

A NON-COMPUTERIZED MARKETING

PLANNING AND STRATEGY GAME

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INTRODUCTION

Since the AMA game was first introduced in 1956, the increasing interest and use of marketing games as teaching instruments has been evidenced. Numerous general planning and functional games have been developed. The most widely adopted marketing games today are the Carnegie-Mellon game, the Carnegie Tech game, the Harvard Business School Simulation and several other functional games.

The common characteristics of these games are the intensive study of the interaction of the complex environments incorporated in these games and the utilization of sophisticated computer programs for controlling the input and output necessary for game operation.

Effective utilization of these games require from the players: (1) an ability to abstract the interactive relationships among the variables incorporated in the game, (2) the commitment of a vast amount of time for the preparation of computerized inputs, (3) a relatively lengthy lapse time designated for the game playing, and (4) the availability of considerable computer facilities and computer time.

However, due to the various environmental settings of different institutions of higher education, many small colleges are not endowed with the conditions which are necessary for the successful utilization of complex marketing games. First, the environments encountered by many of the small colleges are generally characterized by students with limited knowledge in marketing and limited ability to abstract the complexities incorporated in the highly sophisticated marketing games. Second, the quarter system which normally runs nine to eleven weeks impedes the wide use of time consuming games. A single quarter is too short for a student to completely familiarize themselves with the interactive relationships incorporated in a sophisticated marketing game and to subsequently execute the time consuming preparation of computerized inputs, punching input cards, and picking up the outputs. Furthermore, in a college where a majority of the students commute to school or work full or part-time they do not have the great amount of disposable time required by many complex, computerized, marketing

games. Finally, small institutions where the computer facilities are scarce and the demand of computer utilization is high, the output turnaround time is relatively long. Consequently, the execution time necessary for a sophisticated game will be lengthy and, therefore, the umpire is unable to effectively control the output turnaround time.

These factors make the operation of a sophisticated and time consuming game impractical. Recognizing the environmental constraints mentioned above and inspired by the success of business games as an effective teaching instrument, the author has developed a non-computerized marketing simulation game.

CHARACTERISTICS AND OBJECTIVES OF THE GAME

The non-computerized marketing planning and strategy game developed involves 12 interactive decision variables. Since the game only involves limited variables, a player is expected to be able to grasp the relationship and the trade off of each variable introduced in the game. The player is not required to utilize computerized input; thus, the time demanded for input preparation and the waiting time for the turnaround of game outputs is minimized.

All inputs are screened by the designated umpire. Consequently, input errors which are frequently induced in key punch decisions are eliminated. The elimination of the input error minimizes the disturbances of the overall output of the industry induced by key punch errors.

The main objectives of this game are multiple. A sophisticated player is expected to be involved in the following decisions:

1. Long and short range planning, 2. Competitive strategy,
3. Growth strategy, 4. Goal setting and the control of routine operations. 5. Marketing auditing,
6. Internal resource constraints and strategic decision-making, 7. Study of the functional relationships among variables, the trade-offs involved and the determination of the best strategy to achieve a firm's predetermined goal.

ABSTRACT OF THE GAME

1. Decision Variables of the Game

The decision variables involved in this game include the marketing potential, personal selling, advertising, research and development, consumer preference, research and product improvement, production and inventory, finance and accounting, competition, marketing information, general planning, marketing growth and competitive strategies and pricing.

2. General description of the game

The Market: The market consists of the U.S., which is divided into six regions and 20 territories. Each territory consists of one state or several states. The marketing potential of each territory

is different. This geographical division allows a firm to do regional advertising and conduct regional consumer preference and product improvements in one region at a time. The product is in its growth stage, hence the total market potential will increase at a rate of 3-4% quarterly. The initial total market potential is not known; however, the player may buy this information from the umpire at the cost of \$2,000.

Personal Selling and Sales: The player determines the allocations of his salesman among the territories. The number of units sold in each territory depends upon the firm's market share which in turn is a function of the firm's total marketing effort relative to its competitor's efforts. Each salesman is allowed to make two calls in any given quarter and there is no limit to the number of salesmen who may call on one territory in one time period. Sales in any given quarter will be assumed to occur in the beginning of the quarter. Every salesman costs \$10,000 when hired and \$2,000 per quarter in salary regardless of whether the salesman is in the training program or works in the field. It takes one quarter to recruit and three months to train a salesman. Thus, a salesman joins the sales force after a two quarter time lag.

Advertising: Product advertising in any quarter increases the firm's total marketing effort. A company may buy either national network or regional advertising or both. The national network is more expensive and less effective, however, it covers the whole country (six regions). The regional advertising, however, covers only the region or regions that the company designates. Both the national and regional advertising is effective in the current quarter only and there is no lag effect. Advertising costs \$3,000 per page/minute per region. The national network costs \$10,000 per page/minute, and there is no constraint on how much advertising a company wishes to spend in any given quarter.

Pricing: The industry retail price for each product averages \$10,000. However, in order to maximize profit and to gain competitive advantages, a firm is allowed to set the unit price higher than industry average price or below average price at any given quarter. If a firm should choose to set the unit price below or above the industry price, the price per unit must be set at an increment of \$500 around the average price. That is, a firm may set the price per unit at \$10,500, \$11,000...or \$9,500, \$9,000 and \$8,500. The minimum selling price per unit is \$5,500. If a firm sets a selling price below \$5,500 the firm will be involved in an Anti-Trust lawsuit and the firm is penalized \$50,000.

Consumer Preference Research and Product Improvement: The product is an industrial good (truck) with three differentiating features: horse-power, capacity and refrigeration. Due to the differences in regional preference, a region in any given year, may prefer one of the features over the other two. If a company can find out the regional preference for a given region and

improve the product on the basis of the findings, the company will increase its marketing effort and competitive advantage in the region where the preference is demonstrated. The cost of finding out the regional preference is \$5,000 for each region. The company may conduct the research in any region or all regions for any given year. Product improvement can be made in any of the three features. The minimum product improvements cost \$4,000. A company may invest in multiples of \$4,000. There is no upper limit for product improvement investment. The Regional preference changes every year and a firm may purchase this information in the quarter prior to the quarter in which the preference change occurs.

Research and Development: If a company can develop a new product it gains a competitive advantage. The minimum research effort per quarter costs a minimum of \$10,000, and a company may invest more than that in multiples of \$10,000.

Plant and Production, Inventory: The initial plant costs \$150,000 and each subsequent plant costs \$30,000. The maximum output for each plant is 5 units per quarter. Overtime production is allowed at the cost of 30% higher than the production of the company's production level. It takes 3 quarters to construct the initial plant, and one quarter for subsequent plant. The total production lead time is six months. The firm must pay the construction cost as soon as it decides to start construction. The company is allowed to idle or to dispose of excess capacity. The idle plant can be reopened in any subsequent quarter. The penalty for idling one plant during any given quarter is \$6,000. The penalty for disposing of a plant is \$30,000. The average cost of production for capacity of 5 units is \$6,000. As capacity increases by additional production plants, total fixed costs rise slightly and the unit variable cost decreases. Consequently, the unit average cost declines as product increases.

When a unit is sold, it is deduced from inventory on a first-in, first-out basis (FIFO). Inventory carrying cost per unit for each quarter is \$300. A firm is allowed to sell its inventory to its competitors at a negotiating price between the buyer and seller.

Finance and Accounting: The management of a company's available capital is of critical importance. Each company starts with \$750,000 of capital. Sales are made on an accounts receivable basis, and the collection lag for accounts receivable is 2 quarters.

If a company is in need of cash, the company is allowed to factor its accounts receivable

at a cost of 20% of the amount factored. Accounts receivable are factored on LIFO basis (last-in, first-out)

Competition: Each company competes for the same territories with the same product. The number of units sold by any given firm in a given territory proportional to the total marketing efforts of the firm relative to its competitors' total marketing efforts. Sales are sold only on a one unit basis. If the total marketing effort of a firm in any given quarter in a given territory is smaller than one unit, the firm will not get any sales in that quarter. However, the firm's uncompensated effort will be carried over to the subsequent quarters in that region. In the subsequent quarters, if the firm has accumulated enough marketing effort for one unit, the firm will be credited a sale of one unit for its accumulated marketing effort. A summary of the cost information is attached in Appendix A.

OPERATION OF THE GAME

The Players: The class is divided into several teams. The total demand of the industry is given prior to the start of the game. In a quarter system, it is suggested that the duration of the game is 20 quarters. However, if time permits, the umpire may extend the duration of the game to 24-28 quarters.

The first through fifth quarters is designated for the development of marketing strategy. During that period each team has to submit input indicating the number of plants and the number of salesmen the firm intends to acquire as well as other specific information such as regional potential and regional preference that the firm intends to purchase. Competition starts at the 6th quarter.

The Input and Output Sheets: Players are required to submit input twice a week on a designated day and time, and receive output the following day. The Standard input sheet is presented in Appendix B. The standard output sheet includes a profit/loss statement, a balance sheet, a cash flow schedule, an inventory ledger as well as other relevant information required by the player.

The Umpire: One umpire is employed. The main function of the umpire in any given quarter includes:

1. Collection and screening of the inputs from each team,
2. Calculation of total marketing efforts for each territory by each firm,
3. Calculation of the market share and sales for each firm,
4. Preparation of the profit and loss statement, balance sheet, inventory sheet, and cash flow sheet for each team,
5. Recording the output of each team on the firm's ledger,
6. Providing information purchased by the player.

The whole calculation and statement preparation requires approximately one hour for a well-trained umpire.

RULES OF MARKETING EFFORT AND COMPETITION

1. Sales

$$S_{ijk} = M_{ijk} \times S_{jk}$$

S_{ijk} : sales of firms i in territory k at quarter j . $i = 1 \dots n$

S_{jk} : total demand in territory k at quarter j . $j = 1 \dots m$

M_{ijk} : the market share of firm i in territory k at quarter j .
 $k = 1 \dots l$

2. Market share

$$M_{ijk} = P_{ijk} / \left(\sum_{i=1}^n P_{ijk} \right)$$

P_{ijk} : the Marketing effort of firm i in territory k at quarter j

$\sum_{i=1}^n P_{ijk}$: the total marketing effort of the industry in territory k at quarter j .

3. Marketing Effort

$$P_{ijk} = Pr_{ijk} F(Ps_{ijk}, An_{ijk}, Ar_{ijk}, Pf_{ijk}, Pn_{ijk})$$

A firm's total marketing effort in a given territory in any given quarter is determined by the firm's selling price (Pr), personal selling (Ps), national advertising effort (An), regional advertising effort (Ar), product feature improvement (Pf) and new product (Pn) set by the firm at that given quarter.

With the exception of price effect, the total marketing effort of a firm in a given territory is the additive effect of each individual decisions variable.

The marketing effort index of each variable at different decision levels is presented in Appendix C.

GAME EVALUATION

The evaluation of the player: A five year (20 quarters) duration is assumed for the game. Player's performance will be evaluated by:

1. The amount of net worth at the end of the 20 quarters.
2. The self-critique paper. Students are required to write a short self-critique paper upon the completion of the game. The paper should explain his strategies, strengths, weaknesses and other managerial problems encountered.

CONCLUSIONS

Most of the computerized marketing games today involve complex environments and are time consuming in preparing of inputs and executing the game, and demand sophisticated computer facilities and computer time. Many small colleges are characterized by: students with limited knowledge and limited ability to abstract the interactive relationships among variables incorporated in these sophisticated games; short quarter system, and constrained computer facilities with scarce computer time. These facts make the execution of sophisticated and time-consuming marketing games impractical to these institutions.

This non-computerized game is developed primarily for institutions encountering a disadvantageous environment described above but desiring to have students benefit from the learning of a simulated

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marketing game. The game simulates a real business world situation with limited interactive variables and requires approximately one to two hours for one umpire to hand calculate each quarter.

This marketing simulation game has been tried and revised several times during the past two years. The general reactions from the players were overwhelmingly favorable. The typical comment is that the marketing game definitely functions as an educational instrument; it integrates all the knowledge taught in finance, accounting, and the basic marketing disciplines in the formulation of competitive and growth strategies. It enables students to recognize the importance of internal constraints on the decision making process and the crucial importance of goal setting and long and short range planning.

APPENDIX A

Selling price per unit	Variable
Salesman:	
a) Hiring expenses per salesman	\$10,000
b) Salary per quarter whether in the field or in training	2,000
Advertising:	
a) Regional Advertising; one page of advertising (cover one region) per quarter, with a maximum of 5 pages per quarter per region	3,000
b) National Advertising; covering the whole nation	10,000
Plant:	
a) Initial plant (capacity of 5 unit/quarter)	150,000
b) Each additional production plant (maximum throughout of 5 units per quarter)	30,000
Research and Development: Minimum per quarter, with no upper limit	10,000
Consumer Preference and Product Improvement:	
a) Cost of regional preference (region per year)	5,000
b) Product feature improvement: minimum of \$4,000 with increment of \$4,000.	
Production: at 5 units capacity	6,000
Market Information:	
a) Total Market Potential	2,000
b) Market Share	5,000
c) Total Industry R and D expenses	1,000
d) Unit production cost in advance	2,000
e) Market research for one region	30,000
Penalties:	
a) Factoring of accounts receivable	20%
b) Missing of deadline set by umpires	No sale
c) Inventory carrying costs per unit/quarter	300
d) Idling one plant in any given quarter	6,000
e) Disposing one plant	30,000

New Horizons in Simulation Games and Experiential Learning, Volume 4, 1977

APPENDIX B

Quarter: _____ Standard Input Sheet Industry: _____ Team: _____

Region	State(s)	Terr.#	Assign.	Price per unit \$
Reg. I	AL	1	_____	National Ad. \$ _____
	ME, NH, VT, MASS	2	_____	Regional Ad. _____
	CON, RI, NY	3	_____	Region Amount
	PENN, NJ	4	_____	I \$ _____
Reg. II	MI, OH	5	_____	II \$ _____
	IND, WIS	6	_____	III \$ _____
	ILL	7	_____	IV \$ _____
Reg. III	MN, IA	8	_____	V \$ _____
	MISS, ND, SD	9	_____	VI \$ _____
	NB, KS	10	_____	
Reg. IV	MD, DL	11	_____	Hiring Salesman _____
	WV, VA, NC, SC	12	_____	New Plant _____
	GA, FL	13	_____	R and D \$ _____
Reg. V	KY, TN	14	_____	No. Plant Idling _____
	AL, AR, MISS, LA	15	_____	No. Plant Disposed _____
	OK, TX	16	_____	No. Plant Overtime _____
Region VI	MT, WY, CO	17	_____	Marketing Information: _____
	AR, NM, ID, NV	18	_____	Market Share-Region(s) _____
	UT	19	_____	Industry R and D _____
	WA, OR	20	_____	Total Demand Potential _____
	CA, HI	20	_____	Other Information _____

Accounts Rec. Factored\$ _____

Regional Potential:
I II III IV V VI

Consumer Preference: Region(s)
I II III IV V VI

Product Feature Improvement:
 Feature _____ \$ _____

APPENDIX C

Marketing Effort Index (MEI)

Marketing Effort Index (MEI) of:

Personal Selling		Regional Ad.		National Ad.	
No. of Call	MEI	No. of page & \$	MEI	No. of page/\$	MEI
0	0	0 -	0	0 -	0
1	6	1 \$3,000	3	1 \$10,000	2
2	13	2 6,000	7	2 20,000	4
3	21	3 9,000	14	3 30,000	7
4	28	4 12,000	19	4 40,000	11
5	34	5 15,000	22	5 50,000	13
5 or more	36	5 pages or more increase by 1 MEI for ea. add. pg.	24	Increase by 2 MEI for each additional page. There is no upper limit.	

Product Feature		Price index		Product Development	
Amount	MEI	Price/unit	Index	Cumulative Amt.	Prob.
0	0	\$13,500	0.40	\$10,000	0
\$4,000	2	13,000	0.45	20,000	1
8,000	4	12,500	0.50	30,000	3
12,000	6	12,000	0.60	40,000	6
16,000	8	11,500	0.70	50,000	9
20,000	10	11,000	0.80	60,000	14
Increase 1 MEI for ea. add. increment-\$4,000		10,500	0.90	70,000	19
		10,000	1.00	80,000	24
		9,500	1.05	90,000	29
		9,000	1.15	100,000	35
		8,500	1.25	110,000 or more	40
		8,000	1.35		
		7,500	1.40		
		7,000	1.45		
		6,500	1.50		
		6,000	1.55		
		5,500	1.60		

Production Cost

Production Capacity	Unit Cost
5	\$6,000
10	5,600
15	5,000
20	4,500
25	4,200
30 and more	4,000