EVALUATING MARKETING PERFORMANCE THROUGH DISTRIBUTION COST ANALYSIS

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I. *WHAT DISTRIBUTION COST ANALYSIS IS*

Neglect of Distribution Costs

It has been observed that firms, particularly those highly marketing-oriented, frequently look to sales volume strategy when trying to attain profit objectives. When cost aspects do get considered, the attention is directed to manufacturing costs, primarily because of the easily known and accepted relationship between manufacturing costs and volume.

Distribution cost control has been somewhat of a last resort. The mistaken notion of the irreducibility of marketing costs is perhaps contributory. But a primary reason why distribution or marketing cost studies have not been employed more often is the fact that cost records and the accounting systems of most companies have not been so devised as to show in distinct breakdowns the various cost items that make up the firm's total distribution cost. While most refined tools of cost control have been applied in the manufacturing process, nothing of the like of time studies, time and motion analysis, statistical cost control, and standard cost accounting have been developed in the area of marketing cost control.

Distribution cost analysis is one tool for cost control in marketing which, while not a new concept, has not been used often. The new ferment in physical distribution, marketing's oldest area, is however giving new attention to distribution costs and distribution cost analysis.

For Philippine firms, the need for distribution cost studies is more critical. The evolving and developing buyers' markets for a growing number of goods and services should shift attention to distribution or marketing activities. Marketing costs are going to increase proportionately more than production costs, or marketing costs will continue to go up while production costs decrease. Already, this is the case for most mass-produced packaged consumer goods.

To limit the discussion of the method to a representative area of mar keting analysis, consideration will be given only to cost analysis for pro ducts although, in cases where product cost analysis might involve custome costs, the relationship will be shown. The presentation of the method in thi paper is very simplified and is meant only to be suggestive of the whol method of distribution cost analysis.

By its nature, distribution cost analysis will also involve the analysi of revenues since the purpose of cost analysis is to pinpoint profitabilit areas and necessarily revenue-cost relationship is considered. Thus, th marketing costs allocated to a specific segment means the costs corres ponding to revenues generated by that specific segment.

Why Distribution Cost Analysis?

A number of studies have been conducted indicating misallocation o misdirection of marketing efforts, whether they be selling efforts, advertisin efforts, etc. Typical findings are:

a. A manufacturer has 78% of its customers bringing in slightl more than 2% of the sales volume;

b. A food processor found that 46% of the number of products manu factured accounted for only 3% of sales volume;

c. Still another company shifted selling and advertising effort from les profitable to more profitable territories and achieved a 78% increas in average sales per salesman, a reduction of 33% in the ratio o selling and advertising expense to sales, and an increase of abou 100% in the ratio of net profit to sales;[1] and

d. A publishing company discovers that 71% of its revenues com from only 10% of its customers and that 1% of such custome account for 31% of revenues.[2]

While the above findings do not reflect the general situation, the point to the fact that, for many companies, misallocation of marketin efforts does in fact exist.

The clear purpose of distribution cost analysis (or revenue-cost anal sis) is, therefore, to pinpoint such gross misallocation of efforts and therel indicate areas of potential cost reduction or areas for correction of revenu

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[1] Charles H. Sevin, *How Manufacturers Reduce Their Distribution Co.* (Washington, D.C.: Government Printing Office, 1958).

[2] Arthur H. Brown, Frank T. Hulswit and John D. Kettelle, "A Study of Sal Operations," *Operations Research Journal* (June, 1956), pp. 296-297.

marketing cost relationship. It is not an optimizing technique as is linear programming which has also been used recently in marketing cost analysis.[3] Unlike mathematical programming, there are no stated objective functions to be optimized or constraints to be observed. It simply aims to reduce negative functions (*i.e.*, cost or marketing efforts) and increase positive functions (*i.e.*, profit or gross margin per unit of effort).

Distribution cost analysis is a fact-finding study which will help management disclose unprofitable product lines and unprofitable accounts, select more profitable channels, determine the more profitable sides of orders and territories, and even locate warehouses or branches.

What Distribution Costs Are

Distribution costs or marketing costs are those which arise out of the activities of market delineation, purchase motivation, adjustment of the product to meet consumer demands, communication of the seller's message to the customer, physical distribution, transaction and post-transaction.[4]

Stated in more operational terms, these are costs incurred after goods have been made available for sale. From the standpoint of accounting data classification, these refer to the group of expenses that follow the gross profit figures on the profit and loss statement.[5] For the purposes of the analysis to be discussed here, this profit-and-loss-statement concept should be borne in mind.

Distribution Cost Concepts

Basic to the discussion of distribution cost analysis are the following cost concepts:[6]

1. *Natural vs. Functional* Costs. Natural costs are costs classified on an object-of-expenditure basis. This is the classification that appears in the accounting books. Thus payroll and rent are natural-expense items.

Functional cost is cost attributable to a certain activity. Classifying costs on the functional basis means grouping cost items homogeneously on the basis of a single activity. Thus personal selling costs include the salesman's salary and transportation expenses.

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[3] Charles H. Sevin and William J. Baumol, "Marketing Costs and Mathematical Programming," *Harvard Business Review* (September-October, 1963), pp. 31-36.

[4] Frank H. Mossman, *Differential Distribution Cost and Revenue Analysis: A New Approach* (East Lansing: Bureau of Business and Economic Research, University of Michigan, 1962), pp. 3-4.

[5] Andre Parent, *Distribution Costs, Their Control and Analysis* (Hamilton, Ontario: The Society of Industrial and Cost Accountants of Canada, 1963), pp. 9-40.

[6] Sevin, *op. cit.* pp. 7-8.

2. *Direct* vs. *Indirect* Costs. Direct costs are those which are incurred for and benefit a single segment of sales (*i.e.,* territory, product or customer) and thus are traceable to such specific segment. They are referred to as separable costs since they accrue only to a distinct and separate costing segment and do not benefit others.

Indirect or common costs are those which are incurred for and benefit more than one segment of sales and therefore cannot, as a practical matter, be traced directly to specific products, customers or other sales-generating segments.

3. *Escapable vs. Nonescapable* costs. Escapable costs are those costs which are eliminated when the specific segment or component to which they refer is eliminated. A salesman's salary is eliminated when he is eliminated. Sales tax on a product is eliminated when such product is eliminated. In a sense, these are variable costs.

Nonescapable costs are those which remain regardless of the elimination of the specific segment to which they refer. Thus, dropping a customer does not eliminate the salary of the salesman who used to call on him. For that specific segment, such costs are similar to fixed costs.

II. *THE COST ANALYSIS APPROACH*

The whole method centers on the allocation of relevant costs to the marketing segment, *i.e.,* an object of marketing effort such as product, customer, territory, channel, order size, and others for which costs are incurred. A segment is therefore a revenue and cost generating unit. The difficult problem in the allocation process involves the allocation of common or indirect costs. Direct or separate costs present no problem as they can be charged directly to a specified segment. Thus, local radio commercial cost for Product A is directly allocable to Product A, but a local radio commercial cost for all products is a common cost which needs to be allocated to all products. The requirement is for a basis of allocating such common or non-separable costs. Often, the separable costs are not easily identified since their identities are lost in the accounting classification of costs.

There should therefore be a reclassification of costs as they appear in the accounting records into a grouping having a functional basis. To do so necessitates the identification of such functional activities.

Functional Cost Groups

In determining cost groupings on the basis of functional activities, we may think of what takes place after goods are made available for sale

The number of distinct functional activities may vary and such may be due to types of products sold, the diversity and expanse of markets, and perhaps the size of the firm. Since the purpose here is to show a method of marketing cost analysis applicable to any type of firm engaged in marketing activities, we may list only what could be considered typical functions within the entire marketing process. Generally, the functions are grouped as follows:[7]

1. Advertising. This includes all forms of non-personal promotion.

2. Personal Selling. This includes all promotional or selling activities through the employment of the sales force.

3. Transportation. This covers activities involved in moving goods from the selling firm to the customers.

4. Break Bulk and Assembly. This includes all activities to prepare shipments of goods to customers. Included are such operations as packing, sorting, consolidation, etc.

5. Inventory. This includes activities undertaken to keep goods available and ready for delivery to buyers.

6. Transaction. Includes those activities that must be performed between the time of the meeting of minds among the parties concerned and the actual transfer of ownership. This should also include post-transaction activities undertaken to guarantee customer-satisfaction and feed-back of information.

7. Activities undertaken to coordinate, supervise, and facilitate performance of the other six.

The list above is very condensed but it should suffice for the purposes of the subsequent discussion. To be determined consequently are the causes of cost differences in the performance of each function. This factor of variability in costs we may refer to as the "control factor." The variation in such control factor explains the variation of costs for each function which are to be allocated subsequently to marketing segments. The control factor would thus serve as the allocation basis.

For advertising, what factors bring about cost differences? The degree of knowledge of the product possessed by the customer is a determining factor. The less knowledgeable the market is, the more advertising is necessary for the product. But how would market knowledge be

[7] Mossman, *op. cit.*, pp. 14-18.

reflected in advertising costs? The amount of advertising services is c course the cost determining variable. But in turn what measures th extent or amount of advertising services used? Such control factors a advertising time and space bought are the variable elements causing th variability in advertising costs. They are, therefore, appropriate bases fo allocating common advertising costs to products, customers, etc.

Personal selling efforts are affected by the density of the marke *i.e.*, the number of customers within a given market area. Assuming adver tising effects to be the same for all products, or all customers (since, i this is not assumed, the effect of advertising should be indicated as i eases up the amount of personal selling effort), the costs of selling to t customer would be dependent on the number of sales calls and the lengt of each sales call. The length (in time) and number of sales calls ar functions of market density. Thus the cost control factor for persona selling are time and number of sales calls.

Transportation costs are affected by distance from the market a well as by volume, in terms of handling units and weight of shipment Inventory costs such as insurance, storage, interest, and inventory contro vary with the average investment in inventory (for interest and insurance) and with the space and time for warehousing requirements (for storag costs). Inventory control costs are affected by the frequency of inflo and outflow of inventory units.

Break bulk and assembly costs vary with volume in terms of handlin units, *i.e.*, number of packages, units of a product, and others, and b the number of orders and shipments.

Transaction costs vary with the amount of order processing, billing credit processing, maintenance of accounts and amount of post-sale ser vicing. Order and billing costs are affected by the number of invoices o documents processed, perhaps more accurately by the number of entrie (*i.e.*, invoice lines). Accounts receivable costs and bad debts vary wit the amount of receivables outstanding.

The appropriate control factor can be determined by analysis of cos behavior for each given segment and this can be done either by a cross section study or by time-series analysis. While there may be other contro factors which can be used for cost allocation, those suggested above ar the ones commonly used and are used here for purposes of illustration.

The process of allocation of common costs to products and com modities given the control factors is suggested by the following scheme:

EXHIBIT 1

Functional-Cost Groups	Basis of Allocation	
	To Commodities	To Customers
Advertising	Cost of space, time, etc. of specific product advertising	Cost of space, time, etc. of specific customer advertising
Personal Selling	Time studies	Number of sales calls
Transportation	Weight or number of shipping units	Weight or number of shipping units
Break Bulk and Assembly	Number of standard handling units	Number of standard handling units
Inventory	Average inventory value, floor space, or inventory record entries	Not allocated
Transactions:		
Order Costs	Number of invoice lines	Number of orders
Billing	Number of invoice lines	Number of invoice lines
Credit Extension	Not allocated	Average amount outstanding
Accounts Rec'ble	Not allocated	Number of invoices posted

Again, the above list is only suggestive. The functions can be detailed and control factors determined for each.

Based on the above scheme, a hypothetical cost-allocation table is presented below.

EXHIBIT 2

	Product Lines				Total
	A	B	C	D	
Gross Margin or Revenue Before Marketing Costs	₱50,000	₱60,000	₱70,000	₱125,000	₱305,000
Per Cent of Total Margin	16%	19%	23%	42%	100%
Advertising Expenses	₱ 4,500	₱ 9,000	₱18,000	₱ 13,500	₱ 45,000
Personal Selling	8,000	16,000	28,000	28,000	80,000
Transportation	2,000	10,000	18,000	10,000	40,000
Inventory	1,000	3,000	8,000	8,000	20,000
Break Bulk and Assembly	1,000	5,000	7,000	7,000	20,000
Transaction	3,000	9,000	9,000	9,000	30,000
Total Allocated Costs	₱19,000	₱52,000	₱88,000	₱ 75,500	₱235,000
Contribution to Profit	₱30,500	₱ 8,000	(₱18,000)	₱ 49,500	₱ 70,000

The two tables are very simplified since the details of the allocation and the regrouping of the natural expenses into functional cost groups will usually have to be done in a worksheet. The simplification, however, will suffice to show how the analysis could proceed.

The figures in Exhibit 2 are derived by the application of the variable control factor share (such variable factors being suggested by Exhibit to the total of the common costs grouped on a functional basis.

EXHIBIT 3
Share of Variable Control Factor
(Basis of Allocation)

	Product Lines				Total
	A	B	C	D	
Advertising	.10	.20	.40	.30	1.00
Personal Selling	.10	.20	.35	.35	1.00
Transportation	.05	.25	.45	.25	1.00
Inventory	.05	.15	.40	.40	1.00
Break Bulk	.05	.25	.35	.35	1.00
Transportation	.10	.30	.30	.30	1.00
Functional Cost Contribution to Total in per cent	8.3%	22.1%	37.6%	32.0%	100%
Profit Contribution to Total in per cent	43.5%	11.5%	–25.5%	70.5%	100%

The figures from the two tables already provide useful informatio to management. Management might content itself with the total net pro figure of ₱70,000. The breakdown, however, shows that this represen contributions of only three products, and one, Product D, is actual contributing a loss. Product A, for example, while bringing in only 16% of gross margin, accounts for only 8.3% of allocated costs and 43.5% of net profit. Product B, bringing in 19% of gross margin, accounts fo a proportionately higher cost, and contributes only 11.5% of profit. Pro duct C is, of course, in worst shape.

Thus, even the simple cost breakdowns as given in Exhibits 2 and already suggest that misallocation of marketing efforts exists.

Some decision must be made about Product C. The same cost dat from Exhibit 2 may be used to help in coming up with a decision whether t drop Product C or not. Consider Exhibit 4 below.

EXHIBIT 4
The Case of Unprofitable Product C

Functional Costs	Total Allocated Costs	Escapable Costs	Nonescapable Costs
Advertising	₱18,000	₱16,000	₱ 2,000
Personal Selling	28,000	26,000	2,000
Transportation	18,000	15,000	3,000

Inventory	8,000	7,000	1,000
Break Bulk and Assembly	7,000	6,500	500
Transaction	9,000	7,000	2,000
Total Costs	₱88,000	₱77,500	₱10,500
Gross Margin Contribution		70,000	
Increase in Net Profit if Product C is dropped		₱ 7,500	

Given the following assumptions: that Product C is not in fact a new product with a big potential, that it is not complementarily demanded with Product A, B or D or with all three, and that it is not used for promotional purposes such as being offered as loss leader, then it would be advisable to drop product C.

There are no assumptions being made regarding manufacturing costs since, for the purposes of distribution cost analysis, we take manufacturing costs as given. This is the reason why we deal only with the gross margin, the difference between sales and cost of goods sold.

How could distribution cost analysis be used in redirecting marketing efforts along more efficient applications? Exhibits 2 and 3 show that there is misallocation of marketing efforts along Products B and C. The need is to make costs of marketing, say Product B, proportionate to the revenue it brings in.

Consider, therefore, the case of Products A and B for comparison, since, on the surface, as indicated by Exhibits 2 and 3, the company would be better off selling more of Product A than of B. Assume that, for these two products, the allocated costs are all variable costs, fixed costs not having been allocated:

EXHIBIT 5

	PRODUCTS	
	A	B
Number of Units Sold	3,000	5,000
Gross Margin Contribution	₱50,000	₱60,000
Gross Margin per unit	₱ 17	₱ 12
Allocated Variable Costs	₱19,500	₱52,000
Allocated variable cost per unit	₱ 6.50	₱ 10.40
Marginal Profit	₱ 10.50	₱ 1.60
Hours it takes to sell a unit	4	4
Marginal Profit per hour of selling effort	₱ 2.60	₱ 0.40

Thus, it is shown that every hour of selling effort spent on Product B results in the giving up of a profit of ₱2.20 arising from the sale of a unit of Product A. The decision is, therefore, to shift selling efforts from B to A. Up to what point? Here, the marginal analysis would tell us that it should be up to the point when the marginal profit contributions per unit of selling effort (in this case, personal selling) of A and B are equal, assuming no other products. For our four-product example, maximizing approach would be to equate the four marginal profit contributions, thus,

$$\frac{G_a - V_a}{M_a} = \frac{G_b - V_b}{M_b} = \frac{G_c - V_c}{M_c} = \frac{G_d - V_d}{M_d}$$

where G is gross margin per unit,
V the allocated variable cost per unit, and
M the amount of marketing effort per unit of product.
The subscripts indicate the products.

Thus distribution cost analysis and marginal analysis could be applied in indicating the direction of realignment of marketing efforts, where such misallocation of efforts are brought out by distribution cost data.

The Allocation of Fixed or Overhead Cost.

Overhead expenses or fixed costs have not been brought in in the preceding discussion. The question involving overhead costs is whether they should be allocated at all for the purposes of cost analysis.

The purpose of distribution cost analysis is to pinpoint misallocation of limited marketing resources. One would be interested therefore in the contribution which a given marketing segment makes to company profit.

Overhead costs need not be allocated if the intention of the analysis is to show where costs are unproportionate to their corresponding revenues. The differences in costs arise largely due to the variable element brought by changes in given cost factors. The allocation of fixed costs would not affect the outcome of the analysis. In other words, there is no need to absorb all costs if the intention is just to indicate areas of inefficiencies. In addition, there being no clear control factor to use as a basis for allocating fixed costs, the allocation would tend to be arbitrary.

One argument presented for the allocation of fixed costs is that, if they are not allocated, this would mean that each marketing segment shares equally the burden of the fixed costs. Certainly, by this argument, some segments should bear heavier responsibility for the presence of the fixed costs.[8]

[8] Martin Mellman, "Marketing Cost Analysis—Its Relationship to Factory Costing Methods," *N.A.A. Bulletin* (January, 1962), pp. 25-33.

There are, however, situations which might necessitate the allocation of fixed costs and in which case some appropriate basis for allocation must be used. One use for absorption or full-costing, as complete allocation of all costs is often referred to, is in decisions regarding price. Prices for products are to be set at levels that allow recovery of all costs. Also, in decisions to invest, full costing is necessary since the investment should be able to recover all costs in addition to generating a satisfactory rate of return.

Application of Cost Analysis to Other Marketing Segments.

The technique described above is applicable to all situations involving the determination of the profitability of any given marketing segment. As has already been mentioned, distribution cost analysis would be useful in identifying the relative profitability of departments, territories, order sizes, and channels, besides product lines and customer groups.

Oftentimes, a combined two or three-segment analysis could be more useful. Taking products and customer groups as an example, the cost analysis could show the relationship between customer and product costs and the relative profitability of each product-customer combination. The following matrix form is suggestive of such an approach:

EXHIBIT 6

Product-Customer Cost Relationship

Customer / Product	C_1	C_2	C_3	C_4	Total Product Allocated Costs
P_1	₱15,000	₱12,000	₱ 8,000	₱13,000	₱ 48,000
P_2	7,000	5,000	9,000	6,000	27,000
P_3	20,000	25,000	10,000	21,000	76,000
P_4	8,000	8,000	10,000	15,000	41,000
Total Customer Allocated Costs	₱50,000	₱50,000	₱37,000	₱55,000	₱192,000

For illustration, the matrix cells are filled up with round figures. Such data as may be presented in such a cost-analysis form may provide certain indications of cost combinations for product-and-customer segment. The data would, of course, be more useful if the absolute figures are translated into relative terms, broken down into escapable and nonescapable costs, and combined with gross-margin figures.

Exhibit 7 gives marginal cost and revenue data for the possible product-customer combinations. The figures are hypothetical and are meant to show how marginal analysis could profit from cost analysis data set up in such a matrix form.

EXHIBIT 7

Profitability Matrix for Product-Customer Combination
(Per Unit of Product Sold, per Unit of Marketing Effort)

Customer / Product	C_1	C_2	C_3	C_4	Total
	$G - C = MP$	$G - C = MP$	$G - C = MP$	$G - C = MP$	$G - C = MP$
P_1	$8 - 4 = 4$	$5 - 2 = 3$	$8 - 6 = 2$	$7 - 3 = 4$	$28 - 15 = 13$
P_2	$5 - 3 = 2$	$2 - 1 = 1$	$3 - 2 = 1$	$7 - 4 = 3$	$17 - 10 = 7$
P_3	$7 - 6 = 1$	$7 - 7 = 0$	$9 - 8 = 1$	$9 - 8 = 1$	$32 - 29 = 3$
P_4	$3 - 2 = 1$	$5 - 4 = 1$	$5 - 3 = 2$	$5 - 4 = 1$	$17 - 13 = 4$
Total	$23 - 15 = 8$	$19 - 14 = 5$	$24 - 19 = 6$	$28 - 19 = 9$	

G is gross margin per unit, C is allocated variable cost, and MP is the marginal profit.

What the above relationships show is that Product P_1 seems to be the most profitable and Product P_3 the least profitable. It also shows that Customer C_4 is the most profitable and Customer C_2 the least profitable.

Assuming that market conditions are the same for all products, and that the variation in marketing efforts is all that accounts for the differences in cost, then every unit of Product P_1 sold to either Customer C_3 or C_4 for every unit of marketing effort (*e.g.*, per unit profit per one sales call) brings a marginal profit of ₱4. For every unit of marketing effort spent in selling one unit of P_1 to C_3, ₱2 of profit is lost in not selling Product P_1 to either Customer C_1 or C_4, and so on.

Applying the marginal technique using the above information would mean that the matrix could be maximized in terms of the marginal profit pay-off when the marginal profits for all cells are equal. Thus,

$$MP_{P_1C_1} = MP_{P_2C_1} = MP_{P_3C_1} = MP_{P_4C_1} = \ldots\ldots\ldots = MP_{P_4C_4}$$

where MP is marginal profit and where the subscripts are the product-customer combination cells.

To summarize, it should be emphasized that the value of distribution cost analysis lies in its effectiveness in identifying areas of marketing inefficiencies by relating costs of given marketing segments to their respective revenues.

The major difficulty in the whole procedure is the allocation of common or nonseparable costs. Since the accounting records do not detail the costs of performing various marketing activities, the approach is to reclassify such costs in terms of functional groups. For each functional group, a cost control factor is determined as the basis for allocation.

While distribution cost analysis does not, by itself, attempt to maximize certain objective functions, the data brought out in such an analysis often provide the information needed to set up marginal analysis or linear programming to find maximum profit combinations.

While the discussion limits itself to cost allocation for product groups, the technique is applicable to similar allocation processes for any marketing segment which needs to be analyzed.