) contrasts opportunism with 'stewardship behavior', which 'involves a trust relation' (p.26). Trust is clearly the obverse of opportunism (Jarillo, 1988), and a relationship based on a higher level of trust will be less subject to potential opportunistic behavior than one with lower levels of trust. Alternatively, improved possibilities for monitoring behavior may produce results equivalent to raising the level of trust in a relationship.

The specific electronic interfacing system contains the functionality of maintaining an 'audit trail' of the steps through which new business was evaluated and underwritten by the agency. Indeed, subsequent to the installation of the system, the focal carrier has granted underwriting authority to most electronically-interfaced agents. This authority implies that agents are able to complete the full circle of quoting, underwriting and issuing policies entirely without reference to the focal carrier. Agents, depending on their size and relationship with the carrier, have different levels of underwriting authority granted to them. Agents are audited regularly to confirm their adherence to company policies with respect to utilization of the underwriting authority.

We propose the following testable hypothesis:

> **H3:** Trust will be positively associated with the degree of vertical integration.

Size

Size has been a prominent variable in industrial organization economics (Scherer, 1980) and has an effect on vertical integration. In general, we could argue a positive effect between size and vertical integration. However, from the perspective

of a downstream service provider like an independent insurance agent, there are few reasons for large agents to be exclusively tied to a single insurance carrier (Stern and El-Ansary, 1977). This is because such vertical integration could weaken their ability to serve a variety of market segments. Thus, in our model, we specify size as a control variable and expect that the relatively larger agents are less likely to be vertically integrated. Thus,

H4: Agent size will be negatively related to the degree of vertical integration.

Efficiency and Its Determinants

The need to use efficiency as an important construct has been recognized (Anderson, 1985) but it has rarely been employed in tests of the transactions cost theory. In the P&C insurance business, with a very large number of firms and products of low differentiability, efficiency improvements may well be the drivers of improved effectiveness. Improved service efficiency can be viewed as a surrogate for product quality and be used as a differentiator by improving the level of service to customers (Etgar, 1976). Further, effectiveness can be realized in terms of a better market position or the ability to charge premium prices. In the following paragraphs, we identify the theoretical reasons for relating a subset of the determinants of VI identified earlier to efficiency; in addition, we relate VI to efficiency.

Vertical Integration. The first hypothesis develops the relationship between VI and efficiency. Specifically, given that Etgar (1976) found that a higher degree of vertical integration was associated with higher efficiency in the US property and casualty insurance industry, we propose the following hypothesis:

H5: The degree of vertical integration will be positively associated with efficiency.

Size and Efficiency. Size effects play a role in determining the level of efficiency (Scherer, 1980) due to scale economies in personnel, equipment, and other

fixed assets. Extending this logic, we treat it as a control variable and expect that the larger agents will, *ceteris paribus*, be more efficient than smaller ones. Thus, the hypothesis is:

H6: Agent size will be positively associated with efficiency.

Complexity and Efficiency. Commercial line policies, while being order-of-magnitude greater in complexity than those of personal lines, are also typically much larger in terms of premium volume. This is mainly due to the size of risks associated with commercial lines as opposed to personal lines. We expect commercial lines to exploit significant scale economies to realize a higher level of efficiency. Thus:

H7: Product complexity will be positively associated with efficiency.

Methods

Research Design

Data. One of the strengths of this study lie in the use of two independent and complementary sources of data: questionnaire and archival records of the focal carrier. Structured questionnaires reflecting the measures of the key constructs were mailed to all 321 agents of a focal insurance carrier that had deployed a sophisticated electronic interfacing system in the marketplace as of July, 1988. Complete data were obtained from 143 electronically-integrated agents, representing a response rate of 44.5%. This is considerably higher than the response rate of 20% reported by Etgar (1978) in his study of the property and casualty market. Supplementary data on the actual volume of commercial premiums of the agent with the focal carrier was provided by the carrier.

Informant. A major area of controversy in research on organizational-level phenomena relates to the identification of appropriate 'informant' who will provide data on the relevant organizational properties. We recognize the need to minimize key-informant bias that could potentially invalidate the results (Bagozzi and

Phillips, 1982). Hence, during interviews conducted with the independent agencies as well as with the marketing managers of the property and casualty company, we sought to identify the knowledgeable informant(s) for each agency as well as assess whether multiple informants were necessary. However, it became apparent that most agencies are owner-managed; accordingly, we chose the owner as the most relevant informant. We also decided that it was inappropriate to collect data from anyone else within the agency since no other person has the vantage point for providing relevant data for this study. Thus, our approach to data collection is consistent with the general recommendation to use the most knowledgeable informant (Huber and Power, 1985; Venkatraman and Grant, 1986); as well as the research practice of relying on a single informant in studies designed to collect data from small organizational units (Daft and Bradshaw, 1980). The mean insurance agency had a total personnel size of 26 and annual commercial premium of $5.8 million.

Measures

Vertical Integration. As mentioned earlier, the focal carrier engages in a wide spectrum of governance relationships with its agents. These range from those who conduct 100% of their business with products offered by this carrier to those who · handle multiple carriers and provide a larger cross-section of products in the marketplace. We operationalize the degree of vertical integration as 'the percentage of commercial line business, in dollar premium terms, accounted for by the focal carrier.' This operationalization is consistent with previous approaches to the measurement of vertical integration. For instance, John and Weitz (1988) operationalize vertical integration as the percentage of sales to end-users as opposed to channel members. Similarly, Pisano (1989) measured integration in terms of either direct equity investment or joint equity venture. We obtained data on the degree of vertical integration from the questionnaire.

Asset Specificity. Consistent with our theory, we focus on human asset specificity. The complexity and the unique features embedded in the specific electronic interfacing system requires either dedicated personnel for dealing with the carrier or specialized training of operators. Further, effective exploitation of the IT capabilities requires higher levels of participation for planning and implementing the new, unique procedures. Thus, we operationalized human asset specificity in terms of three dichotomous questionnaire items that were summated: (a) the presence of a dedicated EIS operator, (b) emphasis on training for EIS operation and (c) the involvement of operators in system planning and implementation.

Complexity. This construct could be measured in many different ways. One is to focus on perceived complexity of the product by the insurance agent. Given our focus on an organizational-level construct of complexity, we decided to measure this as 'the percentage of commercial line business' since it is a good surrogate for the level of complexity. This is further augmented by the fact that it is widely acknowledged that commercial lines are more complex than personal lines.

Level of Trust. The level of trust is operationalized as the extent of underwriting authority given to the agent. Since this function is perhaps the most critical aspect of the insurance process, and was thus far carried out only by the carrier, the extent of underwriting authority delegated is an appropriate measure for the trust placed by the carrier with the agent. Four levels of underwriting authority from the questionnaire serve as the measure.

Efficiency. Output per employee was operationalized as the commercial lines premiums per employee, a measure analogous to sales volume per employee. This measure of efficiency is consistent with Etgar (1976) and with standard engineering treatments of efficiency as the ratio of output to input. Further, in an industry such as insurance, the cost of labor is perhaps the largest single element of cost in an

agency. Whereas the commercial premiums specific to this focal carrier were obtained from the carrier's objective archival records, the total commercial premiums for the agency as a whole were calculated by applying the percentage of commercial premiums that the carrier represented for the agent, as reported in the questionnaire. The number of employees was obtained from agent-reported questionnaire data. Only employees engaged in commercial lines' business were considered with no attempt to split the top management group (usually not more than one or two persons) of the agent into personal and commercial lines.

Size. Size was operationalized as an 8-level categorization based on total premiums, reported by agents in the questionnaire.

Model Specifications and Analysis

The equations for the two sets of hypotheses -- one dealing with VI and the other dealing with efficiency -- are as follows:

$$VI = a_0 + a_1 \text{ Trust} + a_2 \text{ Asset Specificity} + a_3 \text{ Complexity} - a_4 \text{ Size} + \text{error} \qquad (1)$$

$$\text{Efficiency} = b_0 + b_1 \text{ VI} + b_2 \text{ Complexity} + b_3 \text{ Size} + \text{error} \qquad (2)$$

Multiple regression was used to test the hypotheses following the models specified in equations (1) and (2).

Results

Table 2 summarizes the zero-order correlations among the variables used in the models.

Table 2: Zero-Order Correlations (n-143)

Variables	Efficiency	VI	Complexity	Asset Specificity	Trust	Size
Efficiency	1.00					
VI	-.12	1.00				
Complexity	.35**	-.31**	1.00			
Asset Specificity	.04	.10	-.08	1.00		
Trust	.03	-.30**	.17*	-.34**	1.00	
Size	.26**	-.59**	.35**	-.12*	.05	1.00

* p<.05; ** p<.01;

Determinants of VI

Table 3 summarizes the results of estimating equation (1). The regression model was significant (F value: 23.36, p<.01), and explained over 40% of the variance in VI. However, it is important to highlight that the hypotheses relating to asset specificity and product complexity were not supported. Further, trust emerged significant in the direction opposite to the one hypothesized, and size -- introduced as a control variable -- emerged as negative and significant (a_4 = -0.531; t-value: 7.48) determinant of VI.

Table 3: Model Estimation (Equation 1)

Coefficient	OLS Estimates (t-value)
a_1 (Trust)	-0.2217 (-3.145)**
a_2 (Asset Specificity)	-.0431 (-.618)
a_3 (Complexity)	-.0778 (-1.096)
a_4 (Size)	-.5310 (-7.483)**

** $p<.001$;

The lack of support for the hypothesized determinants of vertical integration, in particular, asset specificity and product complexity, is a striking finding. The results are specially noteworthy in the light of the strong theoretical rationale in the transaction cost framework for expecting these variables to predict vertical integration, as well as previous empirical work (Anderson, 1985; John and Weitz, 1988) which has generally yielded statistically significant relationships in the direction hypothesized. In the next section, we discuss the possible reasons for, and the implications of, the lack of explanatory power of asset specificity and product complexity as determinants of vertical electronic integration.

The coefficient for trust was, contrary to the hypothesis, negative and significant, implying an inverse relationship between the level of trust and vertical integration. This suggests that the focal carrier tends to rely to a greater extent on the less vertically integrated agents, who incidentally are larger as indicated by a strong negative correlation between size and VI (Table 2). This seemingly contradictory

finding can be explained when we consider that underwriting authority is highly coveted by agents (due to the control and authority over the process of writing and issuing insurance that it implies), and the focal carrier is likely to be employing it as an incentive to agents to increase their business with the carrier. Agents that already have a high share of business with the carrier are less likely to need this incentive. In the discussion below, we suggest that it is the monitoring capabilities of electronic integration which enables them to trust even the less vertically integrated agents.

As expected, size emerged as a significant negative determinant of vertical electronic integration. It has been well-recognized that the relatively larger independent agents require a wide range of product options within the complex P&C insurance marketplace which are less likely to be met by the product range of a single insurance carrier (Stern and El-Ansary, 1977). Thus, this research further confirms this relationships. More importantly, it appears that even within the sample defined by electronic interfacing capability, the general theoretical expectation of size and VI was supported, suggesting that the information technology-mediated exchange does not alter the relationship of size with VI.

Determinants of Efficiency

Table 4 summarizes the results of estimating equation (2). The regression model was significant (F value: 7.95, p<.01), and explained over 15% of the variance in efficiency. It is important to note that we were not developing a full model of efficiency, but focused on specifying the relationship among the subset of variables (hypothesized to affect VI) and efficiency. Thus, the overall R^2 is less important relative to the coefficients of the specific variables in the model. Product complexity ($b_2 = 0.308$; t-value: 3.61) and size -- introduced here as a predictor variable -- emerged as positive and significant ($b_3 = 0.202$; t-value: 2.02) determinants of efficiency. Thus, two of the three coefficients emerged in the hypothesized direction and statistically significant at p-levels better than .01.

Table 4: Model Estimation (Equation 2)

Coefficient	OLS Estimates (t-value)
b_1 (VI)	.0889 (.906)
b_2(Prod. Complexity)	.3081 (3.613)**
b_3(Size)	.2021 (2.02)*

* P<.01; ** p<.001

Agent size was found to positively related to efficiency. This supports our hypothesis derived from the genera. theories of industrial organization economics. Product complexity is also a significant determinant of efficiency, for commercial lines policies are significantly larger than those of personal lines in terms of premium value, and an agent with a relatively high share of commercial lines would gain efficiency from economies arising out of high value products. However, contrary to our hypothesis and to the findings of Etgar (1976), the degree of vertical integration was not a significant determinant of efficiency (b_1: 0.0889 t-value: 0.91; ns). This is a puzzling result as we expected those agencies who have a higher share of their business with the focal carrier and have dedicated electronic interfacing capabilities to have a higher level of efficiency. This finding needs to be explored further in future research efforts.

Further, as an ex-post assessment, we evaluated whether there are indirect effects of (a) product complexity and (b) size through VI on efficiency. The two indirect effects were: $(a_3 * b_1)$; and $(a_4 * b_1)$[3] respectively. These two indirect effects were not statistically different from zero, again implying that VI has minimal mediating role in the efficiency model.

Summary

Table 5 summarizes the results, which indicates that only three of the seven hypotheses are supported. Indeed, it is important to note that the central hypotheses

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[4]The statistical test for the indirect effect -- which is a product of two beta coefficients -- is based on the approximation provided by Sobel (1982).

relating to the transaction costs framework did not receive empirical support in this study.

Table 5: Support for Hypotheses

Hypothesis	Relationship	Result
H1	Positive Effect of Asset Specificity on VI	Not Supported
H2	Positive Effect of Product Complexity on VI	Not Supported
H3	Positive Effect of Trust on VI	Not Supported
H4	Negative Effect of Size on VI	Supported
H5	Positive Effect of VI on Efficiency	Not Supported
H6	Positive Effect of Size on Efficiency	Supported
H7	Positive Effect of Product Complexity on Efficiency	Supported

Discussion

Possible Explanations Due to the Distinctive Features of Electronic Integration

Prior research studies have consistently demonstrated that the major transaction cost determinants, such as complexity and asset specificity, have significant effects on the levels of vertical integration. However, the distinctive characteristics of governance structure between the relevant organizations in this research context pertain to the role of I.T. Thus, it is likely that in the context of vertical, *electronic* integration, the I.T. capabilities act to mitigate the traditional determinants of VI arising from the transaction cost model. Specifically, we speculate that vertical electronic integration is a mode of governance where the superior information processing and monitoring capabilities embedded in the technology that underly the governance structure have a significant impact on the information attributes of the transaction context. This impact could be sufficient to mitigate the impacts of transaction costs in market-like modes so as to make insignificant the transaction costs differentials between differing degrees of vertical integration.

Moreover, in the context of vertical, electronic integration, the need for developing specific assets may be reduced, or could be standardized across all types of agencies. For instance, the level of carrier-specific training required for electronic interfacing may be both low and standard across governance modes to influence the level of VI. Indeed, we speculate that sharply increased expert system capabilities built into the interfacing system could reduce human asset specificity at the level of the agency with a correspondingly minimized impact on the level of vertical, electronic integration. Lower requirements of asset specificity may not convert the transacting situation into a small numbers bargaining one, making it relatively more attractive to conduct the transactions in market-like governance modes.

Similarly, product complexity had insignificant predictive power over the level of VI. This could be due to the possibility that the complexity inherent in commercial lines can be efficiently handled through sophisticated software, thereby simplifying the transaction and eliminating some of the 'frictions' resulting from dealing with complex products in a market setting.

Opportunism too may be attenuated by the increased monitoring capability of electronic interfacing, given that the system has the functionality to record the process of underwriting -- which can be, and is, periodically audited. This 'audit trail' allows the focal carrier to delegate underwriting authority to electronically integrated agencies irrespective of their specific level of integration. Indeed, the decentralization of underwriting authority could be an important differentiator in the marketplace to induce the agency to shift its business to the focal carrier. This could partially explain why the level of trust was found to be negatively associated with VI: higher underwriting authority could be recently granted to those with a smaller share of the carrier's business to induce them to increase their level of vertical integration. However, a cross-sectional study, such as this one, cannot

distinguish between changes in trust and changes in vertical integration, which is an important area of further inquiry.

The general theoretical case for the existence of substitutes for vertical integration was first suggested by Blois (1972). Quasi-integration describes a situation in which many of the benefits from vertical integration accrue to a focal firm without the firm incurring the costs associated with ownership. The substantial theoretical development of this idea in the industrial organization stream is reviewed by Mahoney (1989) who suggests that a wide range of vertical control options exist for firms to reap the benefits of vertical integration without incurring the full costs of ownership. Conceptually, from the perspective of the transaction costs motives for vertical integration, these theoretical developments imply that transactions costs in market-like modes may be controlled by the use of certain formal arrangements and mechanisms.

The idea that the effect of the determinants of transaction costs in non-hierarchical relations can be mitigated under certain conditions has recently been gaining conceptual and empirical currency. Jarillo (1988) noted that the network form of governance between firms was analogous to Ouchi's (1980) concept of clans in a hierarchy. In both modes, opportunism is tempered, the time horizon is lengthened and transaction costs lowered. While clans mitigate conditions of high uncertainty through a strong organizational culture, Jarillo suggests that trust relations can be purposefully forged between firms engaged in long-term relationships in a network governance form. Game theoretic concepts also support the notion of cooperative behavior in the case of repeated games (Kreps, 1984); recurrent exchange is similar to an infinite horizon game. Reputation effects also moderate the incentive to behave opportunistically.

While the notion that transaction costs can be reduced in market modes due to the influence of conditions such as formal arrangements such as vertical restraints, long-term relationships, or trust relations appears to be established, the present study has in fact reached a stronger conclusion -- that transactions costs determinants do not differ between degrees of vertical integration. Indeed, in a recent study, Walker and Poppo (1989) reached a similar conclusion in a study of the transaction cost differences between two types of suppliers - an in-house profit center and a single-source supplier. Contrary to theory, their results showed no differences in transaction costs between the two types of governance structures. They suggest that *organizational policies*, such as those used to develop external suppliers and manage the supplier relationship, could account for the findings.

The potential managerial implications of the present findings are significant. Our study did not find any differences in transaction cost determinants between differing degrees of vertical integration, suggesting that market-modes of governance may be economically feasible in a context of vertical electronic integration. Where a firm can lower transaction costs of the organizing mode closer to the market, the firm can shift transactions out to market modes from hierarchical modes. Since market modes theoretically have production costs advantages (Williamson, 1985), a firm that can lower transactions costs by the use of electronic integration might gain a competitive advantage over firms that cannot or have not achieved similar reductions in transaction costs. In such a situation, companies may profitably consider more 'arms-length' relationships, and avoid the explicit and implied responsibilities that underly exclusive relationships. These responsibilities include support in times of industry downturns, advertising subsidies, and consulting teams sent out by the focal carrier to help the more vertically integrated agents manage their business better. Vertical integration in the context of IT-mediated exchange could then have significant competitive implications. While

this mode of organizing is emerging rapidly in many markets for dealing with both upstream and downstream integration, very little systematic research findings on their role and effects have been forthcoming. However we caution that more research is needed before we can develop strong implications for managerial practice. Indeed, an important area of future research is to develop a theoretical model of electronic integration that builds from theories of vertical integration but is differentiated along key characteristics of IT-mediated exchange.

Limitations

We enumerate a set of limitations of this study with a view to suggesting areas that could be improved in future research efforts. Given the infancy of theoretical development and empirical research both in the context of transaction costs model for vertical integration as well as its role and application for a particular form of vertical integration, namely vertical, electronic integration, these limitations are not as serious as they may be in more mature streams.

First, the operationalization of the measures could be improved to reflect the need for multi-item scales. However, in this study, we used measures that are (a) generally in line with the theoretical arguments; (b) consistent with prior research (e.g., Anderson, 1985; John & Weitz, 1988); and (c) appropriate for the specific industry setting (i.e., measures readily understood by the respondents, assessed during pre-tests), thus mitigating potential measurement error.

Second, the robustness of the results requires further corroboration in a sample of agents that are not electronically-interfaced. This could not be achieved in the present study since the measure of asset specificity was intricately tied to the dedicated human assets required to operate the system and was not applicable in a benchmark sample of non-interfaced agents.

Finally, given that electronic interfacing is relatively new in many markets, a powerful design would be to adopt a pre- versus post- electronic interfacing to assess

the change in the level of VI as well as its determinants and effects. This could help, for example, to understand the negative relationship between trust and VI observed in this study.

Conclusions

This paper developed a set of hypotheses on the determinants and effects of vertical, electronic integration that were rooted in the transaction cost framework and were tested in a sample of 143 independent insurance agencies in the property and casualty segment of the insurance industry. The results provide no support for the transaction cost determinants, raising the possibility that the availability of sophisticated information processing capabilities could mitigate the transaction cost effects. Some explanations for the results and issues for future research were noted.

Given the consistently strong results for the transaction cost determinants in prior research, this set of results are particularly striking. However, partial explanation could lie in the setting. namely: a particular form of integration. We believe that the results would provide an impetus to develop a contingency view of the role of transaction cost framework, especially in the context of information technology. This is because the emerging capabilities of information technology could both enhance and mitigate the transaction cost determinants and a more careful delineation of the underlying causes and effects is an important area of future research.

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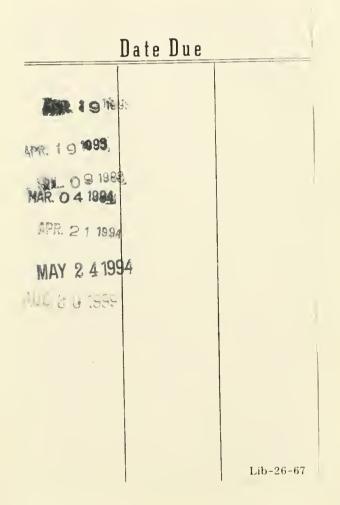Jarillo, J. Carlos. (1988). "On strategic networks". *Strategic Management Journal*, 9:31-41.

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