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Dynamics of New Product Campaigns

HARLAN D. MILLS

Introducing a new consumer product on a nationwide basis is much like playing a game of stud poker.

Consumer reactions early in the campaign, when sufficiently well understood, can provide vital clues in accelerating or cutting off product promotion as required for maximum impact to corporate objectives.

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THE MAJOR fact of life for new consumer products in our competitive economy is that most of them *fail*.

Yet every one of these new products is originally launched with enthusiasm and seeming good reason. Indeed, the greater the enthusiasm and the higher the hopes, the more difficult it is to recognize a failure. First, a trade-retailing pipeline must be filled; then a consumer trial period follows; and eventually some combined trade-consumer level of acceptance emerges. The early trade shipments and consumer sales may tell little about the final outcome. A million units sold bears quite different meanings if a million consumers have tried once, or if half that many have tried and repeated.

Thus, new product campaign strategies must be able to handle a spectrum of failures and successes. They must be able to use information from the field early and continuously, and to accelerate or decelerate new product campaigns objectively for maximum profit performance. The time advantage of a new product success can easily perish for want of adequate follow-through actions in production, logistics, and retail distribution. Sins of omission in successful introductions can cost reduced profits, even though they may be less noticeable than failures.

The game of stud poker furnishes a useful analogy here. The hole card corresponds to the new product. The cards dealt face up on the table represent field performance of the product during the campaign. Accelerating or decelerating the new product campaign as new marketing information becomes available corresponds to the betting, "seeing," and "folding up" that occur as new cards are dealt.

Unfortunately a new product campaign may be planned from the beginning in an imaginative and creative way, but without adequate provision for using early field information to make effective changes in strategy in the course of the campaign. This corresponds to playing poker on the basis of your hole card alone, paying little attention to the other cards being dealt face up in your and your opponent's hands. In poker, it is easy to see that this is unwise. It is not as easy to see this in marketing where the problem of securing information is so much more difficult.

It would be nice to have a successful new product every time, just as it would be nice to be dealt four aces in every poker hand. But neither of these situations is very likely. And any strategy that speculates or depends on such hope cannot be successful. The object in poker is not to win the most hands, but to win the most

money. Similarly, the purpose in business is not to maximize the number of successful new product introductions, but to maximize corporate profits.

New Product Market Structures

The eventual success or failure of a new national consumer product depends upon a continuing set of interactions among trade retailers and a multitude of individual consumers. These interactions are not visible immediately. The real momentum of the product, like the major part of an iceberg, is far below the surface; it is revealed slowly in the time span of a new product campaign.

Developing an entire market picture with its associated complex of reactions spread out among trade retailers and the consumers is a painstaking, tedious, and complicated analytic undertaking. Yet such undertakings can allow earlier forecasts of the eventual results and deeper understandings of the marketing situation as it develops during a new product campaign.

The market structure in a new product campaign can be diagrammed as in Figure 1. Care must be taken to distinguish between the available actions that the company can take, other market reactions, and the desired results.

For example, volume is a *goal*, not a *decision*; the decision is to advertise and promote to (hopefully) reach or exceed that volume goal. We can *decide* to employ our own marketing resources in terms of salesmen, advertising, funds, price discounts, and so forth. Events in the consumer population or in the trade retailing system then result through the interaction of our actions and competitive forces.

In this diagram, consider "consumer trying" and "consumer rebuying" each feeding into "consumer volume." Only "consumer volume" affects the trade retailing system, since this is all the trade retailing system knows about. Yet there is a profound difference between products with the same early consumer volume where one product has a high trying but low rebuying rate and the other has a low trying but high rebuying rate.

As another example, notice that "consumer trying" is fed by "consumer promotion" and "trade distribution." An unsatisfactory "consumer trying" rate can be the result of deficiencies in one or both of these causes. The "trade distribution" is relatively easy to obtain objective measurements on, and can thereby be used as a control and inferential check on the quality of the "consumer promotion."

Thus, in a complicated network of events, original marketing actions pass through the trade system and the consumer population and eventually come back as marketing results. The structure in Figure 1 is a start in understanding this network in better detail. This understanding must always be

imperfect; but even small increases in the understanding of this structure may allow decisive increases in marketing effectiveness. In particular, the analysis of repeat purchasing can provide decisive early information on the ultimate acceptance of the product and the campaign as it unfolds.¹

It is not the burden of good poker strategy to win with poor hands but rather to try to lose as little as possible with them when they are dealt. Similarly, it should not be the burden of marketing strategy in a new product campaign to win with a poor product. Instead, the problem is to do as well as possible with a new product of *unknown* capabilities even though we have high hopes for it (and have researched its potential to our best ability beforehand).

This new product of unknown capability may be good or bad; and "doing as well as possible" may mean dropping the whole idea as soon as the field information indicates that it is bad. It is too much to expect a creative marketing organization, all "wrapped up" in the product, to appreciate the failure as early as it might be observed by analytic processes.

The ultimate marketing properties of new products are revealed only as the trade and consumer population acquire experience with them. However high the hopes, the ultimate test of a product's value lies in this complex of trade and consumer reactions.

A New Product Campaign Model

Suppose, on the basis of experience and market analysis, an empirical law is found relating the number of consumer units that try a new product to the level of that new product's promotion campaign. Suppose this empirical law is of the form

$$(1) \quad T = \frac{Nx}{A + x}$$

where

¹ F. J. Anscombe, "Estimating a Mixed-Exponential Response Law," *Journal of the American Statistical Association*, Vol. 56 (September, 1961), pp. 493-502; L. A. Fourt and J. W. Woodlock, "Early Prediction of Market Success for New Grocery Products," *JOURNAL OF MARKETING*, Vol. 25 (October, 1962), pp. 31-38.

• ABOUT THE AUTHOR. Harlan D. Mills is Manager, Systems Analysis, Federal Systems Division, IBM. He has a Ph.D. in Mathematics, and has taught at Iowa State, Princeton, and New York Universities. He has also served on the technical staffs at GE and RCA.

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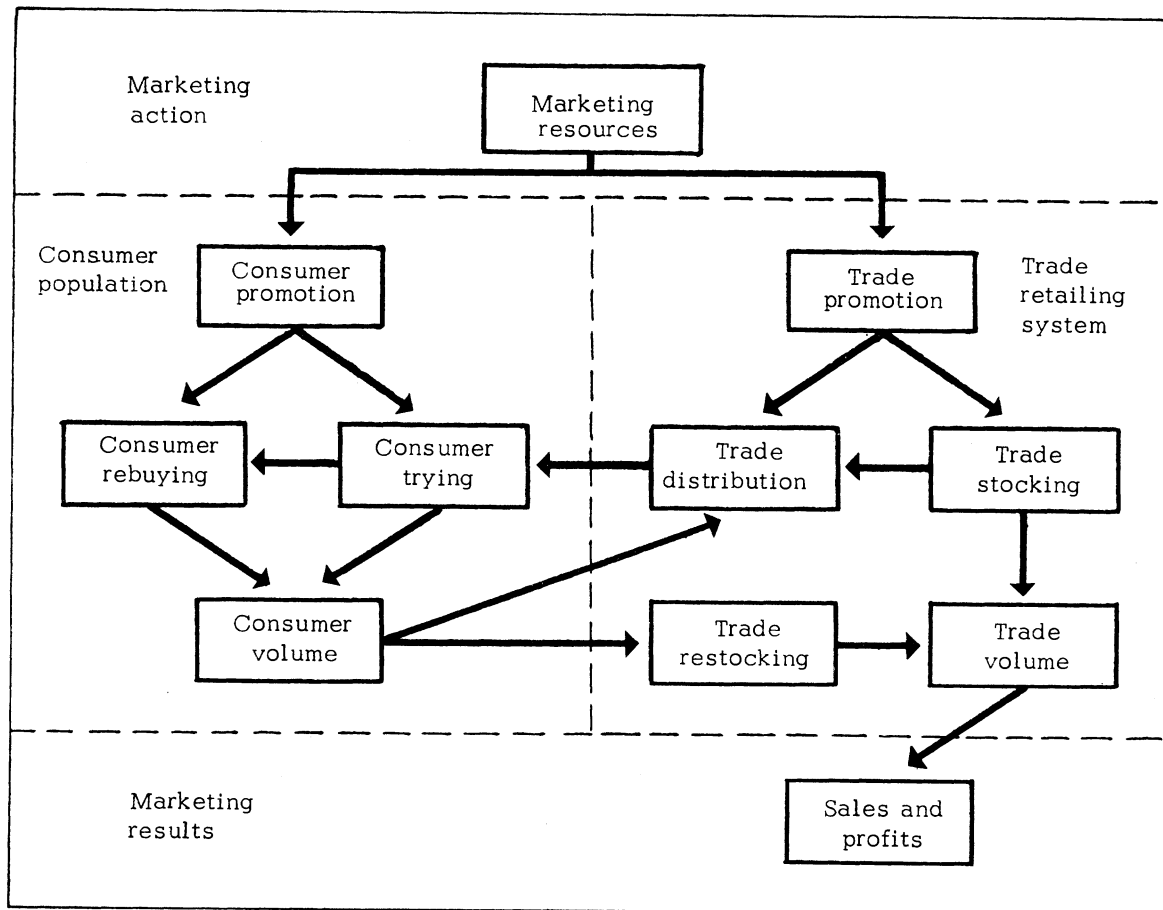


FIGURE 1. Market structure in a new product campaign.

T = the number of consumers trying.

N = the total number of consumers in the market,

x = the dollars of promotion used,

A = new product "market resistance."

A is a number that varies from one campaign to the next, and is adjusted to fit the statistical data. The name of A arises because the larger A is in a new product campaign, the less is the return in consumer units trying the product for each dollar of promotion effort. Equation (1) represents a simple, but general, market structure. In specific cases we may also want to consider product distribution, the breakdown of promotional effort between the trade system and direct consumer promotion, and other factors.

Suppose the average rate of purchases per year, generated by a trial purchase, turns out to be R . This statistic, different for each product, depends on the repeat rate and level of use of the product. We also define a time horizon, H , over which the profitability of the product is to be judged. Let p be the unit price of the product, and c be the normal unit cost of the product— c does not contain the costs of the introductory campaign, but it does include continuing marketing, manufacturing, and other expenses during the life of the product.

Then we can determine the following quantities of interest. First, the volume of the product over its profit horizon will be

$$(2) \quad V = TRH$$

(*triers times buying rate times horizon*). We cannot predict V in equation (2), since both T and R will be quantities that emerge during the campaign (like cards that show up in stud poker).

Next, the profit of the product over this horizon will be

$$(3) \quad P = V(p - c) - x$$

(*profit in normal operations less introductory costs*).

Finally, substituting equations (1) and (2) into equation (3), we can write profit in terms of the decision variable x and two unknown market statistics A and R , as

$$(4) \quad P = \left(\frac{Nx}{A + x} \right) RH(p - c) - x,$$

where N , p , and c are constants.

We can simplify equation (4) by arbitrarily introducing a new statistic B , in place of R , by the definition

$$(5) \quad B = NH(p - c)R,$$

which we interpret (for reasons later apparent) as B = new product "profit potential."

Then, the profit of the new product over its horizon P becomes, simply

$$(6) \quad P = \frac{Bx}{A + x} - x$$

Equation (6) displays our strategic situation very concisely. We wish to maximize P by choosing x, except that we do not know what A and B are to begin with. Their values are revealed only by the consumer during the course of the new product campaign.

In general, the solution to the foregoing problem is as follows. Begin a new product campaign at some trial rate indicated by *a priori* estimates of A and B; as soon as possible, estimate values of A and B from early field information and revise the trial rate of the new product campaign; maintain the estimation and revision process continuously through the campaign. This is a "feedback process" with the marketer in charge.

Decision Rules

It is instructive to solve the problem of maximizing P in equation (6) when A and B are assumed to be known (or estimated). We find, then, by differentiating P with respect to x and then checking the second derivative also that P is maximized when

$$(7) \quad x = \begin{cases} \sqrt{AB} - A & \text{if } B > A \\ 0 & \text{if } B \leq A. \end{cases}$$

This decision rule says: initiate a new product campaign only if, first, "profit potential" B exceeds "market resistance" A, and; second, it gives the level of effort in terms of A and B. Notice that A, B, and x are measured in dollars.

As already noted, decision rule (7) suffers in real life from lack of knowledge of A and B at the beginning of the campaign; so, we need to work out the situation during the course of the campaign as such values become firmer. On the basis of initial estimates, suppose that a partial amount s of x has already been invested in a new product campaign, and that now new estimates A* and B* are available for A and B. What should the revision x* of x be?

As a poker hand progresses, one must continuously evaluate risks and rewards. The reward is the pot already existing. If you believe the odds are in your favor, considering your next bet against the pot, the bet is justified, but otherwise not. There is another point of view possible, of "protecting one's money." But do not be misled—there is no such thing. Bets made in the past are irrelevant, except in their reflection of the current situation.

Similarly, in the course of a new product campaign, there is no such thing as "protecting one's money." As the situation unfolds, decision-makers must look ahead. Money invested does indeed de-

velop a certain momentum in the market; but it is that *momentum*, and not the money, that must be taken into account.

Suppose, then, that s has already been spent, and that we seek to revise our total level x to x* on the basis of new estimates A* and B* of A and B. Let x* = s + y*; that is, y* will be the additional (incremental) level of effort, beyond s, to be put into the campaign. The total profit over the horizon, for any y*, can be determined, as in (6), as

$$(8) \quad P = \frac{B^* (s + y^*)}{A^* + (s + y^*)} - (s + y^*).$$

Then, differentiating again, and checking for a maximum, we find

$$(9) \quad y^* = \begin{cases} \sqrt{A^*B^*} - A^* - s, & \text{if } B^* > A^* + 2s + \frac{s^2}{A^*}; \\ 0, & \text{if } B^* \leq A^* + 2s + \frac{s^2}{A^*}. \end{cases}$$

Decision rule (9) is more complex than rule (7), reflecting the market momentum already built up by the expenditure of s, but is of the same type. It gives a criterion for calling off the campaign—when the "market potential" B* is determined to be below the quantity A* + 2s + s²/A*. Notice that this is a stricter criterion than for initiating a campaign, since this latter quantity is greater than "market resistant" A* by the amount of the last two terms. In fact, this is *opposite* from the strategy of "protecting one's money"—the more money expended in a campaign, the better the product should look to continue it! A little thought will convince you the criterion is valid, however. It "milks" the marginal new products, rather than carrying them along.

The quantitative part of decision rule (9) gives the means for continuously revising campaign plans as statistics and better estimates for A and B become available. The quantities A and B, it is true, are not easily observable, and require advanced statistical sampling and analysis for effective measurement and understanding. But this is a fact of life. Progress in many areas often requires a level of performance unheard of previously.

For example, the construction of atomic piles required the fabrication of carbon blocks of fantastic purity—uncalled for in any previous application for more mundane chores in combustion or electrical conduction. Or consider the number of perfectly functioning mechanical parts in the automobiles filling the superhighways any Sunday afternoon—there is a new order of reliability, without which these highways would be hopelessly clogged with disabled cars.

Progress in marketing likewise requires feats of imagination, statistics, and logic that everyone "knows" to be impossible today.