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Abstract

Is knowledge power? The study asks this question in the context of EDI links between suppliers and wholesalers in grocery marketing channels. This paper starts with the view that EDI links favor the suppliers, because they obtain trading information and gain marketing flexibility more than the wholesalers do. Based on exploratory survey data from 33 grocery wholesalers, the paper confirms that EDI use may lower wholesalers’ perceived bargaining power. But it also shows that an appropriate level of incentives from suppliers tends to compensate for the power loss. This results in higher trust and cooperation in the trading relationships.

Introduction

In wholesale grocery distribution channels, the role of information is increasingly recognized as one of the important bases in buyer-seller relations. Wholesalers, in particular, are worried about the effects of an industry-wide distribution reengineering effort called Efficient Consumer Response (ECR), which extensively uses EDI. With ECR, “information will replace dollars as the currency of the deal, and creativity, knowledge and improved business systems and processes will be the fulcrum determining how power is assessed and balanced” (Progressive Grocer, 1995). If the ability to leverage business knowledge ultimately determines who prospers economically, then how does the use of EDI, which automates the trading of transactional knowledge between firms, influence the balance of firm bargaining power? Interestingly, there are conflicting reports from both industry and academic studies on who gains power with EDI in grocery distribution channels.

Theoretical Background

Among the existing studies, there are two main threads of research that look at the impact of EDI in channel power dynamics. The first research stream focuses on market structure as a primary source of bargaining power. The second research stream views firms’ bargaining power as one part of firm behaviors in the context of interorganizational relationships (IORs).

Market Structure View. The first research stream looks at the impact of EDI on market structure using transaction cost economics or TCE (e.g., Williamson, 1975). Using this TCE, Malone et al. (1987) predicted that advanced information technology (IT) favors an overall shift toward markets. Emphasizing how IT lowers buyer search costs, this view also argues that the relative power between buyers and sellers shifts toward the buyers (Bakos, 1991). However, Bakos and Brynjolfsson (1993) argued that firms choose close relations with trading partners in order to jointly enjoy technology innovations. Similarly, Clemons et al. (1993) noted that economies of scale, learning curve effects and other factors favor a move towards long-term relationships with a smaller set of trading partners. For EDI research, a difficulty of this view is that market structure is influenced not only by EDI use but also by many other factors such as firms’ strategies, technological innovations, and their complex interactions. Furthermore, when power is measured by profitability, no power shift was detected in the grocery distribution channel (Messinger and Narasimhan, 1995).

IOR View. The second research stream assesses IT’s impact from the IOR standpoint. In contrast to the market structure studies, power is not treated as a separate entity but as only one part of IOR along with conflict, cooperation and maintenance. Based on field interviews, Stern and Kaufmann (1985) conjectured that EDI makes existing relations closer and more satisfactory because EDI improves interfirm communication. In an empirical study, Bensaou (1993) indeed found that the scope of EDI use was positively related to the level of cooperative atmosphere in the Japanese buyer-supplier relations. However, EDI can increase a firm’s vulnerability (Hart and Saunders, 1997) as well. For example, Clemons and Row (1993) described how grocery retailers may lose bargaining power because EDI improves coordination. As more store-level information goes to suppliers, they use this information to exercise more monitoring on product promotions at the retailer level, squeezing the profit margins of the event-driven retailers. Thus the IOR view has not yet provided a definitive answer to the EDI impact on bargaining power. EDI may serve as a coordination enabler, but it may also be an element of contentions between suppliers and wholesalers.

Theoretical Model for Channel Power Shift

As a first step of empirical investigation, this paper takes the IOR view to examine the impact that EDI has on the bargaining relationships between trading partners. The theoretical model is shown in Figure 1. We consider its hypotheses.
Some benefits of EDI use such as logistics cost reductions can be enjoyed by both suppliers and wholesalers. However, other benefits are not necessarily symmetrical. For instance, suppliers obtain more accurate and timely information on product sales and on their partner’s operational status through EDI links. In contrast, wholesalers do not obtain through EDI any information on supplier’s operational status.

H1: The extent of EDI use between suppliers and wholesalers is positively associated with the magnitude of power loss felt by wholesalers.

If we assume that EDI usage results in a power shift towards the suppliers, then why do the wholesalers agree to use EDI in the first place? According to relational exchange theory (Dwyer et al., 1987; Heide, 1994; Lusch and Brown, 1996; Macneil, 1980), the suppliers must somehow compensate for the negative consequences on the wholesalers’ side to maintain the balance of trading exchanges. On the basis of the interviews I conducted, grocery suppliers indeed tended to provide two kinds of incentives: price breaks on EDI use and value-added services to the wholesalers.

H2: The extent of EDI use between suppliers and wholesalers is positively associated with the degree of price breaks provided by suppliers.

H3: The extent of EDI use between suppliers and wholesalers is positively associated with the level of incremental value-added services provided by suppliers.

Furthermore, these incentives should proportionally increase the perceived power level of the wholesalers, so that the wholesalers agree to exchange more trading information via EDI.

H4: The degree of price breaks provided by suppliers is positively associated with the magnitude of power gain perceived by the trading wholesalers.

H5: The level of value-added services provided by suppliers is positively associated with the magnitude of power gain perceived by the trading wholesalers.

Finally, if relational exchange theory indeed applies, any change in perceived power level should lead to a change of behavioral outcomes such as trust and cooperation.

H6: The magnitude of ex post power gain felt by the wholesalers is positively associated with favorable behavioral outcomes in the trading relationship.

Method and Results

To test the theoretical model, I conducted three case studies and surveyed grocery wholesalers using a questionnaire. I collected survey data from 33 U.S. grocery wholesalers among those listed in 1996 Uniform Code Council EDI Member Directory and Chain Store Guide/Wholesale Grocers ’97. The very small sample size may reflect the slow EDI penetration among wholesalers. Nevertheless, there was some evidence the sample resembles that of a previous industrywide EDI survey (Joint Industry Project on ECR, 1995).

In principle, structural equation modeling (SEM) is an appropriate statistical method to test relationships with multiple paths. Given the sample size, however, I first applied partial correlation analysis, and I simulated SEM analysis by using EQS for Windows (Bentler, 1995). I then compared the results from both methods. The main focus of these analyses was to evaluate the direction and magnitude of the hypothesized relationships rather than precise estimate of their coefficients.

The partial correlation analysis found that price break positively correlated with EDI use ($r = .32$ at $\alpha < .10$) and felt power level ($r = .56$ at $\alpha < .01$), supporting H2 and H4. It also found power positively related to behavioral outcomes ($r = .43$ at $\alpha < .05$) to confirm H6. However, EDI use did not significantly correlate with felt power, thereby rejecting H1. Incremental value-added service was negatively correlated with EDI use, while it had a non-significant positive correlation with power. Thus H3 and H5 were rejected. Then I created a SEM model (Figure 2) by using the original sample (N = 33) and three bootstrap simulation samples (N = 100, 500, 1,000). The coefficient estimates of SEM analysis ($df = 24$, CFI = 0.87 to 1.00) are fairly consistent with those obtained from the partial correlation analysis as shown in Table 1.
The above results at first suggest that EDI use did not contribute to a power shift. However, the negative effect of incremental value-added service on EDI use—the effect that may have reversed the effect of price break—casts some doubt on this observation. A higher use of EDI occurred presumably when the level of value-added service was high to begin with. Given the initial higher level, the incremental value-added service level was probably lower. Thus, incremental value-added service should be regarded as a reflection of initial trading atmosphere rather than an incentive on EDI use.

To test this argument, I created a post-hoc model by removing incremental value-added service from the original one. The partial correlation analysis found a stronger negative correlation (r = -.24) between EDI use and power (H1). Its statistical significance did not reach a .10 level, although it did so only when power was measured by just purchase price (r = -.36 at α ≤ .05) or purchase price and shipping schedule (r = -.35 at α ≤ .05). On the other hand, the SEM analysis (df = 18, CFI = .91 to 1.00) did find support for H1, while showing conforming results with those from the correlation analysis (Table 2). As small sample size punishes statistical significance, Table 2 thus appears to support H1 overall.

<table>
<thead>
<tr>
<th>Method</th>
<th>CFI</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>H6</th>
</tr>
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<tr>
<td>partial correlation</td>
<td>n.a.</td>
<td>-.13</td>
<td>.32*</td>
<td>-.32*</td>
<td>.56***</td>
<td>.28</td>
<td>.43***</td>
</tr>
<tr>
<td>SEM (N = 33)</td>
<td>1.00</td>
<td>-.17</td>
<td>.29*</td>
<td>-.36**</td>
<td>.63***</td>
<td>.29*</td>
<td>n.a.</td>
</tr>
<tr>
<td>SEM (N' = 100)</td>
<td>.87</td>
<td>-.14</td>
<td>.26***</td>
<td>-.35***</td>
<td>.63***</td>
<td>.33***</td>
<td>n.a.</td>
</tr>
<tr>
<td>SEM (N' = 500)</td>
<td>.87</td>
<td>-.16***</td>
<td>.28***</td>
<td>-.34***</td>
<td>.62***</td>
<td>.32***</td>
<td>n.a.</td>
</tr>
<tr>
<td>SEM (N' = 1,000)</td>
<td>.87</td>
<td>-.17***</td>
<td>.29***</td>
<td>-.35</td>
<td>.62***</td>
<td>.31***</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

*: bootstrap simulation with 10 replications, **: α ≤ .05, ***: α ≤ .01

<table>
<thead>
<tr>
<th>Table 2. Post-hoc Coefficient Estimates</th>
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<tbody>
<tr>
<td>Method</td>
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<td>SEM (N' = 500)</td>
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<td>SEM (N' = 1,000)</td>
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</table>

*: bootstrap simulation with 10 replications, **: α ≤ .10, ***: α ≤ .01

**Conclusion**

There was some evidence that power shifts towards suppliers with EDI. However, the results also suggest that successful trading relationships, characterized by higher trust and cooperation, have suppliers who provide reciprocal incentives to wholesalers for obtaining sensitive trading information from them. In this sense, suppliers have a choice to make EDI either an enabler for cooperative joint operations, or a source of conflict in trade bargaining.

**Acknowledgment**

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**References**

References available upon request from author mnakayam@anderson.ucla.edu).