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## COST AND REVENUE ANALYSIS FOR THE SMALL/MEDIUM FOOD DISTRIBUTOR

by:

James R. Burley  
Central Michigan University

### Statement of Problem

The problem dealt with in this paper is whether applicability of Cost and Revenue analysis to small and medium sized food distributors may be cost effective through the use of grouping techniques and the mini-computer.

### Objectives

The objectives of the study were to test the applicability of techniques suggested by Seven and Johnson to determine their feasibility in use. A secondary objective of the study was to assess the value of a mini-computer for aggregating cost, volume, aggregate throughput and other data that would be useful in a managerial decision making study.

Profitability analysis has been an important technique to the businessman for years. Methods have been developed to aid in this analysis, such as the Rule of Thumb method, Contribution Method, Full Cost Method, as well as Cost and Revenue Analysis. Management may use one or all of these techniques to evaluate the profitability of operations. Only Cost and Revenue Analysis has the potential to give the manager profitability information on each product, customer,

territory or salesman the firm deals with.<sup>1</sup> Recent developments have highlighted the value of C&R analysis to the smaller business operator who has traditionally avoided techniques with the sophistication of C&R.

It has been said that "necessity is the mother of invention," and this may be the reason for the increased interest in C&R techniques. As energy, credit and operating costs have increased drastically, distribution managers in particular have turned to C&R analysis as a method of understanding the impact of such increases on profits. The increases have been so significant in some cases that quarterly analysis may not begin to be enough. Sound business practices dictate that now, more than ever, the firm should establish a cost and revenue analysis system to enable identification of the costs which are incurred by product line or in dealing with the firm's customers.

Additional value accrues to C&R techniques because they force the firm to group costs and revenues according to the way they are incurred, as opposed to conventional methods offered by the accounting profession.<sup>2</sup> Determination of delivery costs requires the addition

of drivers' wages, fuel expenses, depreciation or lease charges on equipment, maintenance expense, as well as overhead and insurance. The summation of these costs represents the costs of the delivery function and as such can be identified with the performance of the delivery function for the firm.

Recent articles have suggested grouping products, customers' orders, etc., to develop cost information for groups of products of similar character as opposed to unique data for each of several products having like patterns of handling or delivery.<sup>3</sup> Food distributors can benefit from this technique since many classes of products have similar margins, similar handling, similar turnover patterns and require similar delivery patterns, i.e., all canned vegetables, frozen dessert products, processed meat products, etc. This approach was utilized in a recent study of a meat processor/distributor/retailer. Very successful results were obtained.

It was hoped that with grouping techniques and the computer, new useful applications of cost and revenue analysis could be developed for a group of firms that because of the large number of products, throughput and transactions, might otherwise not have the use of this very effective analytical tool.

#### Methodology

The study was conducted during two months in a meat processor/distributor with approximately 600 active accounts and 230 different products. The products were grouped for cost purposes according to the amount of handling, processing, volume throughput or spoilage which was incurred in their distribution.

A sample of products and customers was selected, to evaluate for profit contribution. The technique was not well understood by the manager during the early phases of the study, but with the success

of the results apparent very quickly, he soon became extremely interested in every phase of the analysis. Standard accounting information from monthly statements was used. Where allocations were necessary, such as apportioning the wages of office staff who did billing a portion of the time, and invoice preparation the rest of the time, a three day study was conducted to determine percentages of time spent on each function. Mean values were then applied to that individual's wage scale to assign their wage costs to either the sales function or the billing function. Fortunately, most employees were performing in only one functional area so direct assignment of their wage costs was possible.

The data can be organized to provide profitability analysis by product, by customer, by territory, by order size or by the sales representative handling the account, to name the most popular methods. Often the desire to analyze costs by product makes the job of analyzing by customer easier since much of the data may be in common. The various costs and revenues must be assigned to customers or products. Standard product costs are easily obtained from the COGS or the COGM information which the manufacturer or distributor prepares. If these have not been computed for processed goods, the procedure of grouping should be employed to allow development of cost data for a group of products which all receive similar processing, i.e., cutting roasts, chops and steaks from a quarter of beef. Each activity involves the same procedure, cutting the quarter, and the particular product obtained has little to do with the actual cost of the cutting operation, but rather shares approximately equally the cost of the meatcutter's time applied to that quarter.

To accompany the groupings for product cost information, control units must be established for all direct costs as well as those indirect costs which are

to be allocated to products or customers, etc, Table 1. Examples of the types of control units which might be utilized are presented below by the functional expense classification they would represent. This list is by no means exclusive, but represents the most common functions occurring in food distributors.

The first step in applying the C&R technique to the meat distributor was to classify costs and revenues into groups for analysis. All meats which were straight throughput items were assigned to one category, a second group with minimal processing was developed for steaks, roasts, etc. The third group were products which required grinding, mixing or formulation. The fourth and final group were products which were prepared for only one customer or with special characteristics. Examples of group IV would include a special ground beef which was prepared for a fast food chain which was a unique fat/water mix, and chili for hog dog restaurants which was principally the by-product of other operations.

The mini-computer was used to assign product code numbers to all the products based upon the classification identified above. Average margins for each group

were developed after examining a random sample of the products involved in each group to determine what the actual margin was, and if the average was a reasonably good prediction of group profitability. Groups I-III were found to be usefully predictable from the averages, but since group IV products were special, each needed to be treated as a separate entity. With this step completed a cost multiplier was calculated for group I-III products which allowed the cost of that product to be determined quickly from an invoice using the average cost factor (1-average margin factor). Costs were then assigned to products and customers.

All manufacturing costs had been included in the product cost step so distribution costs were the only costs remaining to be dealt with. All costs which were directly attributable to various products and customers were directly assigned. Sales commissions is an excellent example of this cost category since the commission was the same to the customers and products and was based on the dollar amount of the sale. Indirect costs required aggregation to determine assignable amounts for each sale. Billing costs were determined by summing office expenses, clerical salaries and

Table 1. Allocation Methods to Customers.

	<u>Included</u>	<u>Basis</u>
Delivery Expense	Truck costs, fuel, driver's wages and fringes, taxes, maintenance	miles driven
Order Processing	Clerical salaries, office supplies, postage charges, telephone expense	invoices processed
Sales Expenses	Commissions	dollar amount of sale
Overhead	Administrative expenses, professional costs, insurance	per customer or per order based upon number of customers or orders during period

materials expenses and dividing the total amount by the number of invoices which had been prepared during the period. Simplifying assumptions regarding the costs of preparing a 3 line versus a 6 line invoice were made. The larger number of items take somewhat more time, but it is not significant enough to affect the outcome of the cost assignment. Delivery expenses were similarly handled by adding truck expenses, depreciation, fuel, drivers' salaries, maintenance and taxes and dividing the total of all delivery costs by the total miles driven during the period. The result is a cost/mile charge that can then be used to identify delivery costs to customers located in various zones from the origin. Even though the delivery charges were calculated on a per mile basis, the assignment of costs was felt to be reasonable because all 2,000 customers did not purchase each day, special trips were often made, and the randomness of the delivery routes precluded an incremental (miles from last stop) basis. This technique would actually over-value the delivery costs to customers who were densely located in a nearby zone and under-value the costs to customers who were long distances in a non-dense customer area. These subjective factors must be noted when analyzing the results of the technique.

Similar procedures were utilized for all indirect but assignable costs. When total assignable costs had been allocated, the costs were assigned to the invoices of selected customers to determine the profitability of orders being received.

#### Results and Conclusion

The results showed that delivery costs were far more significant than the owner had anticipated, averaging \$1.21 per mile. As a result of the study, the owner of the meat distribution plant was able to better understand the impact of certain management decisions on his firm's profitability. If an order were called

in from a customer located 100 miles away, the manager could not identify the delivery costs for an order to that customer as \$121 (\$1.21 per mile x 100 miles). The total margin on the order should be great enough to cover all the functional costs, including delivery, order billing, sales and overhead, or the order is not a profitable one to accept. There are obvious good reasons, such as business relationships over a number of years, which can temper such mechanistic decisions, but the fact remains that the costs of dealing with the customer have been identified so that management can make an informal judgment on the wisdom of various policies.

The meat distributor instituted some basic order rules as a result of the study. Basic profitability rules were developed regarding orders, e.g., "No special deliveries outside zone A on orders under \$100." A decision structure allowing the computer to identify expected profit from each order is under development so that the profitability of the order can be determined at the order entry point, giving salesmen an opportunity to attempt to augment those sales which are marginally profitable at the order entry point. An alternative, which has implications for customer service, would be to have the salesmen request a delay in filling the order until it could be profitable. In the fresh meat business this was not determined to be appropriate, but other product categories might find this a useful strategy.

The cost and revenue analysis method has been recommended for years, but has been the province of large firms able to afford information processing equipment as well as underwrite the costs of such a technique. Developments in computer systems for small businesses and the use of grouping techniques now allow even the small business to benefit from the use of C&R analysis. Application of the technique can be a useful tool for management in profitability analysis.

### Implications for the Food Industry

Cost increases may have supplied much of the motivation to implement C&R techniques but the computer has supplied the facilitating capability to aggregate the large amounts of data necessary for a comprehensive C&R analysis. The small mini-computer, now in widespread use in food distribution facilities nationwide, has offered the means to deal with the large amount of information which must be assembled to arrive at the appropriate C&R unit costs. This was a nearly impossible task for many food distributors prior to the computer.

With thousands of products and just as many customers, manually compiling information for a C&R system was far more costly than the information value which could be gleaned from the process. The computer has shifted the balance of the cost vs. value decision of information to favor the analysis of the data. Single customer lists which must be kept for billing information can significantly aid in developing C&R information. The difficulty of establishing total pounds sold during a time period with manual information processing was immense, since every invoice had to be added to obtain total pounds sold. With the computer, a simple summation of pounds sold can be developed. This can significantly aid in establishing the unit control basis for costs in various categories. Thus, the

computer has become the facilitating device that allows the small and medium sized food distributor to conduct a C&R analysis using information that previously would have been too costly to compile.

Cost and revenue analyzing techniques can and should be applied to the smaller food distribution business to develop accurate profitability information for management to utilize in product, customer, salesmen or territory related questions. The costs of distribution have risen sharply, making such analysis necessary. The computer allows storage and access to information which was unavailable to smaller distributors until now. Capital, storage and movement costs are not likely to decline in the future, creating the need for the manager to have better decision making information at his disposal.

### FOOTNOTES

<sup>1</sup>Sevin, Marketing Productivity Analysis, McGraw Hill, 1965, p. 3.

<sup>2</sup>Johnson and Ostrom, Grouping Segments for Profitability Analysis, MSU Business Topics, Vol. 28, Spring 1980, pp. 39-44

<sup>3</sup>Idem.

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