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Coordination in Marketing Channels: The Effect of Information Systems.

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Introduction

Marketing channels are complex interdependent partnerships that enable goods to flow from producers to consumers. Coordination in channels requires divergent goals of channel members to be reconciled. In the marketing literature the focus of studies on channel coordination has been on comparing different channel structures and consequent optimal strategies. The crux of the problem is to find optimal mechanisms in which costs and profits are shared by different channel members. The resultant intra-channel climate of cooperation and conflict are vastly dependent on these mechanisms.

In recent years, marketing channels have seen significant structural changes because of introduction of interorganizational systems (IOS). These systems facilitate exchange of business information across organizational boundaries and normally comprise of an industry specific application on top of an electronic data interchange (EDI) backbone system. Some well-known examples are Quick Response (QR) in the fashion industry and Efficient Consumer Response (ECR) in the grocery industry. The two important technical requirements for these systems are (1) message standards which provide the definitions of the data being transmitted and (2) telecommunication protocols. The grocery industry, for example, combines these two requirements into an industry standard called Uniform Communication Standard (UCS). The early systems were proprietary in nature, and often provided the initiator with first mover advantage. More recently, proprietary systems have given way to industry standards. Differing standards were found to be irritants for wider adoption and required costly translations and third party services. A more important development in recent years is the integration of these electronic linkages into the internal systems of the trading partners.

Effects of IS on marketing channels

The adoption of IOS has often been accompanied by massive reengineering/ restructuring of inter and intra-organizational processes, structure and resources. The benefits of such re-organization efforts and their division among trading partners have not been very clear at least during the initial phases. This has been a subject of much speculation in the past with retailers suspecting the manufacturers as the prime beneficiaries and vice-versa. Recent studies [KURT93] on ECR point towards benefits to both manufacturers and distributors. Benefits arise from cost savings from automation of ordering activities; reduction in fixed overheads from efficient utilization of manufacturing capacity or warehouses; lower inventory and fewer physical assets. There are indirect benefits of reduced clerical errors in ordering and invoicing . These benefits accrue to both parties in a dyad, for example, ordering costs to retailers and order processing costs to manufacturers may both be reduced due to automation. Similarly, both partners may have reduced inventory. Efficient replenishment, a part of the overall ECR effort, can potentially reduce supply chain-wide inventory levels by 50%. Note however that as the technology matures and IOS become common place, the benefits of electronic trading will not be retained by the channel members. Competition to maintain market share will ensure that most of the benefits will ultimately go to the consumer.

Past Studies

The initial studies on effect of information systems on distribution channels were mainly case studies on how information system has altered the buyer-supplier relationship and allowed the initiator to achieve competitive advantage. They include McKessonís Economost [CLEM88], American Hospital

Supplies/Baxterís ASAP [KONS88, SHOR92]. Emmelhainz [EMME87] has studied the effect of electronic data interchange on the purchasing process. Recently Nidumolu [NIDU95] and Chandra et al. [CHAN95] have used Stern and Reveís [STER80] political economic framework to examine changes in channel structure brought about by interorganizational systems.

Problem Definition

If these systems are causing such big bang effects on marketing and logistics organization and costs, then it is surely a worthwhile effort to model them. There are very few models using management science and microeconomics to explore such changes. The issues that need examination are (1) the effect on final and intermediate prices and sales (2) benefits accruing to different partners under no adoption, partial adoption and full adoption (3) the effect of cost of joining the network on decision by trading partners to join and (4) effect on turnaround times and inventory. Preliminary studies [KURT93], for example in the dry grocery supply chain, predict average consumer price reduction by 11%. This also affects intermediate price like-wise. The supply chain inventory is slated to go down by 41% from 104 days of supply to 61 days. It is also predicted that partners who adopt these systems early will be able to pass on these benefits to the consumer and thereby gain market share and competitive advantage. Therefore these linkages exhibit competitive externalities by taking away product sales from their competitors.

	Effect of Increase in adoption cost		Effect of Decrease in transaction Cost	
	Centralized	Decentralized	Centralized	Decentralized
Number of retailers	(-)	(-)	(+)	(+)
Total Channel Profit	(-)	(-)	(+)	(+)
Manufacturer's Profit	(NA)	(-)	(NA)	(+)
Retailer's Profit	(NA)	(+)	(NA)	No effect

Table 1. Effects of changes in the adoption cost and transaction cost on number of retailers and profits

The Model

We analyze coordination in a single producer - multiple retailers channel with the producer as a monopolist. We assume different market conditions (1) common demand facing the retailers , i.e., the retailers are competing against each other and (2) retailers operating in segmented market with a measure of monopoly in their respective geographic regions. We study the effects of (1) lower transaction cost and (2) adoption cost as a result of the introduction of IOS on channel profit and its allocation among channel members. Lower transaction costs as mentioned before are a result of reduced administrative cost, lower inventory and reduced physical assets. Adoption of IOS is costly because of software and hardware requirements, communication lines, translation software and training of personnel. We assume different allocation of decision rights, that is, centralized decision making versus decentralized decision making [JEUL83]. In centralized decision making the manufacturer decides to maximize total channel profit. This would happen when the channel is integrated or when the manufacturer and the retailers undertake joint pricing and quantity decisions. In decentralized decision making each trading partner optimizes its own profit without consideration for the overall effect on the channel. Note that Riggins et. al. [RIGG94] and

Seidmann and Wang [SEID95] have analyzed a mirror image of this problem in a buyer initiated EDI network with multiple suppliers. Although the main focus of their work is adoption of EDI by suppliers, Seidmann and Wang also examine the effect on prices and quantities as a result of heterogeneity of suppliersí productivity. Initially we assume adoption costs are borne entirely by the manufacturer and the reduction in transaction cost accrues to the retailer only. This simple model provides some managerial insights into the behavior of the supply chain under the current assumption. The overall channel profit is affected negatively by the adoption cost and positively by reduction in transaction cost. We assume that adoption cost incurred by the manufacturer is directly proportional to the number of retailers and not on the quantity sold. A reduction in transaction cost affects profit by reducing the cost of operation and is assumed to be directly proportional to the number of units sold. Under the situation of retailers competing in a common market, and for the decentralized decision making, the manufacturer is able to extract all the benefits from the retailers. A larger adoption cost leads to a decrease in number of retailers thereby reducing retailer competition. This in turn leads to increased profits for the retailers who remain in the system.

The final price is reduced and sales quantity increased with larger reduction in transaction cost; the reverse is true for increases in adoption cost. Part of the result is summarized in Table 1. There exists an optimum number of retailers in case of both centralized and decentralized cases. The value of the optimum number of retailers increases with reduction in transaction cost and decreases with increase in adoption cost. Note that we have not incorporated the cost of entry or exit; such costs may lead to different optima. At times the manufacturer may not have any control on the adoption decision of the retailers. In that case it is better for the manufacturer and retailers to cooperate and share any extra in an agreed manner.

We also find that in a decentralized environment, the manufacturer is always better off by having cooperative agreements with retailers. (e.g. side payments as described by Jeuland and Shugan). Since IOS lead to different levels of profits, these cooperative arrangements will have to be re-negotiated with the adoption of the IOS.

Results similar to those in Table 1 also hold for retailers operating in a segmented market, except that in this case the manufacturer is not able to expropriate all the profits. In another paper, we examine the effect of partial adoption on profits of manufacturer and retailers. We also examine the case when adoption costs are borne by the retailers.

Conclusions & Extensions

This study contributes towards understanding analytically some of the factors behind the complex phenomena of IS and marketing channel interaction. It has also attempted to address the need for supplementing empirical and anecdotal evidence with an analytical model

Current studies have considered identical benefits accruing to channel members (at the same level). Heterogeneity has been assumed with respect to cost or production functions but not in terms of benefits. Under stochastic demand condition, benefits to different suppliers may not be the same if the demand uncertainty is different for different markets.

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