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ACCOUNTING FOR DISTRIBUTION COSTS IN THE DENNISON MANUFACTURING COMPANY DURING THE 1920S AND 1930S

Abstract: This paper suggests that Activity-Based Costing is not a new cost accounting technique but rather one that has been revived as a consequence of difficult economic times. The Dennison Manufacturing Company of Framingham, Massachusetts used accounting techniques throughout their organization that were clearly activity-based. This company's approach to costing distribution or marketing costs in particular is explored here. These costs tend to be ignored today; yet this company, along with others, made a concerted effort to understand these costs and to account for them.

One of the most popular accounting systems around today is Activity-Based Costing. It has been and is being adopted by many companies in the United States since its popularization by such authors as Cooper and Kaplan (1988, 1991, 1992) and Cooper (1988, 1989). In the wake of a decade of economic decline, these and other writers have contended that traditional cost accounting failed to provide managers with the kind of information needed to make good business decisions (Johnson and Kaplan 1987). The advocates of Activity-Based Costing claim that tracing activities and their costs will provide more useful information for decision-making than information generated by cost systems that track the costs of products and product lines, costs that are often-times replete with arbitrary allocations of joint overhead costs.

The irony of Activity-Based Costing is that it is not new; rather, it has been forgotten. In forgetting accounting history, researchers are forced to reinvent the wheel. In the 1920s and 1930s, there were cost accounting spokesmen that advocated, and some companies that adopted, cost systems that were clearly activity-based. The experiences and techniques of a single company, still in existence today, are the subjects of this

paper. The focus here is on distribution, or marketing costs, a subject rarely broached in the cost literature or textbooks of today but one still of critical importance to companies engaging in marketing efforts that cause tremendous expense.

During the 1920s, social and economic events were moving cost accounting into the area of distribution costing. The huge sums spent on advertising, promotion, selling and other distribution expenses were the subject of repeated concern by those who worried about the manipulation of demand and the rising prices of goods. Many were angered by advertising campaigns and direct selling techniques, viewing them as not only wasting money but also contrary to a system that was supposed to be driven by demand, not by supply. Surveys that reported dramatic increases in distribution costs relative to production costs disturbed the public, the government and businesses. However, business, increasingly driven by mass production techniques, had already moved into a creation of demand mode.

> "It is an allegation too near the truth to be passed over lightly that more than a little of the savings due to scientific management or to mass production have been lost through the necessities which high productivity has put upon us to sell aggressively and through the attempts we have so far made to meet these necessities, with antiquated equipment and with an antiquated point of view, as ill adapted to the new needs of marketing as were the methods and point of view of handy crafts to the needs of the modern factories" (Dennison 1928, 249).

A report on waste in industry was released in 1921 by the Committee on Waste of the Federated American Engineering Societies (appointed by Herbert Hoover). This report ignited interest in the control of waste through standardization, simplification and education (of the firm). While the report laid most of the blame for waste at the feet of management, the approach to waste control proposed by the Committee involved an analysis by each firm to determine where costs had gone out of control. Among the sources of waste cited by the Committee was an insufficient analysis of the needs of the customer resulting in an unchecked explosion of variety which, in turn, placed costly demands on the plant's ability to retool and adapt to each product's minor modifications.

In 1924, the federal government, under the impetus of Sec-

retary of Commerce Hoover, recognized a need to look more closely at distribution costs in particular and established the Domestic Commerce Division of the Department of Commerce to study the issue. This study found a clear link between waste, product differentiation and increasing costs of distribution. A company that had developed a multiplicity of products varying only by color or other superficial style changes had created a world of expense that would not exist with the single functional product. Ignoring the obvious increase in production costs, it would also incur far more costs in the following areas: storage and handling costs for the larger inventory; clerical costs for ordering materials and for taking and filling sales orders; inspection costs; cost accounting costs because of the increased complications; sales efforts; and print advertising and order book costs.

Castenholz (1930), writing about distribution costs, said that, contrary to the natural order of things, production had become the stimulant for consumption rather than vice versa. For Castenholz, that natural order was the notion that demand precedes and stimulates supply. If firms reversed the ordering and produced in advance of demand, they would be forced to spend enormous sums on selling. Since distribution costs had risen, according to contemporary surveys, to the extent of doubling the cost of a product, they had become the most likely area of cost savings. Castenholz advised cost accountants to examine distribution costs closely.

Castenholz recommended that businesses engage in research to uncover what the consumer really wanted in order to avoid ruinous distribution costs. He proposed sales tests before making large capital investments and suggested questionnaires, house-to-house canvassing, limited area advertising and studying publicly available information. He thought it a mistake to allow selling to be treated haphazardly, believing that it should be just as rigorously planned and controlled as factory costs. He worried that businesses tended to exempt from study costs that had been traditionally accounted for as period expenses, a treatment that generated, at worst, misleading information.

The firm that wanted to tackle its distribution problems could find guidance from the cost literature, from the Department of Commerce and from trade associations. Available books included Castenholz's *The Control of Distribution Costs and Sales* (1930), Heckert's *The Analysis and Control of Distribu-*

tion Costs (1940) and Longman's *Distribution Cost Analysis* (1941). Trade associations, including the National Wholesale Druggists' Association, the National Wholesale Hardware Association and the Institute of Meat Packers, published suggested methods of allocating distribution costs. *The National Association of Cost Accountants — Bulletin* published many articles on the subject some of which were general in nature while others described in detail the approach taken by specific firms.

The Dennison Manufacturing Company of Framingham, Massachusetts, with 6,000 different products, gross revenues of $16,000,000 and employees numbering 4,000 (Freeman 1929) was praised by Longman (1941) for having the best procedures for handling distribution costs by product. Statistical records of costs, collected over many years, were analyzed, functional areas were isolated and causes of cost variation were uncovered. This research into company costs permitted Dennison to establish standard costs for a considerable portion of their distribution costs and to apply other methods of analysis to costs not adaptable to a standard costing system.

E. S. Freeman (1933), Dennison's chief statistician and source of most of the information on the company's distribution policies, created a useful metaphor to describe his approach to researching and handling Dennison's distribution costs. The primary function of a manufacturing entity is a cyclical one. Money is used to purchase the resources needed to manufacture products. These products are then traded to the public for money offers (contracts). The money offers are then turned back into money so that the company can start the cycle again. In this regard, he suggested that a manufacturing business could usefully be thought of as composed of two factories, a goods factory and a money factory.

The goods factory manufactured the products available for sale. Traditional raw materials were transformed by labor and overhead into finished products. The money factory produced money offers. The raw materials of the money factory were the finished products of the goods factory. These raw materials were transformed by labor, primarily personified by the salesman, along with his overhead (travel expense, printing costs for sample brochures etc.) into money offers from customers. All of the costs incurred in the money factory he called order-getting costs and were viewed somewhat as speculative investments. Neither factory completes the job. The money offers

have to be accepted, the goods delivered and the money collected. These functions were carried out by the warehouse, shipping and office departments and the costs associated with them were called order-filling costs and were viewed as rather routine in nature. The functions within the order-filling category were not categorized as factory overhead as was common because they varied with the accepted money offers, not with production. Together, the order-getting and order-filling functions comprised the distribution costs of the business.

According to Freeman, the company's distribution costs were segregated into two major cost categories and were handled very differently from a cost viewpoint. Order-getting included advertising, selling expenses, writing letters — all the costs incurred for the purpose of getting customers to place orders for goods. Order-filling included the costs that arose after the customer placed an order and ended when the customer paid for goods received. Many of the order-filling costs were incurred after production had taken place, but some were incurred before production when customers placed special orders rather than stock orders. Since most of the jobs or duties associated with order-filling costs were repetitive in nature, they could be studied and accounted for in much the same way as manufacturing costs.

Freeman identified twenty-six functional areas under the order-filling classification, dividing them into office functions and warehousing and shipping functions. Office functions included: credit, bad and overdue accounts, correspondence, order records, pricing and invoicing, accounts payable, accounts receivable, cash receiving, general accounting, factory accounting, sales accounting, sales statistics, order and letter files, postage and office management. Warehousing and shipping functions included: balance of stock records, receiving stock, space for stock, getting out stock orders, assembly and checking, packing, packing material, stencil or label, loading cars or trucks, storing hold orders and warehouse management.

Freeman (1929) reported that detailed studies were first made of methods and policies in order to establish standards. Henry Dennison, the owner and president of the firm, was an advocate of scientific management and had been president of the Taylor Society. Giving Freeman his full support and confidence, engineering estimates and time studies that had been applied to manufacturing processes were applied to the office

and warehouse functions as well. These studies were used to improve on methods currently in place and to find out how long it should take to, for example, price and type out each line of an invoice, to pack a bulky and heavy versus a small and light order or to update inventory records (Farrell 1936). Once done, standard costs for the performance of the various jobs within functions were established and revised approximately once a year. Departments were then given a flexible budget with a definite amount for fixed charges and a standard cost for each job performed. A master budget was not used because the employees within these functional areas had no control over the amount of work they did (when the work load was under capacity); their duties arose from the sales orders generated by the sales force.

The demand of the order or product on a particular function was critical to the proportional distribution of the costs of that function to the product. Statistics were kept for years on the costs of each of the functions. The demands on each function created by merchandise lines were separately calculated. Then sources of cost variability were determined. Freeman determined that six factors were most closely correlated with the functional costs. They were: per order, per item, per customer-month, per letter, per 1,000 cubic inches, and per dollar of sales. That is to say, as orders or as size of order increased, certain functional costs tended to increase. For example, about 22% of the total office and warehouse costs varied with the number of orders and 20% with the physical volume of shipments (Freeman 1933).

The cost per order (an order was the sum of all products ordered at a given time by one customer) included credit analysis, keeping order records, pricing and invoicing the totals, entering the order on accounts receivable records, updating sales statistics, keeping order and letter files, postage, assembling and checking the order as a whole, stenciling and labeling, loading and a prorata charge for office and warehouse management based on labor. The cost per item (each different product ordered was called an item — that is, a line item on an order) included a charge for pricing and invoicing the individual items, updating sales statistics, updating inventory records, removing inventory from stock, assembling and checking each item ordered and a prorata charge for office and warehouse management based on labor.

The cost per customer month was generated by the number of monthly receivable statements mailed. It included charges for getting out the statement and recording payments and a prorata charge for office management. The cost per letter involved corresponding with customers. This was charged with costs for typing letters, for postage, for keeping order and letter files and a prorata charge for office management. The cost per thousand cubic inches included charges for receiving stock, for taking up inventory space, for assembling and checking, for packing, for loading, for storing hold orders, and a prorata charge for warehouse management.

The cost per dollar of sales was used for bad and overdue accounts only. It included the loss from bad accounts and the costs of pursuing overdue accounts. It was also given a prorata charge for office management. This cost was not combined with the others as part of the order-filling cost charge because it was not related to products but rather to customers. It was deemed a reduction of total anticipated sales revenue. Accordingly, it was deducted separately from sales prices.

All of these costs were analyzed and calculated by classes of merchandise. The cost per item, per order, per customer month and per letter were then combined into one subtotal and the thousand cubic inches cost was another. Summed together, they were called secondary cost of products. The primary cost, not discussed here, was the factory cost (direct labor, materials and overhead).

With this comprehensive standard cost system Dennison could calculate standard costs and quote prices to customers on the spot because the attributes of each item ordered could be tracked and costed under the system. For example, large, bulky orders were charged (in part) by thousand cubic inches for the functions of receiving stock, space for stock, assembly and checking, packing, packing material, loading cars or trucks and warehouse management. Small orders (in size) would receive proportionately smaller charges for those functions. Large orders, in terms of number of different items ordered, would receive larger charges for order records, pricing and invoicing, and order and letter files than orders including only one item. Most of these charges were made on the basis of per line item typed. Rates for special order versus stock orders were the same for some functions and different for others.

These distribution costs were the only ones charged to

products. Costs of function elements not clearly product-related were allocated elsewhere. These included accounts payable, general accounting, factory accounting, sales accounting, some costs of keeping sales statistics, some postage charges and some costs of office management. These were deemed to be hopelessly common or joint in nature whose allocation to products would be completely arbitrary and useless. Product cost ultimately was the sum of a standard cost per thousand cubic inches plus a standard cost per item and order (the secondary costs) plus the standard factory cost (the primary costs computed elsewhere). These standard costs were also used for inventory costing for financial accounting purposes although Freeman (1933, 13) said that "this kind of a cost has not yet acquired the authority and sanction of convention and fashion."

Order-getting costs were not charged (with the exception of special, made-to-order items) to products. The costs of the money factory were usually common to all products, hence other cost objectives were set. Long-term statistics were kept by customers or class of customers, by one method of selling versus another, by territory, by salesmen and by merchandise items and lines. Order-getting costs incurred to get the customer to place an order were the most difficult to pin down. Freeman used marginal analysis to determine the most profitable of these cost objectives.

One area in which marginal analysis was applied was in determining selling costs by town for the purpose of planning sales routes and changing channels of distribution. The statistical records kept allowed for a computation of the cost of the salesman's time per town which was then broken down into the number of calls made, number of sales made, dollar of sales and the class of goods. This analysis offered a differential analysis of what it would profit the firm if the town were visited or were dropped or if the town were visited less frequently. Sales managers wanted to know the marginal travel cost per town. Armed with this information, in tandem with other firm objectives, the best route per salesman could be planned. When there were many customers in each town, this analysis was further broken down to customers.

These analyses were not the end-all regarding such determinations as where to send salesmen. Recognition was given to the need to develop prospects in new areas, to the fact that it often takes time to turn an unprofitable customer or area into

profitable outlets and that a profitable area one year may not be so the next. The information gathered was used as input into the decision-making process, not as a substitute for it.

Each salesman filled out a simple card for each customer visited regardless of whether a sale was made. The card included spaces to record the customer visited, the item(s) sold, the time spent with the customer, customer requests for mailings, customer type, complaints by the customer, items purchased from which competitors and the reasons why, and the salesman's evaluation of how future contacts with the customer should be handled.

After the cards were returned to the company and orders filled, all the information was placed on a tabulating machine card. From the punched cards created for lost sales, the company could assemble reports on competitive trends and see whether lost sales were due to price, delivery or other reasons. From successful sales cards, they could compile a variety of reports by classes of orders, on sales per salesman, sales by type of customer and sales by product.

Mail order costs, advertising and retail sales costs were studied also. Much of this was done by means of questionnaires and analysis of statistical data long retained by the company. The approach to analysis of advertising was far ahead of its time. Advertising primarily in magazines, Dennison included in each advertisement an invitation to the reader to write to the company for further information. This was usually a request for a brochure or a party magazine (the company made crepe paper which was commonly used in party decorations). The address given included a code that identified the magazine and the issue. Many people did write. A few months after the requests were received, Dennison would mail questionnaires on a random basis to the writers asking them what they bought, the dollar amount of their purchases and from whom they bought the merchandise. Freeman thought that these questionnaires gave them reasonable assurance about the efficacy of their advertising efforts.

The intriguing aspect of the Dennison Corporation's approach to distribution costing was its analysis of the various distribution activities. As recommended by today's Activity-Based Costing consultants, the Company analyzed and costed functions or activities. The Company's management understood that different sized goods and orders put different demands on

various activities and should therefore bear different costs. Dennison understood that most salesmen's costs were joint relative to products and that maximizing the use of their time had to be determined through the analysis of different cost objectives such as customer type and town. Freeman appreciated that the decisions made by management were only as good as the information provided to them. While he claimed to be only scratching the surface of the field of distribution costing, he was confident that only by combining research (based on statistics gathered over time) and analysis would any reliable basis for decision-making be developed.

It is impossible to determine from the literature what proportion of firms practiced distribution cost analysis during the 1920s and 1930s. An editorial note appended to Freeman's 1929 article in the *NACA — Bulletin* reported that the membership had been surveyed with the finding that few companies had done anything at all in the field. Similar surveys applicable to later periods have not been discovered. Nevertheless, other firms and industries did make great strides in this area.

Discussions of distribution costs virtually disappear from all accounting publications during the early 1940s for an obvious reason: the war effort concentrated most manufacturing facilities on war production severely curtailing civilian production. In general, many firms found the area unwieldy and feared that the effort to develop their systems to encompass distribution costs would prove unrewarding. It required extensive, time-consuming and expensive research for each individual firm. Guidance was available for many specific industries as well as introductions into the general concepts. Nevertheless, these guides did not substitute for research.

Another difficulty was that contemporary accounting rules (not yet called Generally Accepted Accounting Principles) preferred and argued for the current expensing of distribution costs — a preference at odds with the notion of assigning distribution costs to products. Although assigning costs to products or functions for managerial purposes is not inconsistent with expensing them in the financial statements, when records are kept for financial purposes it can become difficult to disaggregate or reorganize the information in them to serve managerial purposes.

Although not an insurmountable problem for a firm determined to invest in a system of statistical record keeping, it is

easy to imagine the dismay of management facing such a prodigious task for the first time. Whatever the extent of distribution analysis within firms during this period, it is true that textbooks now omit such discussions. Clearly, at some point after the 1940s, interest in the area waned and the discourse disappeared from the literature. In the post-war decade, the general prosperity of the United States resulting from apparently limitless demand from here and abroad made any major investment in distribution cost analysis seem like an unnecessary expense.

As the Activity-Based Costing advocates advise today, Dennison Manufacturing did not assign costs based on production volume unless that was the reason why they were incurred. No distribution costs were allocated based on production volume and many costs that are now taught merely as factory overhead (storage and other inventory handling costs) were also handled in a very different manner at Dennison. Costs were pooled according to factors of variability that had been discovered through statistical research. The allocation to products was based on a measure of normal capacity developed from averages over long periods of time which, in turn, depended upon the source of variation (average pounds of product handled in a year, average orders taken etc.). Using normal capacity rather than budgeted capacity as the denominator volume meant that idle time or other areas of waste were isolated. As Dennison, along with many other companies, suffered through the Great Depression, their cost system enabled them to see how severely idle capacity of all kinds was affecting the company, to understand where costs could be cut, and how far prices could be lowered. Perhaps it was this that allowed them to survive.

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