Financial Dimensions of Marketing Management

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Although many different kinds of techniques can aid in the more effective allocation of marketing effort, renewed interest has recently been shown in the possible contribution of tools developed in the functional areas of accounting and finance. The nature, areas of application, and limitations of some of these profit-oriented aids to decision making and control are discussed in this article.

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NUMEROUS articles have been written in recent years on the marketing applications of quantitative methods, multivariate statistics, and the behavioral sciences. An otherwise desirable emphasis on new techniques and interdisciplinary relationships has contributed to the relative neglect of analytical tools developed in the accounting and finance areas. This article is designed to familiarize the reader with the assistance in managerial decision making and marketing control that such tools can provide.

Alternate Accounting Systems

Three major types of accounting information systems are in current use. The most common is the traditional custodial system, which provides a financial account of the condition of the organization at given points in time. This system is designed primarily to generate the balance sheets and income statements required by external interests such as stockholders, securities exchanges, and government agencies.

Performance accounting is a less common but still widely employed accounting information system. Its purpose is to match the performance of centers of responsibilities or profit against the plans, standards, and budgets previously formulated for such centers. Thus, these centers serve as the basic collection units for both cost and revenue data with reports subsequently being made available on the performance of each unit.

The third type of accounting information system, one still in relatively limited use, can be characterized as decision-oriented and contribution-based. Accounting and statistical information are used primarily to evaluate alternate courses of action. The system relies heavily on contribution accounting whereby all unavoidable costs functionally related to a product are allocated to it. Net sales minus such costs reveals the contribution each product makes towards overhead. Decisions based on contribution accounting have particular relevance in the areas of product introduction and abandonment, in pricing and, generally, in the determination of

the appropriate level of marketing effort. A similar contribution approach can be applied to measure territory, customer, and salesman profitability.[1]

Contribution Accounting and Segment Analysis

Financial evaluation of customer and product segments is an essential feature of the marketing decision process. Unfortunately, many commonly employed approaches stress the net income derived from each segment. Because these methods require the full allocation of all costs, they can be misleading when used as a basis for selecting among alternate courses of action. For example, the fixed costs arbitrarily assigned under a full costing system to an unprofitable territory would not be eliminated by discontinuing service in that area.[2] Given those weaknesses of a full costing approach, contribution profit becomes the relevant accounting concept for decisions affecting marketing segments.[3] Consequently, the accounting information system must facilitate the assignment of direct cost and sales figures and disclose the contribution of each segment. Distribution cost accounting, employed by advocates of both full and direct costing, is the essential analytical tool in cost determination. This technique has been extensively treated in the marketing literature and requires no further discussion at this time.[4]

The contribution approach is complicated by certain operational difficulties. Future expected costs rather than past costs are the ones most relevant for decision making. Similarly, the evaluation should involve the opportunity costs, rather than the actual costs, of committing scarce corporate resources. Finally, a method must be developed for assigning to each marketing segment only that proportion of its promotional expenditures presumed to have an impact in the time period under consideration. Future costs and opportunity costs are not easily estimated, nor can promotional costs be prorated with any great certainty.

Operational problems notwithstanding, a contribution-based, decision-oriented accounting information system would facilitate the evaluation of possible courses of action such as serving a new market, discontinuing a product, adding a channel of distribution, or increasing promotional expenditures. Management might then rank a number of possible courses of action or weigh projections of expected revenue and cost by subjective probability estimates. When such calculations are made, the working capital invested in accounts receivable and inventories must be considered as part of the assets being managed.[5]

Marketing-Oriented Financial Reporting Forms

How should contribution profit data be presented to management? Most marketing executives are relatively unfamiliar with the kind of reporting approach being advocated by farsighted accountants. Table 1 of this paper illustrates a recently proposed format for disclosing territorial contribution. Especially noteworthy are the allowances made for the user cost of fixed assets and the cost of capital. If, in contrast, a measure of return on investment by segment is preferred, it can be provided by a relatively simple modification. No cost of capital deductions would be made, and the resulting adjusted net segment contribution would be divided by the budgeted average capital for the segment. The resulting figure is termed "Return on Assets Committed." The recommended format thus allows a choice between a residual income or a return on assets approach to segment efficiency. The relative merits of these two approaches are currently being debated.[6]

A projected divisional profit and loss statement or a comparison of actual with budgeted revenues and expenses can also be presented in a manner highlighting marginal contributions. This type of profitability accounting format relies heavily on standard costs applied on an absorption basis. Absorption costing assigns direct and indirect costs to a product, division, or function while making clear the profit contribution on the direct costs. A further distinction can be made between direct marketing costs and other marketing expenses relevant to a product or customer segment. Table 2 depicts such a system.

Marketing expenses can also be classified into order-processing and order-generating expenses. The order-processing expenses are similar in nature to manufacturing overhead and can be controlled in the same fashion. Order-generating ex-

1. "The Role of Accounting," *Marketing Insights* (March 27, 1967), p. 10.

2. See "Report of the Committee on Cost and Profitability Analyses for Marketing," *Accounting Review*, Supplement to Vol. 47 (1972), pp. 590-591.

3. For a minority view advocating the greater use of full costing rather than direct costing in the area of pricing, see Richard J. L. Herson and Ronald S. Hertz, "Direct Costing in Pricing—A Critical Reappraisal," *Management Services*, Vol. 5 (March-April 1968), pp. 35-44.

4. For an especially clear and managerially oriented treatment of Distribution Cost Accounting, see "Marketing Cost Analysis" in William J. Stanton and Richard H. Buskirk, *Management of the Sales Force* (Homewood, Ill.: Richard D. Irwin, Inc., 1969), pp. 595-613.

5. J. S. Schiff and Michael Schiff, "New Sales Management Tool: ROAM," *Harvard Business Review*, Vol. 45 (July-August 1967), pp. 59-60.

6. See David Solomons, *Divisional Performance: Measurement and Control* (New York: Financial Executives Research Foundation, 1965), p. 63; and L. R. Amey, *The Efficiency of Business Enterprises* (London: George Allen and Unwin Ltd., 1969), pp. 136-145.

TABLE 1
FORMAT FOR REPORTING TERRITORIAL CONTRIBUTION

	Amount	*Behavior*
REVENUES	$1,200,000	Variable
Less: Variable costs		
Current value of expired direct variable services performed by the segment	200,000	Variable
Current value or standard differential cost of services provided to the segment by other parts of the firm	120,000	Variable
Cost of capital: (8%) × Current value of average traceable working capital	80,000	Semi-variable, part of working capital may be fixed
SEGMENT CONTRIBUTION MARGIN	800,000	
Less: Direct, out-of-pocket, fixed costs incurred by or specifically for the segment[a]	280,000	Fixed
SEGMENT CONTROLLABLE MARGIN	520,000	
Less: Specific long-run costs. User cost in current value of direct fixed assets of the segment based on estimated decline during period	150,000	Obsolescence portion fixed; user portion variable
Cost of capital: (8%) × Current value of average direct fixed capital	160,000	Fixed
NET SEGMENT MARGIN	$ 210,000	

Source: "Report of the Committee on Cost and Profitability Analyses for Marketing," *The Accounting Review*, Supplement to Vol. 47 (1972), p. 592.
[a]It may be desirable to further separate these costs according to the degree of periodic management discretion over them.

penses involve a longer time dimension in the sense that they are incurred today for future benefits. Advertising and marketing research costs, for example, can be classified as order-generating costs presumed to have an effect over the entire life cycle of the product.[7]

Break-even Analysis

Break-even analysis is employed with considerable frequency by marketing managers.[8] Despite its popularity, the break-even approach is widely faulted by academics and consultants for assuming static revenue-output and cost-output functional relationships and for not taking either change or risk into account. (In fact, a statistical technique which incorporates relative risks has been proposed.)[9] The basic break-even relationships have been further criticized as overly simplified because profits also depend upon production processes, the quality of selling efforts, and the composition of demand, as well as numerous other internal and external factors.

Most critics would admit, however, that break-even analysis remains a useful financial tool for firms in oligopolistic industries where prices are often "sticky," plants are generally large with considerable excess capacity, and variable costs are reasonably constant and account for a relatively low proportion of the final selling price. Examples of such industries are petroleum refining, steel manufacturing, and the production of industrial chemicals.

7. Sanford Simon, *Managing Marketing Profitability* (New York: American Management Association, 1969), p. 23.

8. For a history of break-even analysis, see Alice C. Dow and Grace Johnson, "The Break-even Point Concept—Its Development and Expanding Applications," *Management Accounting*, Vol. 50 (February 1969), pp. 29-31. For a review of relevant applications, see especially Douglas P. Gould, *Marketing for Profit* (New York: Reinhold Publishing Corporation, 1961), pp. 31, 47-58, 69, 77-88, 124, 150; and Paul Stillson and Leonard Arnoff, "Product Search and Evaluation," JOURNAL OF MARKETING, Vol. 22 (July 1957), pp. 33-39.

9. Robert K. Jaedicke and Alexander A. Robrikels, "Cost-Volume-Profit Analysis Under Conditions of Uncertainty," *Accounting Review*, Vol. 39 (October 1964), pp. 917-926.

TABLE 2
AUGMENTED CONTRIBUTION MARGIN PROFIT AND LOSS STATEMENT (DOLLARS)

Proceeds from sales				$250.0
Variable cost of goods sold	$120.0	Raw materials	$40.0	
		Packing materials	20.0	
		Direct labor	60.0	
Variable gross profit (manufacturing contribution margin)				130.0
Other variable expense	20.0	Freight	5.0	
		Warehousing	6.0	
		Spoilage	2.0	
		Commissions	4.0	
		Discounts	3.0	
Variable profit (distribution contribution margin)				110.0
Direct product costs	22.0	Advertising	12.0	
		Promotion	10.0	
Direct product profit				88.0
Direct division costs	4.5	Sales management	0.7	
		Product management	0.3	
		Sales force	2.8	
		Sales incentive plan	0.2	
		Market research	0.5	
Division profit contribution (net contribution margin)				83.5
Allocated period expenses				
Factory overhead	28.0	Supervisory	20.0	
		Maintenance	5.0	
		Utilities, etc.	3.0	
Plant depreciation	5.0			
Corporate administration, other	12.5	Administration	10.0	
		Bad debts	0.5	
		Interest	1.0	
		Branch office	1.0	
Net division profit (before taxes)				$ 38.0

Source: Sam R. Goodman, *Techniques of Profitability Analysis* (New York: John Wiley, 1970), p. 112.

To generate a range of possibilities at a given price, break-even analysis can be combined with a distribution of volume estimates. One method involves the use of a beta probability distribution which yields a 50% probability for the most likely volume.[10] Another approach is to approximate price volume curves and derive multiple breakeven points.[11] Once an approximate price level is determined, the actual price becomes a tactical decision. A more complex, simulation-based technique involves pricing to achieve the highest possible present value of the contribution margin that the product makes over its entire life cycle to the recovery of each period's overhead costs and profits.[12]

Proposed Return-on-Investment Applications

The use of return-on-investment analysis has been advocated in almost every area of marketing expenditure. Dean and Tarpey have forcibly argued for its application in establishing the advertising budget, although they recognize the operational difficulties involved in estimating the stream of future revenues associated with alternate levels of advertising.[13] (Return-on-investment

10. Bill P. Darden, "An Operational Approach to Product Pricing," JOURNAL OF MARKETING, Vol. 32 (April 1968), pp. 29-33.

11. Douglas P. Gould, "Opportunity Accounting for Product Line Decisions," *Management Accounting*, Vol. 50 (April 1969), pp. 33-38.

12. William S. Kallimanis, "Product Contribution Analysis for Multi-Product Pricing," *Management Accounting*, Vol. 49 (July 1968), pp. 3-11.

13. Joel Dean, "Does Advertising Belong in the Capital Budget," JOURNAL OF MARKETING, Vol. 30 (October 1966), pp. 15-21; Lawrence T. Tarpey, "Advertising Theory and the Capital Budgeting Model," *Business Horizons* (Summer 1965), pp. 87-93.

calculations for advertising and similar marketing outlays should consider the actual amount invested to be the cost of the expenditure minus the additional income tax paid had such an expenditure not been made.)

Lambert has argued that financial considerations should be a major determinant both of channel length and the marketing functions performed by each channel member.[14] Grabner and Robeson maintain that the design of physical distribution systems should be viewed in capital budgeting terms.[15] The relevance of a modified return-on-assets managed approach to sales management has also been demonstrated.[16] Myers and Samli have proposed a present value approach for evaluating both individual marketing research projects and entire marketing research programs.[17] Scheuble advocates the use of discounted cash flow techniques in new product evaluation. His article also contains a nomographic shortcut which facilitates the necessary calculations.[18] Another proposed use of capital budgeting involves determining whether an additional investment should be allocated to the marketing function rather than to such competing areas as manufacturing or research and development.[19]

Winer has developed a more generalized return-on-investment approach called the PROD (Profit Oriented Decision) system. PROD assumes that each product's cost of capital approximates the firm's aggregate fixed annual marketing expense attributable to that product. Once the cost-of-capital and "add on" percentages have been totalled and expressed as a return-on-investment target, the incremental costs, revenues, and investments associated with possible marketing decisions can be discounted to determine in each case whether the desired level of return would be attained. Winer proceeds to demonstrate how the PROD approach could be applied to decisions in the new product, channels, and pricing areas.[20]

PRESS (Product Review and Evaluation Sub-System) is an especially promising method proposed for use in product abandonment decisions. PRESS utilizes a standard variable cost accounting system and relies upon marketing performance data for its inputs. Only costs directly associated with the product or sales of a specific product are considered relevant to the analysis. The basis for product comparisons is the Selection Index Number, which can be expressed as follows:

$$\text{S.I.} = \frac{\dfrac{\text{Product A Contribution}}{\text{Contribution of all Products}}}{\dfrac{\text{Product A Use of Resources}}{\text{Use of Resources by all Products}}} \times \frac{\text{Product A Contribution}}{\text{Contribution of All Products}}$$

For example, assume product A's contribution to profit was 5% of the total contribution of all products but its use of resources was 10% of the firm's resources. Under such circumstances, its Selection Index Number is revealed to be

$$2.5\% = \frac{5\%}{10\%} \times 5\%$$

The contribution of Product A is reduced because of its disproportionate use of the firm's resources.

The approach is expanded at this point to allow managers to insert subjective estimates of the financial effects of a price change with concomitant volume and cost changes. Also, an exponentially weighted moving average is used to extrapolate sales for the next year. Finally, managers are asked to estimate any interaction effects with complementary or substitutable products. The various financial estimates are employed within a contribution accounting framework. The necessary data base is similar to what would be required for a cash flow analysis.[21]

Efforts to view a firm's customers as a form of investment also deserve mention. Bursk argues that a specific dollar figure can be placed on the investment value of customers if the return on that investment is considered to be the contribution of these customers to profit and overhead.[22]

Corporate Use of R-O-I In Marketing

To what extent are the various capital budgeting tools being employed by marketing managers?

14. Eugene W. Lambert, Jr., "Financial Considerations in Choosing a Marketing Channel," *MSU Business Topics*, Vol. 14 (Winter 1966), pp. 17-26.

15. John R. Grabner, Jr., and James F. Robeson, "Distribution Systems Analysis: A Problem in Capital Budgeting," in *Business Logistics: Problems and Perspectives*, David McConoughy, ed. (Los Angeles: University of Southern California Research Institute for Business, 1969), pp. 143-156.

16. Same references as footnote 5. See also Michael Schiff, "The Use of R-O-I in Sales Management," JOURNAL OF MARKETING, Vol. 27 (July 1963), pp. 70-73.

17. James H. Myers and A. Coskun Samli, "Management Control of Marketing Research," *Journal of Marketing Research*, Vol. 6 (August 1969), pp. 267-277.

18. Philip A. Scheuble, Jr., "ROI for New Product Policy," *Harvard Business Review*, Vol. 47 (November-December 1969), pp. 110-120.

19. George J. Stigler, *The Theory of Price* (New York: The Macmillan Co., 1960), pp. 96-106.

20. Leon Winer, "A Profit Oriented Decision System," JOURNAL OF MARKETING, Vol. 30 (April 1966), pp. 38-44.

21. Paul W. Hamelman and Edward M. Mazze, "Improving Product Abandonment Decisions," JOURNAL OF MARKETING, Vol. 36 (April 1972), pp. 20-26.

22. Edward C. Bursk, "View Your Customers as Investments," *Harvard Business Review*, Vol. 44 (May-June 1966), pp. 91-94.

Three recent surveys have explored various dimensions of this problem. Konopa reported on the relative frequency with which each such technique was being employed by *Fortune 500* companies.[23] Hise and Strawser subsequently investigated the extent to which the largest U.S. corporations were utilizing various methods of financial budgeting before making long-term commitments in the new product, channel, advertising, sales management, and marketing research areas.[24] More recently, Shapiro and Aronchick conducted a similar investigation in the Canadian context.[25]

Although these three studies were carried out over a period of six years with only the largest corporations being surveyed, certain trends running throughout all three studies deserve mention. The conceptual superiority of the discounted cash flow methods in allowing for the time value of money continues to gain increased recognition. Business practitioners are utilizing both the internal rate-of-return and the net present value methods with considerable frequency and growing satisfaction. Nevertheless, relatively wide use continues to be made of the payback method even though the conceptual shortcomings of this method are known to those employing it.

The Canadian study also suggests that discounted cash flow applications are restricted to the areas of new product development and channel management. Finally, both the Hise and Strawser study and its Canadian counterpart reveal that making appropriate allowance for risk and accurately estimating future revenues and expenses are considered the most serious of the operational difficulties encountered in using capital budgeting techniques.

Credit Management

A number of analytical techniques have been proposed to determine the credit rating of prospective accounts. In the more standard approaches to evaluating trade credit applicants, considerable reliance is generally placed upon the results of employing the financial "quick ratio" (current assets less inventories divided by current liabilities). This ratio emphasizes the relationship of cash, marketable securities, and accounts receivables to current obligations. Inventories are excluded from the "quick ratio" as they are presumably the least liquid portion of the credit applicant's current assets. The "quick ratio" is a more severe measure of the potential customer's liquidity than the current ratio (current assets divided by current liabilities).[26]

Kaplan's approach in the business credit risk area requires probability estimates as to the likelihood of receiving payment. The same author has argued that, for the firm with excess capacity evaluating a doubtful credit discount, the appropriate bad debt consideration is not the selling price but the incremental costs of production.[27] A computer-based system has also been developed to balance the probabilities of good and bad credit risks. This system also allows the firm to adjust its credit policies to changing market conditions by either raising or lowering the minimum score required to receive varying amounts of credit.[28]

What factors determine the wisdom of varying the cash discount? Changing that discount can either shorten or lengthen the period within which receivables are paid off with a corresponding adjustment in the amount of necessary investment in receivables. The desirability of lengthening the period for which credit is extended also depends on the additional costs and revenues involved. Both the additional volume of sales that would be generated and the additional profit associated with these incremental sales must be forecast. In making such calculations, the firm's required return on investment must be treated as a charge against the additional investment in receivables associated with increased sales. The expected increase in the average collection period or, conversely, the inevitable slowdown in the rate at which receivables will turn over must also be estimated along with any net change in bad debts.

Financial Data and Marketing Control

Two major forms of marketing control are heavily dependent upon the use of financial data. The first is control over the efficient allocation of

23. Leonard J. Konopa, *New Products: Assessing Commercial Potential*, Management Bulletin 88 (New York: American Management Association, 1966).

24. Richard T. Hise and Robert H. Strawser, "Application of Capital Budgeting Techniques to Marketing Operations," *MSU Business Topics*, Vol. 18 (Summer 1970), pp. 69-75.

25. Stanley J. Shapiro and Danny Aronchick, "The New Product Evaluation Process: Theory and Canadian Practice," in *Canadian Marketing: Problems and Prospects*, Donald Thompson and David Leighton, eds. (Toronto: John Wiley & Sons Canada Ltd., forthcoming). For a discussion of the value, strengths, and weaknesses of the four financial budgeting techniques, see James C. Van Horne, *Fundamentals of Financial Management* (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1971), pp. 160-167.

26. Eugene M. Lerner, *Managerial Finance* (New York: Harcourt-Brace-Jovanovich Inc., 1971), pp. 58-59; and Edward Altman, "Financial Ratios Discriminant Analysis and the Prediction of Corporate Bankruptcy," *Journal of Finance*, Vol. 23 (September 1968), pp. 589-609.

27. Robert M. Kaplan, "Credit Risks and Opportunities," *Harvard Business Review*, Vol. 45 (March-April 1967), pp. 78-88.

28. William P. Boggess, "Screen-test Your Credit Risks," *Harvard Business Review*, Vol. 45 (November-December 1967), pp. 113-122. See also Carl C. Greer, "Deciding to Accept or Reject a Marginal Retail Credit Applicant," *Journal of Retailing*, Vol. 43 (Winter 1968), pp. 44-53.

TABLE 3
STATEMENT OF EARNINGS—SUMMARY OF VARIANCES

	Plan	*Actual*	*Variance*
Statement of earnings			
Gross sales	$26,878	$27,240	$ 362
Standard variable costs	17,177	17,400	−223
Standard profit contribution	9,701	9,840	139
Specific product expenses	2,012	2,090	− 78
Product earnings	7,689	7,750	61
General expenses	5,866	5,940	− 74
Earnings before tax	$1,823	$1,810	$− 13
Summary of variances			
Sales variance:			$ 139
Price	$ 0.2		
Volume	130.6		
Product	8.2		
Performance variance			−152
Product	− 78		
General	− 74		
Net variance			$− 13

Source: Adapted from Sanford R. Simon, *Managing Marketing Profitability* (New York: American Marketing Association, 1969), p. 77.

marketing effort. Many of the attempts to improve such allocations are computer-based and management science oriented, but much can be accomplished solely by the intelligent rearrangement of available accounting records.

Let us consider the average consumer products firm which is reported to spend from 1% to 5% of its funds in areas where neither present nor potential future profits warrant investment spending.[29] The resulting losses may follow from efforts to achieve too high a share of an unusually competitive market or they may be due to a failure to adapt the nature and/or the level of marketing effort to variations in climate or ethnic composition. One proposed approach to this problem involves using past profitability data for each area as a standard against which to evaluate proposed future marketing expenditures.

The first step in the proposed analysis involves subtracting manufacturing costs from sales revenues to reveal available marketing funds. This amount minus all demand generating expenditures (advertising, personal selling, and sales promotion) yields Gross Marketing Earnings (GME). GME minus marketing overhead discloses Net Marketing Earnings (NME). Corporate management will evaluate marketing management mainly on the basis of the NME. The advertising and sales promotion outlays are adjusted to reflect only those expenditures which directly affect retail sales in the time period under consideration. Finally, corporate overhead charges are deducted from NME to reveal net profits before taxes. Adjusted accounts can then be generated for each marketing area and a variety of ratios calculated to reveal those areas which offer maximum profit improvement opportunities.[30]

The second type of control involves a comparison of planned and actual performance. The marketing information system should be designed not only to alert marketing management as to any differences between actual and expected sales results but also to reveal the reasons that have caused such a difference. Sophisticated information systems are being developed to allocate marketing costs first to functional cost centers and then to various control units on the basis of the factors causing cost differences. The information obtained concerning the relative profitability of customers or segments serves as an essential first step in the design of appropriate corrective policies.[31]

29. Richard A. Feder, "How to Measure Marketing Performance," *Harvard Business Review*, Vol. 43 (May-June 1965), pp. 132-142.

30. Same reference as footnote 29. For a somewhat modified further development of the Feder approach, see Stanley F. Stasch, *Systems Analysis for Marketing Planning and Control* (Glenview, Ill.: Scott, Foresman and Company, 1972), pp. 497-542.

31. Frank H. Mossman and Malcolm L. Worrell, Jr., "Analytical Methods of Measuring Marketing Profitability: A Matrix Approach," *MSU Business Topics*, Vol. 14 (Autumn 1966), pp. 35-45.

An integrated marketing-financial information system should also identify all variances and present profitability reports consistent with the responsibilities of each level of marketing management. Under a product manager structure, for example, the system would generate a statement disclosing the profitability of each product line as revealed by subtracting from product line revenues all expenses directly associated with generating these revenues. Such a statement of earnings can also be designed to reveal off-target expense performance outside the marketing area. In addition, various financial ratios can be employed to monitor results. Statistical controls can be set on these financial ratios so that management by exception procedures may be utilized in reviewing performance.

When a significant performance deviation is noticed, then variance analysis can be undertaken. Variance analysis is a special accounting technique used to determine the relative contribution of different factors to the overall deviation in performance. If, for example, actual profit contribution is below plan, this variance may be due to price declines, volume declines, an unfavorable change in the mix of products sold and/or cost increases.[32] To determine the significance of each variance, it is necessary to compute actual profits on the basis that budgeted figures had been achieved for all items except the one variation then being examined. For that factor and that factor alone, the actual cost rather than the budgeted figure is used in the analysis. Marketing management thus discovers how many dollars were lost or gained because that single variable deviated from its target level. Table 3 illustrates how the results of variance analysis can be presented to aid management action.

32. Raymond L. Kelso and Robert A. Elliott, "Bridging Communications Gap Between Accountants and Managers," *Management Accounting*, Vol. 51 (November 1969), pp. 41-43.

MARKETING MEMO

A New View of Behavior . . . Can S/R Be Misleading? . . .

The basis of scientific psychology is a cause-effect model in which stimuli act on organisms to produce responses. It hardly seems possible that such a simple and venerable model could be in error, but I believe it is. . . .

A control-system model of the brain provides a physical explanation for the existence of goals or purposes, and shows that behavior is the control of input, not output.

A systematic investigation of controlled quantities can reveal an organism's structure of control systems. The structure is hierarchical, in that some quantities are controlled as the means for controlling higher-order quantities. The output of a higher-order system is not a muscle force, but a reference level (variable) for a lower-order controlled quantity. The highest-order reference levels are inherited and are associated with the meta-behavior termed reorganization.

When controlled quantities are discovered, the related stimulus-response laws become trivially predictable. Variability of behavior all but disappears once controlled quantities are known. Behavior itself is seen in terms of this model to be self-determined in a specific and highly significant sense that calls into serious doubt the ultimate feasibility of operant conditioning of human beings by other human beings.

—William T. Powers, "Feedback: Beyond Behaviorism," *Science*, Vol. 179 (January 26, 1973), pp. 351-356, at pp. 351 and 356. Copyright 1973 by the American Association for the Advancement of Science.