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The Marketing Intermediary as an Information Seller: A New Approach

The model assumes that each marketing intermediary sells information about supply conditions at a price and maximizes his profits from the sale. Under free entry, price equals the average cost of information handling. Solving optimal conditions then provides, in a single-level channel case, the equilibrium values for the number of intermediaries operating in the channel, number of suppliers handled by each intermediary, and price charged for each information bit. The model is then extended to a multiple-level channel case.

Introduction

The rationale for the emergence of intermediary institutions in marketing channels has been the focus of research for many marketing scholars. A review of the work done in this area reveals two broad approaches to this issue. One group of scholars has focused on the ability of such intermediary institutions to reduce costs of the physical flows of goods and services from producers to users. Alderson and Martin (1965) in their "sortment and assortment" model suggested that marketing intermediaries can streamline physical flows and rearrange them in more economic setups. Stigler (1951) introduced the notion of vertical specialization, whereby he proposed that marketing functions are shifted to specialized agencies to achieve greater efficiencies. Mallen's (1973) notion of vertical spin-off followed basically the same rationale.

Another approach adopted by several researchers has been to focus on the role of a marketing intermediary in facilitating the transmission of information within the marketing channel between producers and users. Therefore, these researchers developed analytic frameworks purporting to explain the emergence of marketing intermediaries due to their ability to collect, disseminate, and use information efficiently (Balderston 1958; Bucklin 1965; Baligh and Richartz 1967).

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The Information-Transmission Approach to Channel Development

Balderston (1958) has expounded in detail the role of a marketing intermediary in transmitting information. The need for information arises because of the inherent uncertainty that buyers and sellers encounter in the markets. Products and services are moved from producers to users through a set of transactional arrangements whereby buyers and sellers enter exchange agreements; however, before entering any such agreements, prospective buyers and sellers need to know what conditions of demand and supply are. Buyers need to know what suppliers offer in terms of prices and quantities; suppliers must know the extent of demand to determine which offers they will accept and which they should reject.

Conditions of exchange required to move products from producers to users therefore generate a need in the channel for setting up a system of communications through which such information is transmitted to buyers and sellers. Operation of a communication network imposes certain costs on a marketing system in terms of resources devoted toward maintaining this network. Given the task of the communicative flow, a reduction in communication costs then reduces total system costs. Then Balderston proceeds to show that an introduction of marketing intermediaries can reduce such costs.

Students of organizations and economic systems have long recognized, however, that, when information becomes valuable, it soon acquires the attributes of an economic good. It is bought and sold, and its disposal is no longer free.

This work therefore extends the basic work of Balderston by developing a new approach toward the marketing intermediary institution. The latter is viewed as an economic agency that is involved to a large degree in buying and selling marketing information. The economic justification for its emergence in a given marketing channel is provided by its ability to operate more efficiently than alternative sellers of information.

The Communication Network Model

Balderston sets up a simple model of a communication network in a marketing channel. To concentrate on the communicative facets of a marketing channel operation, he assumes a single-product market, standard order size, a single standardized method of shipment, no inventory costs, and constant costs for transmission of any bit of information. Total system communication costs (without an intermediary) are computed by multiplying the number of sellers (m) by the number of buyers (n) times cost per contact (A). A marketing intermediary who maintains contacts with all suppliers and buyers and who operates under identical conditions can transmit the same information at lower costs of $A(m + n)$. With an intermediary, the system then saves

$$S_1 = A[mn - (m + n)]. \tag{1}$$

And with w intermediaries, the total savings Sw reach

$$Sw = A[mn - w(m + n)]. \tag{2}$$

Equation (2) is then used to derive the equilibrium number of intermediaries who will operate in a marketing system, w^*. The mechanism through which the adjustment takes place is intermediaries' profits. Assuming that intermediaries appropriate all savings, total intermediaries' profits are equal to Sw. Initially Sw is positive; this attracts new entrepreneurs, who enter the system. As w increases, $w(m + n)$ increases as well as reducing Sw. When it reaches zero, entry ceases and the equilibrium level of intermediaries (w^*) is reached. The variable w^* can be easily derived from $Sw = 0$ and is equal to

$$w^* = mn/(m + n). \tag{3}$$

Multiple-Level Channels

Baligh and Richartz (1967) have further extended the communications network model by introducing the notion of multiple-layer channels. Using the rationale expounded in the communications network model, they showed that second-level intermediaries who connect first-level intermediaries and the buyers (or sellers) can further lower total system communication costs. Designating the number of second-level intermediaries operating in a marketing system as w_2, the savings, Sw, generated by their introduction will equal

$$Sw = A[mw_1^* - W_2(m + w_1^*)], \tag{4}$$

or

$$Sw = A[nw_1^* - w_2(n + w_1^*)], \tag{4A}$$

where w_1^* denotes the equilibrium number of first-level intermediaries. The equilibrium number of second-level intermediaries can be derived as for the first-level ones and would equal

$$w_2^* = \frac{w_1 m}{w_1 + m}, \tag{5}$$

or

$$w_2^* = \frac{w_1 n}{w_1 + n}. \tag{5A}$$

Criticism

An analysis of the communications network model reveals a basic inconsistency. Consider a two-layer channel. In this channel, following derivation of w_1^* and w_2^* once w_2^* is determined, first-level intermediaries need, in effect, to connect the n buyers not with m suppliers but with a smaller number of second-level intermediaries (as $w_2^* < m$). From equation (2) we know that the number of first-level intermediaries depends on the number of end points of information receivers and providers; as $w_2^* < m$, fewer intrachannel contacts now need to be made, and therefore fewer first-level intermediaries will survive in the channel.

However, such a reduction also implies fewer linkages at the second level in the channel, reducing the optimal number of second-level intermediaries, which in turn creates a new chain of reductions in both channel levels, and leading to a channel with only one intermediary on each level. Such a monopolistic structure can be expected to allow the two intermediaries to reap above-normal profits. However, if no barriers to entry exist, newcomers will enter the system. Thus, the number of first- and second-level intermediaries grows and contracts cyclically, rendering the system unstable. Or, in other words, no equilibrium configuration exists in the multiple-level channel of Balderston and of Baligh and Richartz.

The inherent weakness of this model lies in its inability to explain the pattern of behavior of the marketing intermediaries. It must be recognized that once information carries economic value it becomes an economic good, and as such it becomes a commodity by itself. It is sold and bought, and its flow in the channel is therefore regulated by a price mechanism. Consequently, to understand correctly how a marketing intermediary operates, a new model has to be developed. Such a model is hereby presented.

Marketing Intermediary as an Information Seller

In this model, the focus of analysis is again on the flow of information within the channel. Therefore, physical flows are not considered. This does not imply that these flows are not important, but they are out of the scope of this analysis, following the traditional approach of the information-transmission school of marketing channels research.

The approach used in this model is economic. We view the marketing intermediary basically as an information broker whose role in the channel is to transmit information. However, such transmission is carried out through a set of prices. To indicate the basic mechanism of the process, its basic assumptions are simplistic. Further fine tuning of the model, however, would not greatly change its basic conclusions. First, we shall present the one-level case; then we extend it to multiple-level cases.

One-Level Case

The "product" that the marketing intermediary sells is an information bit. He can collect information about the suppliers who operate in the system and sell it to the buyers, or vice versa. In the latter case, the analysis is identical but inverse to the former. Therefore, for the sake of brevity, presentation is limited to the former case only. In the simplest case, one can assume that each intermediary collects information about all suppliers and no spatial or other specialization exists. All intermediaries therefore sell identical information, and the buyer can acquire all the information he needs from one intermediary.

For his "product," information about the supply conditions offered by each supplier, the intermediary charges a uniform price p. The intermediary behaves as a regular profit-maximizing entity and sets his price at a level where his profits are highest. To determine p, one must therefore calculate an intermediary's profit function Π—that is, identify his revenues and costs. His total revenue is a product of revenue per information buyer—that is, price charged per each bit of information (p) times the number of suppliers (m) about whom information is supplied times the number (n_i) of information buyers—from an individual intermediary.

Total intermediaries' revenue would then equal

$$R = n_i(mp), \text{ where } n_i \leqslant n. \tag{6}$$

An intermediary's costs include two components. The first are the communication costs, which are directly proportional to the number of channel contacts established by the intermediary. Assuming uniform costs, L, per contact irrespective with whom, it can easily be determined that an intermediary's communication costs equal $L(m + n_i)$.

Besides communication costs, an intermediary has also to bear information-processing costs. Those reflect the costs associated with encoding, storing, retrieving, and organizing information within the intermediary's organization and pertain to the size of the information batch handled by it, which in terms of units of information equals mn_i. These costs are represented by the function $F(mn_i)$. It is not inconceivable to assume that, from a certain level, such costs start to increase more than proportionally with the total information transfer of the intermediary as a result of diseconomies of organization (i.e., in this range $F' > 0$ and $F'' > 0$, where the prime denotes derivation). Intermediary costs would then equal

$$C = L(m + n_i) + F(mn_i), \tag{6A}$$

and his profit

$$\Pi = R - C = n_i mp - L(m + n_i) - F(mn_i). \tag{7}$$

For a given price, p, the optimal number of buyers that the intermediary contacts is given by the first-order condition $\partial\Pi/\partial n_i = 0$, which yields the conditions

$$p = \frac{L}{m} + F'. \tag{8}$$

But how is the price p determined? Under free intermediaries' entry, all profits vanish (i.e., $\Pi = 0$), and the price equals average intermediary cost, AC_w. By (7) we then have

$$p = AC_w = \frac{L}{n_i} + \frac{L}{m} + \frac{F(mn_i)}{mn_i}. \tag{9}$$

Figure 1 presents AC_w as a function of the number of buyers of information, n_i. It shows that the second part of the function, L/m, is independent of n_i; L/n_i decreases as n_i increases (a geometric hyperbola); and the third component, $F(mn_i)/mn_i$, increases with n_i (an upward-sloping curve). Altogether, this implies that AC has a minimum at a certain level of n_i^*, where the average intermediary's information-collecting and handling costs per information unit are the lowest.

At the point of minimum AC_w, the condition $\partial AC_w/\partial n_i = 0$ holds. Consequently, we have at this point

$$F' = \frac{F}{mn_i} + \frac{L}{n_i}. \tag{10}$$

Combining conditions (8) and (9) also yields condition (10). Hence, in equilibrium, $n_i = n_i^*$, the number of buyers minimizing AC_w, and

$$p = p^* = \min_{n_i} AC_w. \tag{11}$$

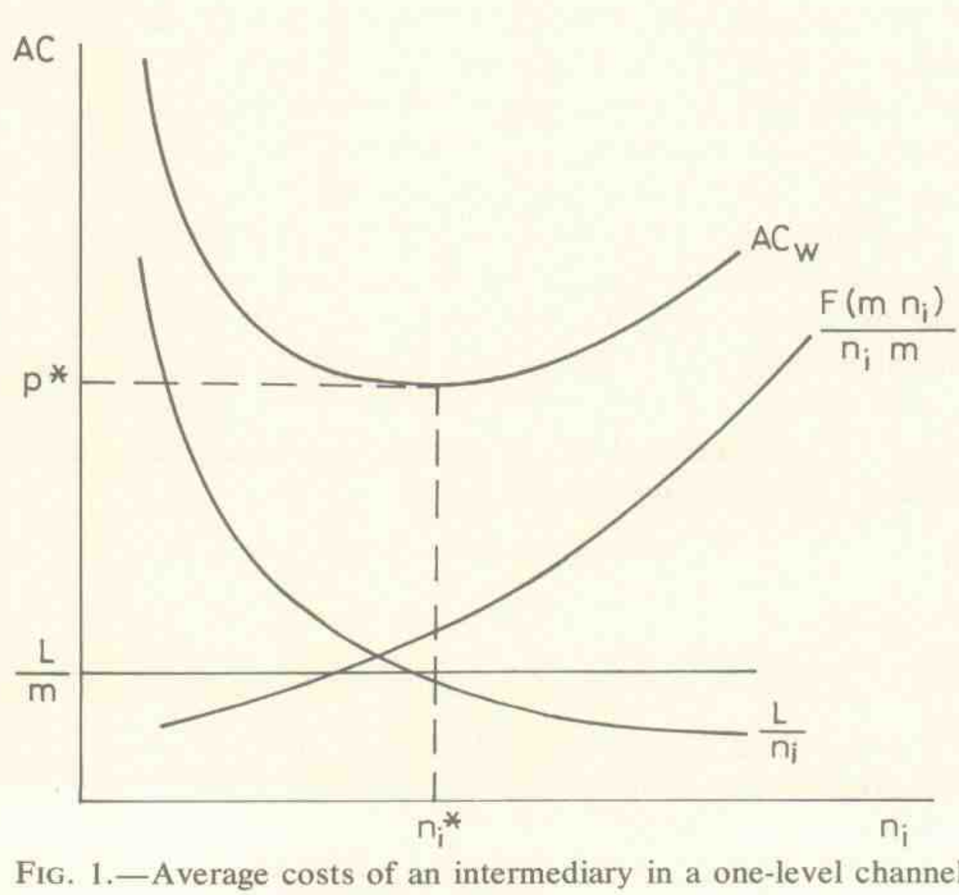

FIG. 1.—Average costs of an intermediary in a one-level channel

The number of intermediaries who will enter the system is then determined by the following equation:

$$w^* = \frac{n}{n_i^*}. \tag{12}$$

Equations (10), (11), and (12) simultaneously determine the equilibrium values of n_i^*, w^*, and p^*, and thus the structure of the marketing channel. Hence, if $n_i^* \geqslant n$, intermediaries will not enter the system, which in effect will operate on a direct contact basis between buyers and sellers. Similarly, if $p^* > L$, the buyer faces a situation where the price charged per information bit by the intermediary exceeds the cost of a direct contact with a supplier. In that case, buyers and sellers will also opt to communicate directly with each other, and a zero-level channel will develop.

Multiple-Level Case

The analysis can be easily extended to encompass multiple-level marketing channels. In such channels, first-level intermediaries sell information about suppliers (or buyers) to second-level intermediaries, who in turn sell it to third-level intermediaries, and so forth, until it reaches ultimate buyers (or suppliers). Assuming that all intermediaries are profit maximizers, they will set their respective prices per information bit, $p_1, p_2, \ldots p_n$, as maximizing profits, but under free entry, competition will force prices to equal average costs. Assuming further that contact costs in the channel are always L per contact and that costs of information processing are dependent only on the amount of information handled, irrespective of the channel level, revenue and cost functions for intermediaries at each level can be calculated.

For the first-level intermediaries, revenues and costs remain essentially the same as for the intermediaries in the one-level case, each intermediary selling his information to z_1 second-level intermediaries. Therefore, his average cost function is

$$AC_1 = \frac{L}{z_1} + \frac{L}{m} + \frac{F\,(mz_1)}{mz_1},$$

and the other equations are:

$$p_1 = AC_1, \tag{13}$$

$$\frac{\partial AC_1}{\partial z_1} = 0, \tag{14}$$

$$N_1 = \frac{N_2}{z_1^*}, \tag{15}$$

where N_1 = the number of first-level intermediaries operating in the marketing channel, N_2 = the number of second-level intermediaries operating in the channel, and z_1^* = the optimal number of information buyers from a first-level intermediary.

Second-level intermediaries buy information from first-level ones and resell it to the third-level intermediaries (or buyers). Assume that each one sells information to z_2 buyers. His revenue function is then equal to:

$$R_2 = z_2 m p_2, \tag{16}$$

and his cost function equals

$$C_2 = mp_1 + Lz_2 + F(mz_2), \tag{17}$$

where mp_1 is the cost of purchasing information from the first level and Lz_2 constitutes contact costs, as each second-level intermediary contacts z_2 buyers to whom he sells the information. Since the cost of contact between first- and second-level intermediaries has already been charged, it need not be considered again. In our system, each first-level intermediary contacts all the suppliers and therefore has available all the supply information. A second-level intermediary can then receive all the supply information about the market by communicating with one first-level intermediary. The last part of equation (17), $F(mz_2)$, represents information-processing and handling costs.

Profit function for the second-level intermediary will then equal:

$$\Pi_2 = z_2 m p_2 - [mp_1 + Lz_2 + F(mz_2)]. \tag{18}$$

Following the rationale expounded in the presentation of the one-level system, we assume that, because of competition, prices are driven down so that $\Pi_2 = 0$. Then p_2 can be extracted as follows:

$$p_2 = \frac{mp_1 + Lz_2 + F(mz_2)}{z_2 m} = AC_2. \tag{19}$$

Taking the first-order conditions for minimum AC_2, that is,

$$\frac{\partial AC_2}{\partial z_2} = 0, \tag{20}$$

yields the optimal number of buyers per second-level intermediary (z_2^*). The number of such intermediaries operating in the marketing system, N_2, will then be equal to

$$N_2 = \frac{N_3}{z_2^*}, \tag{21}$$

where N_3 is the total number of next-level intermediaries.

The analysis can be generalized to I levels, as follows:

$$p_1 = AC_1 = \frac{L}{z_1} + \frac{L}{m} + \frac{F(z_1 m)}{z_1 m}, \tag{22}$$

$$p_i = AC_i = \frac{p_{i-1}}{z_i} + \frac{L}{m} + \frac{F(z_i m)}{z_i m} \text{ for } i = 2, 3, \ldots, I, \quad (22A)$$

$$\frac{\partial AC_i}{\partial z_i} = 0 \qquad \text{for } i = 1, 2, \ldots, I, \quad (23)$$

$$N_i = \frac{N_{i+1}}{z_i} \qquad \text{for } i = 1, 2, \ldots, I - 1, \quad (24)$$

$$N_I = \frac{n}{z_I}.$$

Altogether, we have $3 \times I$ equations with which we need to solve for $p_1^*, \ldots, p_I^*, z_1^*, \ldots, z_I^*$, and $N_1^*, \ldots, N_I^*$ (i.e., $3 \times I$ unknowns).

Implications

One important implication of the model is that the price of an information bit must always decline as information moves from one channel level to the next one—that is, $p_i > p_{i+1}$. If this does not take place, intermediaries at the ith level will find it profitable to circumvent the intermediaries at $(i + 1)$ level and sell information directly to those behind them.

The model shows that channel width depends on contact costs and on the intermediaries' information-processing abilities. Jointly, both determine the optimal number of information buyers that one intermediary can serve efficiently. When channel contact costs, L, are low, z_i^* and p_i^* decrease and N_i^* increases.[1] When processing costs increase as a result of greater information-processing problems (i.e., when $F[mz_i]/mz_i$ function shifts upward), then z_i^* decreases and N_i and p_i^* increase. However, channel width also affects channel length. In wider channels, we shall find greater length—that is, more levels—simply because there are fewer empty levels without any intermediaries.

Analysis of the solution set of equations reveals that marketing channels tend to adopt a pyramid-like structure whereby the number of intermediaries at each level is smaller than that at the preceding one. Information tends to become concentrated in fewer hands as it passes through the channel. The major reason for that is that a higher-level intermediary (i.e., farther away from the information source) pays a lower price per information bit. This in turn reduces his costs relative to those of the intermediary in the level before him; it allows him to operate at minimum average costs with more information buyers and generates a need for fewer intermediaries at his level.

The model shows how vertical price mechanisms determine channel

1. Thus, differentiating (10) totally with respect to L yields $dn_i^*/dL = 1/(F''mn_i^{*2}) > 0$, and from (8), $dp/dL = 1/m + F''m\, dn_i^*/dL > 0$. From (12), $dw^*/dL = -n/n_i^{*2}\, dn_i^*/dL < 0$.

width, length, and mode of intrachannel interactions. Thus, when the price of information transfer in the channel increases, channel width decreases. When intermediaries have to pay higher prices for information received from a lower channel level, then, at each channel level average costs per information bit increase, forcing each intermediary to finance the increased costs by selling the information to a larger number of information buyers at the next level—that is, z_i increases lowering N_i—and slimming down the channel.

Conclusions

The basic contribution of the early models of communication networks in marketing channels has been the demonstration of the importance of a marketing intermediary for improving channel efficiency through a reduction in channel communication costs. This powerful notion allowed researchers to focus on the role of a marketing intermediary in handling channel communications and independent of channel physical flows.

The model developed in this paper further advances this notion. It recognizes explicitly that when information acquires economic value it becomes an economic good and generates independent markets where it is bought and sold. This model depicts the marketing intermediary not as a passive information transmitter but as an active trader in information. Information transfer is determined by the price mechanism in each intermediary market.

The model therefore shows how a structure of a marketing channel is determined by the conduct of channel members (in terms of price schedule), while this conduct is in turn affected by technological factors (of information processing) and market factors (the number of buyers and sellers operating in the system). Therefore it can be used to predict channel structures as well as channel members' conduct in particular channels.

This work focuses on the inherent characteristics of channel structure and performance from an economic point of view. It does not attempt to incorporate behavioral factors that permeate channel members' conduct. Future research must therefore address itself to the issue of integration of economic and behavioral facets of channel operation. One attempt to do so has been made by Stern (1979). Important questions here are, for example, how control over information flows enhances a channel member's power and how it generates conflicts within the channel. (For research that points to the relative importance of information transfer in channel conflicts, see Etgar [1978].)

Another avenue of analysis is to attempt to analyze more complex systems—that is, models that acknowledge geographical differences and that attempt to integrate both the physical and the information-transfer roles of marketing intermediaries.

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