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Practical Marketing Model for Short- and Long-Range Planning

Frank Schultz

Models are still regarded with suspicion by many as systems that are wonderful in theory, very poor in reality. Here's the story of one that worked—and is working—beautifully in marketing—

A PRACTICAL MARKETING MODEL FOR SHORT- AND LONG-RANGE PLANNING

by Frank Schultz
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THE PRESIDENT of the Consumer Products Division of a large manufacturer had just learned that a competitor introduced a new product into two test markets which posed a threat to his Division's most profitable product line —a line which had a dominant share of market in its product category. Before formulating plans to attempt to counter this threat, the president wanted to know:

- What effect this competitive new product might have on his product line based on varying levels of market penetration by the competitor;
- What are the estimated profits and returns on investment for the competitor based on different shares of market.

By using the Division's marketing planning model, the president was able to determine quickly that the profit, return on investment, and payback period for the competitor looked quite good, assuming reasonable penetration of the market. Figure 1, on page 18, illustrates the estimated returns on investment achieved at different levels of market share. Because it was considered desirable to display these relationships in graph form, the modeling system's plotting capability was used to print out the data in this manner.

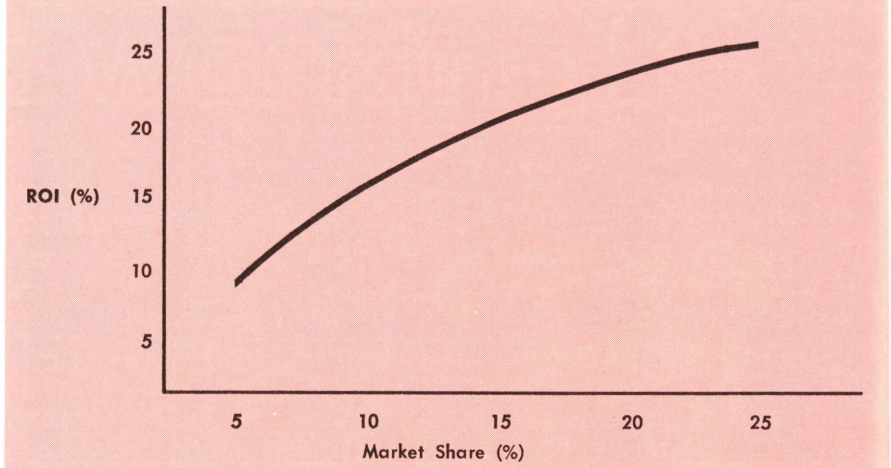
It was also determined that the impact of the competitor on the Division's major product line and the overall Division profit plan could be fairly significant. Figure 2, page 19, shows this impact in graph form.

The conclusion at this point was that the new competitor was likely to be in the market to stay and that serious attention had to be given to the various possible ways of minimizing his penetration in the market.

Before detailed plans were developed, the president also wanted to ascertain the effect on product line and Division profitability if it were decided to reduce prices as a

FIGURE 1

Competitor's Estimated Returns on Investment at Various Shares of Market



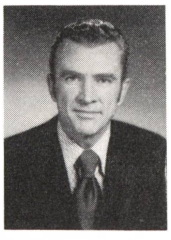
The impact on profits of various growth rates for the total market had to be assessed, as did the influence of changes in manufacturing cost at various volume levels, the effect of various market shares over time for the current product, and the impact of lost distribution if volume erosion continued.

countermeasure. An immediate national price reduction was examined using the planning model, as was the possibility of implementing the decrease on a region-by-region basis so as to minimize the impact on the current fiscal year. Figure 3, on page 19, demonstrates the effect on total Division profits of various national price reductions. This showed clearly that the product is making a negative contribution to profit when its price is lowered to approximately $3.25.

Various levels of price reduction were all rejected at this stage since the negative impact on profits exceeded that due to the competitor's penetration in all but the few instances where a dominating share of market was estimated for the new competitor, and this was not considered likely to occur. The development of detailed marketing plans by the product group was initiated to minimize the effect of this potentially serious new competitive product.

The Division also had a strong position in another product line which in total was only growing with increases in population. Its product was a premium-price brand and was losing market share to several low-price entries. As volume declined, manufacturing costs per unit increased and the profit margin declined accordingly. It became evident that there might be an overall profit advantage to be gained by introducing a new low-price product under a different brand name. Before product development work was instituted, the president wanted to analyze the ten-year volume and profit projections if (1) only the current product continued to be marketed, and if (2) a new low-price brand was introduced by the Division.

The impact on profits of various growth rates for the total market had to be assessed, as did the influence of changes in manufacturing cost at various volume levels, the effect of various market shares over time for the current product, and the impact of lost distribution if volume erosion continued. In addition to these considerations for the current product, the president also wanted to know what total ten-year volume and profits might be as a possible result of introducing the new product and what would be the difference in net profit between marketing only the current brand and introducing the new product. This analysis would include factoring in the amount of



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volume which the new product might take from the present brand, determining manufacturing costs due to changes in volume, and examining return on investment and cash flows.

The computer planning model was ideally suited to this task because of the variations to be examined and the ten-year period involved. Figure 4, below, illustrates the expected profit trends for the present product and the combined profit levels resulting from the introduction of a new, low-price product. (Since the computer terminal cannot graph two lines simultaneously, this composite was prepared from two separate charts.)

The conclusion drawn from the total analysis was that the introduction of a low-price brand would substantially improve the Division's profit potential with a satisfactory return on investment and, as a result, product development work was begun.

The preceding examples indicate only a few of the many ways in which this company's marketing planning models have been used by various members of management to:

—Examine a variety of alternative marketing assumptions and
—Obtain answers to a wide array of "what if?" questions.

Much discussion about the use of

FIGURE 2

Product Line Profitability Related to Competitive Market Share

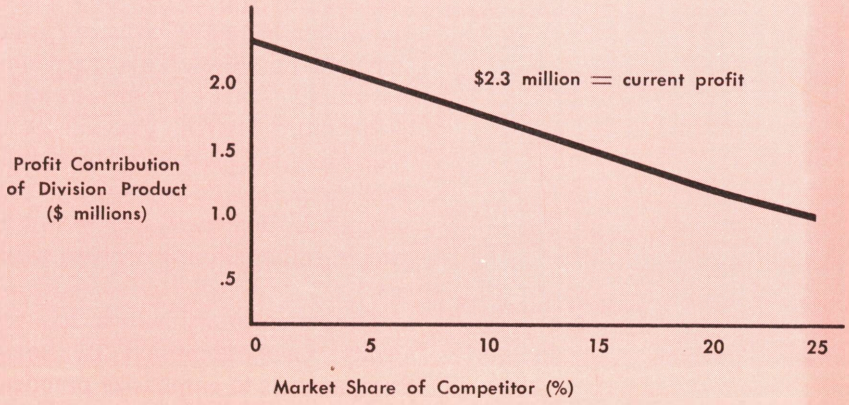


FIGURE 3

Effect of Price Declines on Division Profitability

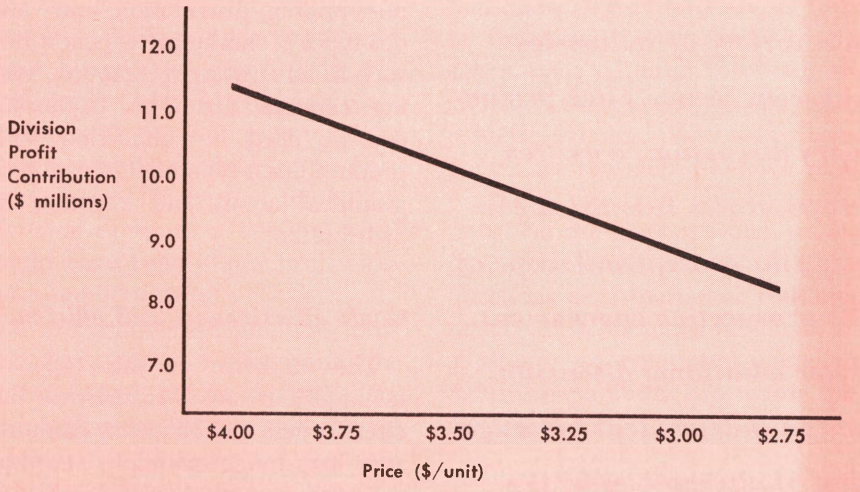
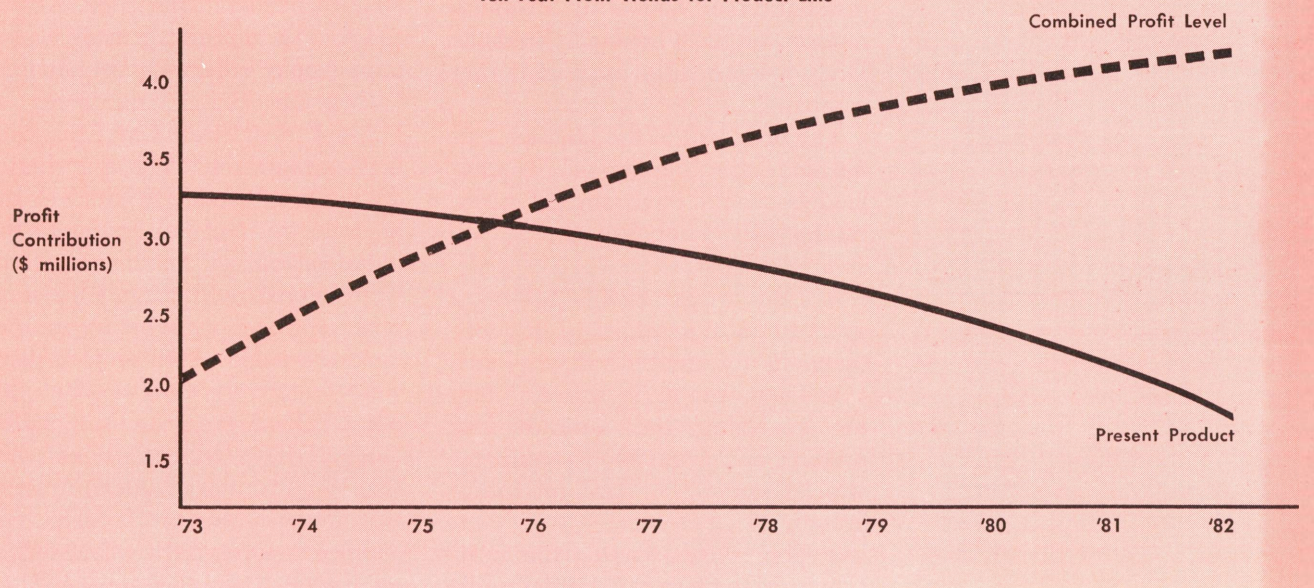


FIGURE 4

Ten-Year Profit Trends for Product Line



the computer related to marketing planning has centered around the theoretical possibilities which exist for solving the cause and effect questions that have bothered management for years. This discussion has usually been expressed in highly technical terms. The result is that there has developed a significant gap in understanding and communication between technical people and marketing decision makers.

The opportunity which has recently been identified by some companies is to emphasize practical computer models for marketing planning use. Essentially, the main purpose of such practical models is to indicate the effect on profitability of variations in market size, share of market, volume, product mix, pricing, distribution, and various types of marketing expenditures such as advertising, promotion, selling expense, etc. This capability can be used in connection with product lines, type of services, geographical areas, and channels of distribution.

Our firm had developed a number of computer models in a variety of industries in recent years. After preliminary discussion, a written proposal was submitted covering the content and scope of the prospective engagement. After additional discussion and an independent investigation of alternatives by the company the work was begun.

Goal: effectiveness and efficiency

The objective of this type of management tool is to increase the effectiveness and efficiency of short- and long-range planning. Experience indicates that this objective is being fulfilled in a growing number of companies. This article is a description of the development and installation of marketing planning models for the Consumer Products Division of a large manufacturing company.

The president of the Division had decided that marketing planning models would have several benefits for his operation:

- They would enable his managers to do more effective in-depth planning for established products.
- They would be a useful tool for analyzing the various new product and acquisition candidates which would be key to future growth.
- They would enable the Division to have these capabilities while maintaining a relatively small group of highly motivated professional product managers.

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The overall project was divided into two phases. Phase 1 was an assessment and planning study covering approximately four weeks. Phase 2 was the model development and installation work covering roughly three months.

The objectives of Phase 1 were to: determine the company's planning needs; evaluate the applicability of models; establish the general logic of the models; analyze the data available and required; evaluate alternative modeling approaches; and estimate the costs and timing required to develop the models. An important part of this process consisted of interviewing the key marketing, sales, and financial managers who would be the prime users of the models. The Division marketing information manager was a key participant in this process because of his knowledge of the people involved, the product lines to be modeled, the planning parameters, the data available, etc. His involvement provided a perspective on the engagement earlier than would otherwise be possible.

Early in the second week of Phase 1 a meeting was held with key managers at which a preliminary overview was presented of the areas to be modeled based on the initial interviews. Some suggestions were offered by managers for computer applications which were beyond the scope of the project; these were tentatively eliminated at this point. These suggestions included computerizing the call report system, an inventory control system, calculating salesmen's bonuses, etc.

Since Division management wanted the product group to do

in-depth planning, the availability of data was a critical consideration for the basic marketing models. Fortunately, the information was being captured by the order entry system. After consideration of various alternative ways of extracting the data, the corporate data processing group wrote the necessary programs to have the historical and projected sales information supplied to the Division for use in the model.

During Phase 1, a number of discussions were held with top management and other key marketing users in which tentative agreements were reached to eliminate some expressed needs and modify others. The general parameters of the modeling needs seemed reasonably well defined. After analyzing various alternative modeling approaches, a recommendation was made to use a specific software modeling system. The complexity of the project precluded the use of highly structured programed models.

Four weeks after the start of Phase 1 a meeting was held with the president and key Division managers to present in detail the recommendations regarding the modeling requirements which would fit the needs of the Division. The key portions of the recommendations were as follows:

1. Divide the Division's more than 100 products and pack sizes into 16 product groups. Provide for an additional nine product groups to accommodate future new product groups.

2. Develop models covering all areas of the business as summarized in Exhibit 1, above. These models would provide marketing plans by product group, sales region, trade channel, and such combinations as product group within a region, trade channel by product group, etc. This type of marketing planning down to a detailed level would have been impractical without computerization.

3. For established products, provide for a report which would indicate actual results versus plan. Although this is a type of control report, actual results are required in the models in order to be able to take advantage of the projection capabilities of the models and get answers to the "what if?" questions which may result from deviation from plan.

4. Be able to provide answers to various types of "what if?" questions. Several examples are set forth in Exhibit 2, below. Most of the calculations required to obtain answers to these questions are quite evident. We find that many companies are routinely pursuing some of these questions on a manual basis. No company of which we are aware, however, pursues all these questions as a matter of continual management practice without the assistance of computer modeling. Several capabilities are worth special comment:

• In developing new monthly sales goals required to

EXHIBIT 1

MODELS DEVELOPED

ESTABLISHED PRODUCT LINE MODELS (National/Region/Trade Channel)
- Two-Year Plan by Month
- Five-Year Plan by Year
- Comparative—Plan vs. Actual (Monthly and Cumulative)

NEW PRODUCTS AND ACQUISITIONS MODELS
- One-Year Profit and Loss by Month
- Ten-Year Profit and Loss by Year
- Ten-Year Cash Flow with ROI and Payback

CONSOLIDATION MODEL (National/Region/Trade Channel)
- Two-Year Plan by Month
- Five-Year Plan by Year
- Comparative—Plan vs. Actual (Monthly and Cumulative)

EXHIBIT 2

EXAMPLES OF "WHAT IF?" QUESTIONS

ESTABLISHED PRODUCTS

1. Actual sales results for all products in the division were 4 per cent behind plan for the first three months of the year.
   A. If this trend continues, what will be the overall division and individual product volume and profit for the year?
   B. If the budget is to be achieved for the year, what sales volume is required for each of the next nine months, for the division in total and for each of the products?
2. Manufacturing costs have increased significantly on product lines A, B, C, and D. If price increases are taken on these lines of 3 per cent, 6 per cent, 7 per cent, and 4 per cent, respectively, will the resulting Division profit margin be within Government Phase II price control guidelines? What would be the effect if each price increase was higher than these levels by 1 per cent, 2 per cent, 3 per cent?
3. Product "B" has a projected volume growth of 5 per cent per year in the five-year plan. What would be the sales volume and profit for the product if annual growth was: 0 per cent, 2 per cent, 4 per cent, 6 per cent, 8 per cent, and 10 per cent?

NEW PRODUCTS

1. What is the effect on the individual product and product group sales volume and profits, if 10 per cent of product "D" volume comes from product "E"? What if this were 20 per cent, 30 per cent?
2. A proposed acquisition requiring $1,500,000 cash investment has a 14 per cent ROI. If the investment were to be increased by $500,000, what is the new ROI? What are the ROI's if volume is 5 per cent, 10 per cent, 15 per cent below forecast?
3. Assuming a sales volume of one million units, what unit price is required for product "G" to break even the year after introduction?

EXHIBIT 3

ALLOCATION MODEL

		Last Year's Sales Index	Population Index	Brand Development Index	Buying Power Index	Weighted Average Index	Planned Sales
REGION	1	90	110	82	103	98	$ 1,960,000
	2	105	120	88	84	96	1,920,000
	.	.	.	.	.	.	.
	.	.	.	.	.	.	.
	.	.	.	.	.	.	.
	9	82	80	103	89	89	1,780,000
	10	117	87	135	126	118	2,360,000
							$20,000,000

		Last Year's Sales Index	Population Index	Brand Development Index	Buying Power Index	Weighted Average Index	Planned Sales
TERRITORY	1	85	95	81	84	87	$ 43,500
	2	102	93	70	95	91	45,500
	.	.	.	.	.	.	.
	.	.	.	.	.	.	.
	.	.	.	.	.	.	.
	41	90	103	106	108	103	51,500
	42	80	100	99	102	91	48,500
							$20,000,000

achieve the original planned volume as indicated in Question One B in Exhibit 2 under Established Products, management is able to focus the attention of marketing managers on the reasonableness of achieving higher, specific targets. We believe it is easier to come to grips with "reality" when analyzing a specific set of new targets. Modeling can make it efficient to provide these new sales targets for review.

• Question Two (Exhibit 2) under New Products pertaining to return on investment is a common consideration in evaluating new products and acquisitions. Since we are dealing with a full profit and loss statement over a ten-year period, the manual calculations required to produce answers to all of the considerations in this question are extensive. It has been estimated that the determination of a specific selected ROI percentage and the preparation of a ten-year P & L could require eight to ten hours if this were done manually using a calculator. The computer derived the ROI percentage in seconds. It took an additional few minutes to have the terminal print a full ten-year P & L.

• Question Two (Exhibit 2) under Established Products is only one version of questions which arose related to the Government's Phase II price control program. This type of model is ideally suited to examine many variations of price increases quickly and efficiently in order to obtain the maximum allowable profit margin.

• New Product Question One (Exhibit 2) represents a desirable capability when introducing a product line extension or a new brand into a product category in which the company already has an entry. The objective is to accommodate the impact of related products and express net profitability. For example, if Product A has a 20 per cent share of market and Product B is a new prospective brand in the same category and is expected to appeal to many of the same consumers, management may believe it is reasonable to assume that 25 per cent of Product B's total volume will come largely from Product A. The model has been developed so that only the total incremental profit contribution of Product B can be shown if desired. This capability can also be used to examine the profit impact of an array of penetration factors before deciding on the one which appears most reasonable, or conservative.

5. As an additional planning tool which could be used in the determination of market potential for products and in the allocation of resources, selection of test market sites, assignment of sales quotas, etc., it was recommended that a model be developed which would permit the efficient weighting of the variety of factors which the Division wanted to use in arriving at such decisions.

Exhibit 3, at left, indicates one of the ways in which this type of model can be used, in this instance to arrive at a targeted volume figure for a brand in each of the ten sales regions and 42 sales territories. Only four possible influencing factors are shown in the example. From a modeling standpoint innumerable factors could be accommodated. In this particular project a provision was made for nine factors. For purposes of illustration in Exhibit 3, the assumption is made that a national sales forecast has already been developed and agreed upon for the next year. If management wishes to distribute this new sales forecast in direct relationship to last year's brand performance in each of the territories, only the first factor (Last Year's Sales Index) is used. The anticipated national volume is used as an input and the computer prints out the appropriate Region and Territory budget in the far right-hand column (Planned Sales). If management decides that previous performance is not the best indicator of sales potential in an area, it could then take into account other factors which it felt should influence brand volume, for

example, Population, Brand Development, and Buying Power. If it is felt that not all of these considerations are equal in importance, each factor can be weighted as deemed appropriate. Planned Sales could then be distributed in relationship to the Weighted Average Index for each sales area.

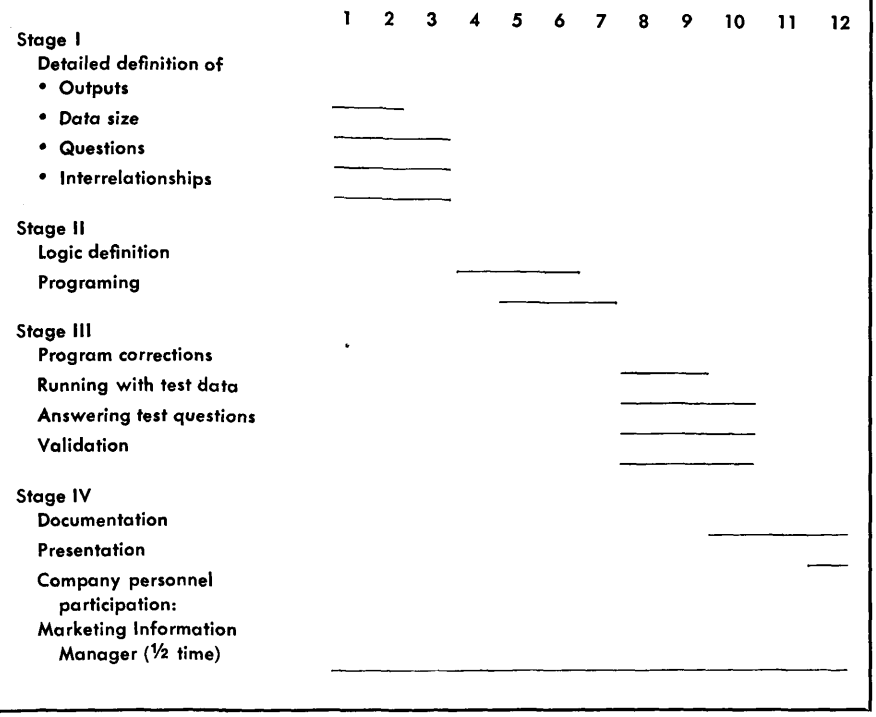
6. In the course of the scoping phase of the project it became evident that additional computerized capabilities would increase the efficiency and effectiveness of the planning process. The following are the more important capabilities which were agreed on to:

- Spread annual projections throughout the year by month using seasonal indices. This capability will enable managers to prepare a base forecast which reflects the normal seasonal fluctuation in sales. To this can be added the expected sales impact due to promotions, advertising, new size introductions, competitive efforts, etc.
- Spread national product line projections to trade channels on a national basis and trade channels within Sales Regions.

Since the Consumer Products Division sells brands in four trade channels and sells a number of products in more than one trade channel, considerable manual calculations would be involved in developing appropriate volume targets. Computerizing this task increases efficiency and enhances the accuracy.

- Convert unit sales projections into dollar sales forecasts. The product managers normally plan in terms of unit volume, while the sales department uses dollar sales targets to manage field force efforts. With 16 product lines, four trade channels, 42 territories, and monthly sales goals, this manual task consumes substantial time for an effort that is ideal for machine computation.

EXHIBIT 4



The consideration of formats desired for output reports was left until last in Phase 1 because the software used allows flexibility with regard to item descriptions and sequence of items. After considering several format possibilities, the Division felt that the full Profit and Loss Statement would best meet its needs. One consideration which made this decision easier than it might otherwise have been is the capability of the modeling system to print line items on a selective basis. Thus, a product manager who wishes to determine the impact on profits due to a change in the mix of his product group can have only the profit line printed out; he does not have to have an entire P & L printed. He can also have several selected line items printed out at once, thereby, in effect, creating his own format to suit the particular situation.

Financial model, too

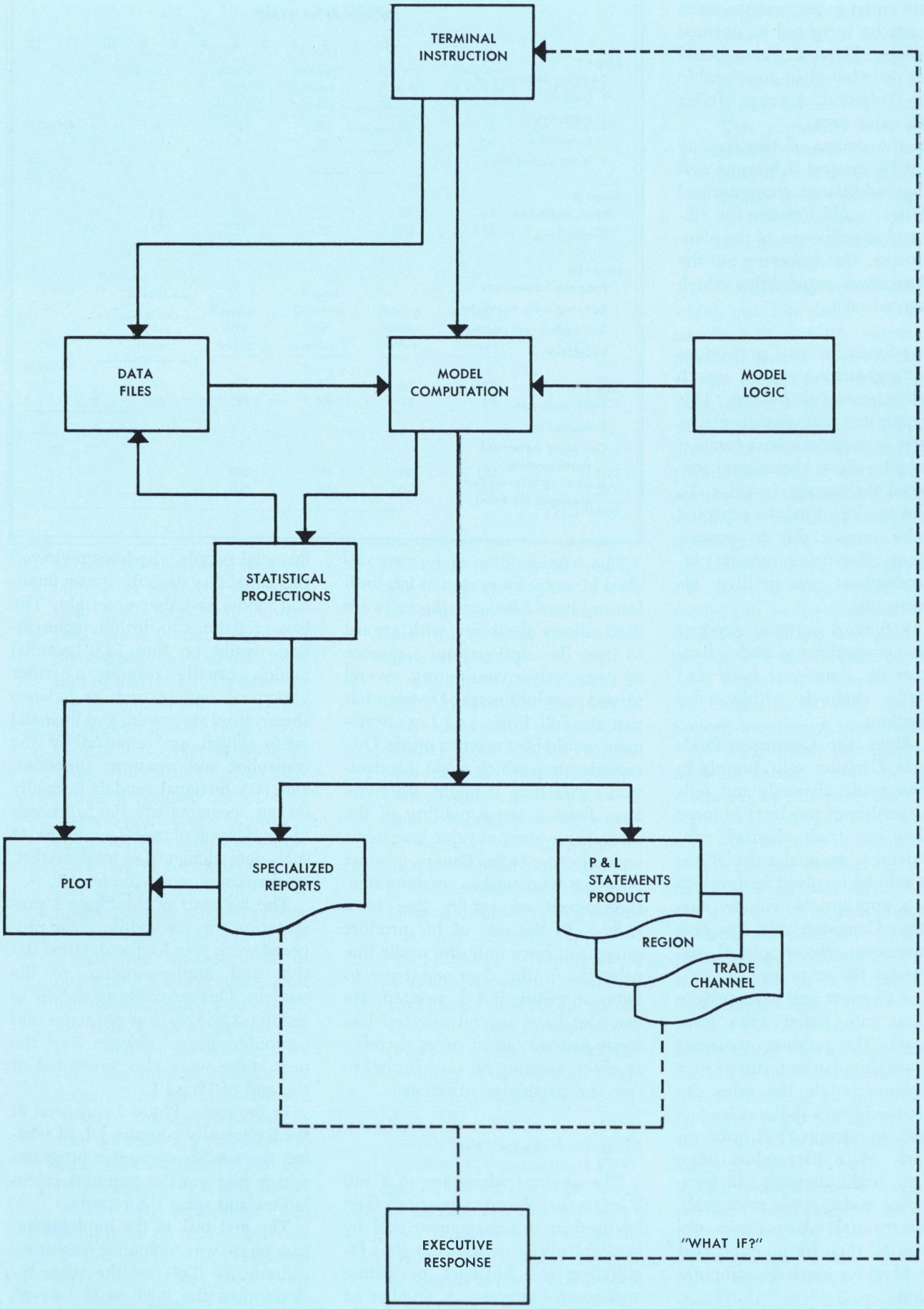
The obvious advantage to a full P & L is that the one report can then be used as a management tool by the controller's department thus facilitating the financial budgeting and control process. A number of financial people who have reviewed this capability describe it as a financial model and they are right. The two exceptions to this characterization would be that (1) financial models usually contain a wider variety of reports such as balance sheets, fund statement, and financial ratios which are required by the controller and treasurer functions, and (2) financial models normally do not accommodate the full needs of marketing planners in terms of such data elements as total market, market share, unit volume, etc.

The last part of the Phase 1 presentation was a schedule of the proposed work plan for the detailed design and implementation of the models. This schedule is shown as Exhibit 4 above. Cost estimates and computer usage charges for the next stage were also presented at the end of Phase 1.

In the main, Phase 2 consisted of the technically complex job of writing the specific computer programs which perform the required calculations and print the reports.

The first task in the implementation phase was to finalize output requirements. This set the stage for developing the logic as to how all

EXHIBIT 5
OVERVIEW OF MODEL SYSTEMS



the data elements interrelate, the sequence of calculations, etc., which is required before specific programs can be written. Exhibit 5, at left, illustrates the relationship of various elements of the model and the operation of the system.

At the end of Phase 1, the intent was to provide modeling capability only on the basis of a product group. It was felt that separate plans for individual brands or package sizes could be accommodated with one of the additional nine product group slots which had not been used. Upon further discussion in Phase 2 it was determined that managers needed considerably greater flexibility, particularly in treating package sizes of various products. Therefore, it was decided that we would provide an additional capability for handling product mix within each product group model. A product manager could then plan separately for a product line or a package size nationally, by geographic area, by trade channel, and time period, and determine separate profitability results or have the information consolidated into the product group plan.

EXHIBIT 6

PROFIT AND LOSS STATEMENT
National—Product Line 2

	(000's omitted)				
	Qtr. 1	Qtr.2	Qtr. 3	Qtr. 4	Tot. 73
Product Line Number	2	2	2	2	2
Gross Sales—Units	545	539	534	529	2,147
Gross Sales—Dollars	1,193	1,180	1,169	1,160	4,702
Returns and Allowances	43	43	43	42	171
Net Sales	1,150	1,137	1,126	1,118	4,531
Standard Cost of Sales	481	476	471	468	1,896
Gross Profit	669	661	655	650	2,635
Television	66	76	73	71	286
Print	32	28	30	29	119
Agency Fees	18	21	19	19	77
Other Advertising	12	12	10	11	45
Total Advertising	128	137	132	130	527
Free Goods	22	19	20	18	79
Selling Materials	17	18	16	17	68
Display Development	6	4	5	4	19
Promotion Allowances (Discounts)	11	8	9	8	36
Special Promotion	9	7	8	8	32
Other Promotion	5	5	4	5	19
Total Promotion	70	61	62	60	253
Samples	2	2	3	3	10
Package Development	3	3	—	—	6
Shipping	27	27	27	27	108
Research and Development	9	8	10	8	35
Market Research	3	4	2	3	12
Food Broker Commission	13	13	13	13	52
Royalties	14	13	6	6	39
Other Direct Expense	4	4	6	6	20
Total Other Direct Expense	75	74	67	66	282
Profit Contribution Product Line	396	389	394	394	1,573

Potential added data

A variety of other details were resolved early in Phase 2. For example, it was decided to leave room for adding at a later date purchased market data on total market size and market share; the ability to manipulate inventory data would be incorporated after a new inventory control system was installed; it was agreed that product samples would be accounted for as a promotional cost and that their volume would not be reflected in either the gross or net sales figure, etc.

Other data handling and formatting considerations arose during the next few weeks but none presented a serious problem. The balance of the work, therefore, was largely technical in nature. The specific programs were written to provide for the proper input of data, manipulating the data, and presenting the resulting information in the desired formats. Test data and hypothetical questions were used to check the accuracy and completeness of the programs.

Although we often speak of developing "a" planning model for the Consumer Products Division, from a technical point of view there are actually six separate models which were required to provide the overall capability.

The last step in the technical process was the development of documentation. This consists of placing in a manual all of the specific programs which comprise the models, directions for the use of the models, steps to be taken to modify programs or create new models as future needs dictate, etc.

The designation and training of an individual as the Division's model builder and computer terminal operator is, of course, vital to the success of developing and using computer models. In this instance the Division's marketing information manager was an ideal choice. He was heavily involved in the planning process, was knowledgeable about data availability and was familiar with the operation of the computer terminal. His contributions during both phases of the engagement were extensive. Training in this case was, therefore, a continuous process. By the end of Phase 2 the marketing information manager was sufficiently familiar with all the requirements for operating and modifying the system to be self-sufficient. The Division had the responsibility for generating the actual sales and expense information to feed into the model and the marketing information manager was in charge of this effort.

As mentioned earlier, the Division elected to have reports presented using its profit and loss formats. Exhibit 6 above indicates the detail available for one of the Division's national brands. Exhibit 7, on page 26, illustrates the types of additional performance measures provided for the evaluation of a

EXHIBIT 7

PROFIT AND LOSS AND CASH FLOW FOR NEW PRODUCT OR ACQUISITION
(000's omitted)

	72	73	74	75	76	77	78	79	80	81
Total Market—Units	24,550	27,128	30,112	33,424	36,934	40,997	44,892	49,157	53,581	58,403
Market Growth Per Cent Per Year	10.0	10.5	11.0	11.0	10.5	10.0	9.5	9.5	9.0	9.0
Market Share Per Cent	9.0	11.9	14.3	17.0	18.2	18.8	19.8	20.7	21.9	23.1
Sales Units	2,213	3,221	4,315	5,671	6,708	7,711	8,870	10,198	11,729	13,488
Price—Dollars	1	1	1	1	1	1	1	1	1	1
Sales—Dollars	2,213	3,221	4,315	5,671	6,708	7,711	8,870	10,198	11,729	13,488
Income After Taxes	33	290	547	494	610	740	899	1,060	1,267	1,502
Addition to Earnings Per Share	.004	.035	.066	.060	.074	.090	.109	.128	.153	.182
Depreciation	131	137	146	158	208	247	301	381	501	801
Working Capital Add Back										2,112
Total Sources	164	427	693	652	818	987	1,200	1,441	1,768	4,415
Working Capital Change	229	168	183	226	173	167	194	221	256	294
Capital Expense	48	60	72	84	300	192	216	240	240	300
Contingency			12	55	149					
Total Uses	277	228	267	365	622	359	410	461	496	594
Net Cash Flow	—113	199	426	287	196	628	790	980	1,272	3,821
Return on Investment Per Cent										17
Payback Period—Years										6

potential new product or acquisition. Profitability statements by sales region and trade channel are consolidations of product sales in a particular geographic area or channel of distribution, taking into account only those expenses directly attributable to the region or trade channel.

In examining product profitability within a sales region, the Division decided to measure initially only the gross profit contribution. At a later date, the Division will consider incorporating a "merchandising profit" measure. This will include direct product line expense items which would not have to be allocated, such as advertising, promotion, food broker commissions, royalties, etc.

Phase 2 was completed almost exactly on schedule, 12 weeks after it began. The final presentation to management was held a week later and documentation was delivered at that time.

To date, the Division has used this planning tool in a variety of ways and is pleased with the results. Usage has been for new product performance analysis, acquisition projection analysis, new production and promotional sales quota allocation, pricing studies, evaluation of alternative strategies, and analysis of competitive new product entries, in addition to use in regular planning activities for established brands. The Division has also been able to make modifications in the accumulation, manipulation, and presentation of data with little difficulty and no outside assistance.

The following benefits result from this type of management tool:

1. Management is able to make *better informed decisions.*
2. Company managers are provided with the tools to *improve in-depth planning.*
3. Decisions are reached with *greater objectivity.*
4. The entire *planning* process is *speeded up.*
5. *A single manager can manage more business,* without a decrease in marketing sophistication.

In the past two years we have noted a small number of leadership companies moving in the direction of using the type of practical marketing model described in this article. During the next five years we believe the existence of such models will become commonplace in industry. Although it is possible for a company to develop this kind of capability by itself from ground zero, there appear to be a number of compelling reasons for creating specific programs which interact with an already existing software modeling environment. Models constructed in this manner can be completed:

- More quickly
- Far more economically
- With greater assurance of success
- Without interfering with company priorities.

Conclusion

Practical marketing models can be a useful management tool which can increase the efficiency and the effectiveness of short- and long-range marketing planning. This assumes, of course, that valid data are available for input and that the predictions made by management are reasonable. The company described in this article has achieved real and varied benefits at an early stage. This project demonstrates that the development of a comprehensive marketing model does not have to be costly, protracted, or of doubtful success. The trend in industry during the past two years indicates that, with this kind of practical modeling as a base capability, the application of the computer to basic marketing planning will, finally, begin to show the promise that has been written about for many years.