A SIMPLIFIED, NONCOMPUTERIZED MARKETING CHANNELS GAME

Alvin C. Burns, Louisiana State University

INTRODUCTION

Several computer-based business simulation games are available as teaching aids and the author's experience suggests the most widely adopted ones are Day and Ness' "Marketing in Action," the Carnegie-Mellon management game, and "Intop." These three and the vast majority of the others share several characteristics. Practically all, for example, simulate companies competing in a complex industrial environment, sometimes multinational in scope. Most look at the industry from the manufacturer's point of view requiring a great variety of attendant decisions to be made by participants for each time period. Each also usually requires a substantial commitment with regard to computer setup, memory, time, keypunching, clerical details, paper and student orientation. The net result of these factors is the student learning from involvement with these games occurs under significant adversity, in the author's opinion. This paper dwells briefly on some observations on two specific problems and shortcomings of most computer-based business games. Its main purpose, however, is to describe a simplified, noncomputerized experimental learning exercise which the author has developed and is useful in teaching marketing channels of distribution concepts.

Perhaps the most troublesome aspect of most computer-based business simulations is the diversity and complexity of decisions required for each period. These decisions range across the complete gamut of corporation activities. A common method of reducing this complexity is to allocate students to teams in accord with their major fields of study, thus providing each firm with a marketing manager, a financial manager, a production manager, and so forth to the point of establishing a full slate of corporate vice presidents. Each student then theoretically formulates policy and assumes responsibility for his particular area. While this tactic solves the complexity problem on the surface, it is often necessary to police student teams to guard against slackers. Generally, the net result is contrary to the objective of teaching an overall perspective of corporate strategy.

The second problem the author has encountered with popular computer-based simulations is their failure to embody a competitive element which marketing educators stress as a vital marketing mix factor: channels of distribution. The consumer sector is implicitly depicted as a nebulous and unimportant factor inasmuch as the "customers" of most games are channel intermediaries such as dealers, retailers or some other entity assumed to be accurately translating consumer-level demand. There is very limited opportunity to take into consideration long-term vertical relationships, retail strategy, or the trade relations mix. Students, particularly marketing management majors, leave

the experience with an unrealistic view of the relationships necessary for an efficiently functioning channel of distribution.

Faced with the dilemma of dissatisfaction with the complexity of popular games yet the simultaneous desire to utilize a channels of distribution frame of reference, the author has devised a simplified marketing game. The game focuses on vertical marketing system relationships and relevant aspects of competing channels of distribution. It endeavors to touch on many of the important issues in the channels literature and is therefore appropriate as a teaching aid in marketing management courses. The present version is simplified to the extent that the game may be conducted entirely with hand calculations. Moreover, a "complete" experience can transpire in a fraction of time required by most computer-based games. Finally, it easily accommodates small classes as no more than one student is necessary per firm.

DESCRIPTION OF THE GAME

The game is organized around a hypothetical industry containing manufacturers, wholesalers, retailers and consumers. Game participants manage firms at each of the first three levels and compete on various fronts. Retailers compete against other retailers for trading area market share. Wholesalers compete with other wholesalers (and sometimes manufacturers) for retail market share. The manufacturer's product line is a single brand which competes against other manufacturers' brands for wholesale, retail, and ultimately consumer market share. At the onset of the game, firms in the industry are autonomous with no existing ties to other firms. Furthermore, firms at the same level in the industry begin the game with equal status in terms of facility capacity and working capital. Differences at the end of the game are therefore the result of each firms' efforts during the game. The number of firms at various levels of the industry is unlimited; however, it is advantageous from a computational standpoint to restrict the industry to a small and tractable number of participants. For large classes two or three mutually exclusive industries works best. Students are familiarized with the game through the use of an "industry grid" (see Figure 1) which specifies the number, type, and location of industry members. The grid is also used to determine the distances for the calculation of physical distribution costs.

Each firm is charged with the objectives of growth and viability through the judicious use of traditional marketing decision variables and the establishment of efficient and advantageous vertical marketing system relationships. The traditional decisions are broken into four categories with minor variations in interpretation contingent upon the firm's position in the channel of distribution. First is the decision of facility size. At the manufacturers' level this is the production plant decision; at the wholesaler level it is analogous to warehouse and materials handling equipment decisions, and at the retail level

it becomes the store size and layout decision. Facility size directly affects the variable cost structure and period overhead as demonstrated in Figure 2. A second decision category concerns the amount of promotion (unshared) the firm wishes to aim at the consumer sector; this activity has major consequences for manufacturers' and retailers, virtually none for wholesalers. Price levels and policies constitute the third decision area, with manufacturers and wholesalers free to negotiate price with each buyer. Retailers are required to "list" a price for each brand in stock. Finally, each firm controls its throughput with input and output decisions. Manufacturers, for example, control production lot sizes and sales to channel members; while wholesalers and retailers negotiate purchases and sales. The task is essentially one of inventory control. Refer to Figure 2 for sample inventory holding costs.

The charnels-related decisions are also four in number. Demand stimulation may be shared in the form of cooperative advertising by any two channel members. This activity is generally initiated by the manufacturer, although any firm may request it from any other firm. A "legal" restriction exists, however, in the requirement that cooperative promotional arrangements be "proportionately equal" as specified by the Robinson-Patman Act. Credit policy is also individually determined by participants. Provisions for credit risk determination, collections policy, interest rates, and limits are set by each firm. Transportation and other physical distribution costs are predetermined and provided on a cost schedule based on the amount of goods and the distance traversed (see Figure 2); however, specifics on the sharing of expenses can be negotiated as part of each transaction. Finally, long-term relationships may be created through contractual arrangements between channel members for specified quantities at negotiated prices over an agreed- upon time period. Penalties for failure to perform contractual duties are also negotiable. Blank contract forms are provided the players to insure uniformity.

GAME OPERATION

The game operates on the premise that all decisions ultimately affect the consumer demand for firms' products. Actually, three types of demand are generated at the consumer level. Generic demand is subdivided into two types of selective demand: brand and retailer. Demand for each manufacturer's brand eventuates from relative competitive efforts (primarily promotion) while retailer demand is affected by the interaction of promotion and price levels. The mathematical formulations of demand are described later.

A number of dry runs are provided during the orientation and start-up phase of the game. In these, retailers are confronted with requests from the consumer sector for various quantities at certain prices. Because all firms begin on equal status, these requests treat the competing brands as perfect substitutes and demonstrate no retailer preference. The purpose of these dry

FIGURE 1

Sample Industry Grid

Each square = 50 miles
Only vertical or horizontal movement of goods is permitted.

FIGURE 2

Sample Production/Marketing Cost Schedule
Facility Size (Square Feet)

Period Output or Sales (units)	10,000	20,000	30,000	40,000
1-25	$500	$700	$900	$1,000
26-50	200	500	700	900
51-100	75	200	500	700
101-200	25	75	200	500
201-300	15	25	75	200
301-500	20	15	25	75
501-700	30	25	15	25
701-1000	75	50	25	15

Overhead: for manufacturers $10 per 100 square feet
for wholesalers $15 per 100 square feet
for retailers $20 per 100 square feet

Sample Inventory Holding Cost Schedules

	Manufacturer	Wholesaler	Retailer
Units	Cost/Unit	Cost/Unit	Cost/Unit
1-50	5	6	1
51-150	4	5	2
151-250	3	4	3
over 250	2	3	4

Sample Distribution/Transportation Cost Schedule

	Number of Miles			
Number of Units	1-10	11-100	101-250	over 250
1-25	10	9	8	7
26-50	9	8	7	6
51-100	8	7	6	5
101-250	7	6	5	4
251-500	4	4	3	3
501-1000	4	3	3	2
over 1000	4	3	2	2

runs is to provide experience and information on the nature of demand. Participants learn the general game procedure and become acquainted with the industry structure. It also serves to forestall errors which may result from unfamiliarity with the game.

Actual participation in the game may begin when the instructor is convinced that all participants are sufficiently familiar with the game operation. As autonomous firms, participants are free to negotiate prices, quantities, and terms of sale. Participants are informed that such negotiations must take place prior to the deadline for period decisions. Confidentiality in dealings is also advised. Participants then submit all decisions: prices, quantities, promotion, expansion, transportation arrangements, purchases (production), etc. to the instructor. The time interval between periods is completely flexible, dependent only on the number of firms and the instructor's resources.

GAME FORMULATION

The majority of the computations are straightforward and can be done directly from each firm's decision sheet (see Figure 3).

FIGURE 3
Sample Financial Statement Form

Firm _____   Period _____

Sales:

Buyer	Amount	Price	Total
___	___	___	___
___	___	___	___
___	___	___	___
___	___	___	___
___	___	___	___
___	___	___	___

Total Revenue _____

Expenses:
  Overhead
  Production/Marketing:
    Units _____ @ _____ = _____

  Distribution/Transportation:

Buyer	Units		
___	___	@	___
___	___	@	___
___	___	@	___
___	___	@	___
___	___	@	___
___	___	@	___

Penalties. . . . . _____
Total Promotion. . . . . _____
Inventory Units. . . . . _____ @ _____ = _____

    Total Expenses _____

Profit(Loss) _____
Working Capital _____
Accounts Payable _____
Accounts Receivable _____

Only the computations of generic, brand and retailer demand for retailers income statements require the use of information on the entire industry. The potential sales for each retailer is a result of industry sales trend, seasonal variation, manufacturers' promotional efforts, retailers' promotional efforts, and retailers' prices. Computation of each retailers' potential sales follows a logical step-by-step procedure. In the first step, the total industry (generic) demand is computed with the general formula:

$$D_t = D_{t-1} \cdot S_t \cdot T_t \qquad\qquad (1)$$

where: D_t = total industry demand for time period t

T_t = trend index factor for time period t

$$d_i = \frac{Promotion_i + 2 \cdot Cooperative\ Promotion_i}{\sum\limits_{i=1}^{n} Promotion_i + \sum\limits_{i=1}^{n} 2 \cdot Cooperative\ Promotion_i} \qquad (2)$$

where:

d_i = Promotional demand index for brand of manufacturer i

$Promotion_i$ = Total unshared promotion of manufacturer i

$Cooperative\ Promotion_i$ = Total cooperative promotion of manufacturer i

n = number of manufacturers

The trend and seasonal pattern are arbitrary and will not be discussed other than to note that the procedure is identical to time series analysis. Cyclical variation is purposely omitted for simplicity.

An index of selective brand demand is next computed with the formula:

The formula treats demand for a particular manufacturer's brand in a simplistic manner, merely comparing the relative amounts in a given time period. Cooperative promotion is afforded a more important role in accord with the vertical marketing systems orientation of the game.

A similar approach is used to compute the effects of retailers' promotional efforts on consumer demand:

$$d_j = \frac{Promotion_j + 2 \cdot Cooperative\ Promotion_j}{\sum\limits_{j=1}^{m} Promotion_j + \sum\limits_{j=1}^{m} 2 \cdot Cooperative\ Promotion_j} \qquad (3)$$

where:

d_j = Promotional demand index for retailer j

$Promotion_j$ = Total unshared promotion of retailer j

$Cooperative\ Promotion_j$ = Total cooperative promotion of retailer j

m = number of retailers

The d_i's and the d_j's define the marginal distributions of a n by m matrix containing the conditional values for brand sales

in each retail firm as defined by the formula:

$$d_{i,j} = d_i \cdot d_j \qquad (4)$$

These proportions could be applied directly to allocate the total industry demand were it not for two problems. In the first place, sales would be too volatile to allow planning from period to period: there would be no evidence of brand or store loyalty. At the same time, retail price differences would be ignored. In order to control for the first problem, the game provides that approximately one-half of a retailer's sales is a carryover from the previous period market share (see equation 6). The sensitivity of demand to retail price levels is somewhat more complicated, however.

The game relies on a linear demand curve model which compares each price for each brand against the average retail price for all brands by all retailers. It takes the general form:

$$Q_{i,j} = a + b \, P_{i,j} \qquad (5)$$

where: $Q_{i,j}$ = demand for brand i given price $P_{i,j}$

$$a = 2 \, D_t$$

$$b = -D_t \, / \, p$$

In this formulation, the demand curve is downward sloping with 2 Dt as the y-intercept. 2 Dt was arbitrarily chosen as the intercept due to its computational convenience; it simplifies the computation of the slope to -Dt/p, where p is 90% of the average retail price of all brands in all retail firms. The average price is discounted to 90% to simulate consumer resistance to inflation and to encourage price competition throughout the channel.

The final determination of each retailer's potential sales is arrived at through the formula:

$$TQ_{i,j} = .5 \cdot S_{i,j,t-1} + .5 \cdot d_{i,j} \cdot Q_{i,j} \qquad (6)$$

where: $TQ_{i,j}$ = total quantity potential sales for brand i by retailer j

$S_{i,j,t-1}$ = previous period sales of brand i by retailer j

$d_{i,j}$ = from equation (4)

$Q_{i,j}$ = from equation (5)

Actually the computations are considerably more simple than this description implies. These equations are saying that a retailer's potential sales are influenced substantially by consumer inertia (last period's market share), the retailer's price relative to other retailer's prices, and the retailer's promotional activities relative to other retailers' promotional outlays. Amounts for each brand are compared against the amount of stock in the store for the time period to ascertain shortages or excesses. An income statement and sales report results.

DISCUSSION ON THE VALUE OF THE CHANNELS GAME

The author apologizes for the brevity of the preceding section and hopes that the reader has sufficient understanding of

the game's operation even though several details have been omitted. It should be apparent that the game does incorporate specific rewards for cooperative efforts within the channel of distribution. It is also reasonably easy to administer despite misperceptions which have undoubtedly been fostered by the functional forms. In fact, an early experiment with the game was conducted during the course of an evening class with the aid of a student from the class who was unfamiliar with the game until that evening. The student handled all computations without error.

The author believes that the game rivals computer- based simulations with respect to the skills and tasks required of players for successful competition. For example, participants are expected to utilize demand estimation and sales forecasting. They are faced with inventory control and price-setting decisions. They must formulate policies on credit, contractual arrangements, and merchandising. Moreover, players must negotiate terms of sale and manage their trade relations mix with other players. This aspect of the game injects an element of realism that computer- based games do not possess.

The greatest value of the game, however, lies in its ability to demonstrate channels of distribution concepts. Participants quickly learn the value of cooperation with other channel members. Early in the game, there is a decided tendency for suboptimization as each player endeavors to maximize profits through high prices and minimal expenditures on promotion. As the game progresses, however, vertical marketing systems can be seen to emerge as firms use contracts, shared promotion and transportation expenses and information flow, Student discussion on the game has tended to support the author's belief that appreciation for these concepts is a result of participating in the game.

The author would be remiss if he did not point out channels of distribution concepts which the game does not treat. In particular, the present version of the game does not permit channel intermediaries to market private brands. Also, the game does not allow franchising systems beyond sales contracts. Finally, the game does not provide for corporate vertical marketing systems through merger or acquisition of participating firms. Countering these three important omissions, however, is the experience provided by the game which affords students a better basis from which to relate the ramifications of each of the above issues.