SOME MISSING LINKS IN OPTIMIZING FOOD DISTRIBUTION EFFICIENCY

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Author presents the supply system problems encountered by convenience stores.

Food retailing institutions in the United States have historically experienced almost continuous evolutionary change in response to advances in technology and new influences on consumer behavior. This has caused frequent and sometimes drastic change in the dominant type of food retailing outlet. The earliest change was from trading post to city general store and country general store. These were followed by small grocery stores and specialty stores. Later the blending of perishable and non-perishable food merchandising created the combination store which soon exploded into the supermarketing concept of food distribution. Each time period and its major food retailing institution has been accompanied by several supplementary forms of food retailing such as public markets, hucksters, specialty food stores, and roadside farm markets. Most recently convenience and fast food stores have become important auxiliary retail outlets for food and related products.

An estimated 700,000 retail locations in the U.S. sell food products either for on-premise or off-premise consumption. Wholesalers and direct delivery processors encounter difficult logistical problems in providing the supply services demanded by the several types of outlets included in this total. But there is very little evidence in the history of food wholesaling to indicate that it has a capability for innovation and adaption to changing conditions comparable to that of retailing. The operating practices in certain segments of the retail supply system are essentially the same now as they were fifty years ago. Other parts of the wholesaling industry, especially grocery wholesaling, by designing facilities and methods to efficiently serve supermarkets can no longer meet the special needs of small food retailers. The increasing concern about energy scarcity, air pollution and productivity in food distribution creates an urgency for improving the logistics of food wholesaling.

New life styles have caused the retailing sector of food distribution to continue the process of adaption. During the past decade developments in the food service industry have been the most spectacular. This industry now boasts of serving one out of every three meals consumed by the U.S. population. Its rate of real sales growth in recent years has been higher than grocery stores--a pattern that is expected to continue. Sales of the two largest fast food chains now exceed one billion dollars a year. The sales growth of these firms is part of a major organizational change in the food service industry resulting from the increasing share of market being acquired by

corporate chains. However, the supply system for food service outlets is still fragmented by commodities and brands with characteristics similar to the high cost system serving small grocery stores. For this and other reasons several large chains are developing their own central supply facilities.

Grocery store retailing has experienced two significant developments since the early 1960s. Of broadest consequence are the problems associated with maturity and over expansion in the supermarket industry. Depressed earnings resulting from limited real growth in food sales along with sharply rising operating costs and low productivity gains is forcing a shift into larger stores with broader nonfood assortments. This trend could lead to fewer and less accessible supermarkets. If so, it may favor even faster growth in the other contemporary adaptive change in grocery retailing--the revival of profitable small grocery store operation.

The most impressive evidence of the resurgence of small grocery stores is found in the 31.5 percent increase occurring between 1962 and 1972 in the number of grocery stores with annual sales between $150,000 and $500,000.[1] The total number of stores of this sales size grew from 27,325 to 35,950, an increase of 8,625 stores. The number of chain owned stores rose from 2,825 at the beginning of this ten year span to 11,050 in 1972. They represent new locations opened by convenience store chains. But independent stores also showed a modest increase during this period. Their number rose from 24,500 to 24,900 and still show a better than 2 to 1 edge in total numbers over chain owned units of comparable sales size. Chain owned stores with less than $150,000 annual sales are estimated to have increased from less than 3,000 units in 1962 to over 6,000 ten years later.

This recent progress in developing a unique and permanent institutional identity for small stores in the organization of food distribution is almost entirely due to the enterprise and imagination of the store operators. Little or no assistance has come from manufacturers or wholesalers in improving small store operational efficiency and competitive position in food retailing. There are indications that most grocery wholesalers regard small stores, including chains purchasing for many convenience stores, as low priority customers. But there are also evidences in the purchasing practices of both chain and independent small store operators of failure to appreciate the mutual advantages of consolidating purchases with a single supplier.

The present small store supply system is characterized by many orders and deliveries of relatively small dollar value. The range in number of weekly deliveries is from 45 to 80 excluding newspapers, store supplies and services. Accurate data are not available on present delivery costs for all of the various types of suppliers serving small stores. However, there are indications that these costs are quite high. Highest of all is for bakery products ranging up to 35 percent of wholesale value. Delivery costs for carbonated beverages, snacks, cookies and crackers, milk, ice cream and items supplied by rack jobbers and specialty wholesalers are all indicated as falling in the range of 15 to 25 percent of wholesale price. And for merchandise purchased from grocery wholesalers, small stores pay from 3 to 5 percent more than supermarkets.

There appear to be opportunities for substantial cost reduction by reorganizing the present methods for supplying small stores. However, some operators may attach greater importance to more or better supply services. The Southland

Corporation has reported that all of the economic advantage achieved thus far, from its large investment in distribution facilities, has been derived from the improved merchandising performance of its stores. Inventories have been reduced and sales increased by better space management. The explanation for this is to be found in the fact that Southland stores can now order as few as 4 retail units of any grocery item rather than case lots as required when purchasing from most grocery wholesalers. This emphasizes the importance of the conflict between shelf space in small grocery stores and manufacturer's case pack sizes. It can only be resolved by a specialized wholesaling service.

As is evident from the statistics on store numbers, the comeback small grocery store retailing is largely attributable to a new branch of food distribution referred to as the convenience store industry. This innovation, like the development of chain food store operation, self service and the supermarket concept, was originated by a small group of entrepreneurs experimenting on the outer fringe of food retailing. Their stores, regarded as southern freaks in the late 1950s, have become a national food retailing phenomenon in the 1970s. This was accomplished by skillfully hybridizing some old and modern retailing methods to create a store type that is distinctively different from other contemporary forms of food retailing.

Convenience store merchandising policy is very simply and consistently directed toward providing maximum public convenience in the purchase of those food, tobacco and nonfood items most likely to be needed between major shopping trips. This policy results in a remarkable similarity among all convenience stores regardless of their ownership. Though there are some variations between firms in merchandising emphasis and product lines, particularly perishable foods, their stores are very similar in location, size, layout and operating practices.

While convenience stores are classified as grocery stores, they differ markedly from the traditional concept of a full line grocery store. This is particularly evident in the product sales mix of convenience stores. Therefore, there are significant differences in the relative importance of various kinds of wholesale suppliers as compared with grocery stores and especially those of supermarket sales size.

Also importantly influencing the small stores relationship to its supply system are the limitations in display and storage space and the number and skill level of store employees as compared with larger food stores. An understanding of the characteristics of these stores is helpful in evaluating their supply arrangements.

According to information drawn from annual surveys conducted this year by three different trade journals, the typical convenience store has these characteristics.[2] Store size ranges around 2300 square feet and, with an inventory of 2900 items, realizes weekly sales of about $4,000 or $208,000 per year.

Convenience stores employ an average of 4.1 people and, except during evening and weekend peak periods, most stores have only one person working during each of two daily eight hour shifts. The number of stores open more than the customary 16 hours per day has been increasing gradually during the last three years.

This is the sales percentage and rank of product groups according to one national survey of convenience store sales:

Tobacco	13.60%
Dairy	12.53
Beer/wine	11.48
Nonfoods	10.85
Soft drinks	9.06
Dry groceries	7.06
Baked goods	6.95
Delicatessen	5.87
Candy	4.90
Ice Cream	3.66

Two other recent surveys of prodcut group sales ratios show beer and wine as the leading sales category. They also show slightly different percentages for other groups probably reflecting differences in the survey sample and the way product groups are aggregated. One survey found that the typical convenience store purchases from 46.9 vendors and receives an average of 58.3 deliveries per week. Another survey shows that 44.5% of all convenience store merchandise is supplied by route vendors. Of the remainder, 18.3 percent is supplied by independent specialty wholesalers and rack jobbers, 12.4 percent by voluntary grocery wholesalers, 11.6 percent by cooperative wholesalers and 13.2 percent from warehouses operated by convenience store chains. These percentages, placing the grocery wholesaler in the position of a minor supplier, together with the average product group sales mix previously described, show the convenience store to be a distinctly different type of grocery store.

In 1972, sales of the convenience store industry increased 26.3 percent over 1971 to reach a total of $3.676 billion. This was 3.6 percent of total U.S. grocery store sales. Sales volume for 1973 is projected to total $4.434 billion and represent 4.1 percent of all grocery store sales. The average store gross margin was 26.16 percent of sales in 1972 and is expected to increase to 26.87 percent this year. Net profit before taxes for the industry averaged 3.27 percent in 1971, declined to 2.66 percent in 1972 and is projected to reach an average of 3.44 percent for 1973.

In contrast to the chain store movement which was largely based on the economies of integrated wholesaling and retailing, and supermarketing, in which the earliest stores had close ties with grocery wholesaling, convenience store chains have yet to acquire or control the wholesaling of a significant portion of their merchandise requirements. The notable exception is The Southland Corporation. But it waited until it had more stores in operation than A&P before building distribution centers. For the most part convenience store operators continue to follow the credo of the pioneers, "Put your money in stores, not wheels".

The logic for avoiding investment in wholesaling is fairly obvious. In the product groups which convenience stores could most readily enter wholesaling, i.e. dry grocery, perishable foods and health and beauty aids, the sales volume from even 100 or more stores in the same market area would not provide the volume required to operate a distribution center efficiently. The three distribution centers now being developed by Southland have been designed and located to serve from 550 to 1,150 existing 7-Eleven stores. These centers are primarily warehousing groceries, tobacco, candy, sausage meats, processed dairy products, frozen food, ice cream and health and beauty aids. Deliveries are made over a 350 mile radius in 45 foot trailers compartmented to maintain three different temperatures.

Believing that the possiblities for effecting improvements in the presently fragmented and costly supply methods for small grocery stores should be researched, the Department of Agricultural Economics and Rural Sociology of the Pennsylvania State University has been surveying present delivery practices. This study work is being conducted under a cooperative research agreement with the Agricultural Research Service of the U.S. Department of Agriculture. Week long observations have been made

in 10 urban independent small grocery stores and 6 suburban chain operated convenience stores. Also, the supply source, type of product, value of deliveries, vendor credits and inter-store merchandise exchanges for a four week period for five stores of the same chain have been tabulated.

The information presented in Tables 1, 2, 3 and 4 come from 6 convenience stores in Pennsylvania operated by different firms. The data was obtained by placing an observer in each store for a one week period to record all merchandise supply activities in terms of value, physical size and time at store of delivery personnel. A sampling was made of the time drivers and store personnel devoted to various delivery activities.

Three of the stores were located in suburbs of Philadelphia and Pittsburgh. Two were located in SMSA's with over 100,000 population and one was located in an isolated town having a population of about 6,000. Two of the stores were units of chains with over 300 stores. Three were in chains with from 40 to 200 stores and one was from a smaller chain. Weekly sales volume of the six stores at the time observed ranged from $3,800 per week to $6,400 with an average of $4,675 which is about $675 higher than the national average according to recent convenience store surveys. The absence of beer and wine in these stores which cannot be sold in grocery stores in Pennsylvania, represents the major difference between study stores and those located in other states.

Table 2 shows the extent of supply fragmentation when the deliveries recorded in six convenience stores operated by different chains were averaged. The store with the fewest deliveries had 46 during the week observed and two had the highest number - 75. In addition to the number of deliveries shown in Table 2, the six stores received a total of 34 visits by sales representatives of manufacturers and wholesalers who spent a total of 649 minutes in the stores preparing orders, shelving merchandise and setting up special displays.

The average of 61 total deliveries is slightly higher than the 58.3 weekly delivery average reported in a trade journal survey.[3] But the number of vendors utilized by the six study stores averaged 34.5 which is substantially below the 46.9 vendors reported as a national average. Two of the study stores were served by 44 vendors. The absence of beer and wine distributors accounts for some part of this difference. Much of the difference between study stores in both number of vendors and total weekly deliveries is explained by the variety of bakery brands carried. The addition of one brand of bread adds five deliveries to the weekly total.

Most significant of the study findings is that 34.7 percent of all deliveries had a wholesale value of less than $10.00 and 76.5 percent of the deliveries were below $50.00. In a total of 192 bakery and snack deliveries recorded in the six stores, only 4 bakery deliveries and 4 snack-biscuit deliveries had a wholesale value over $50.00. The other category with a large number of low value deliveries was soft drinks with 27 out of 38 under $50.00. The average elapsed time for deliveries was found to be 12.8 minutes for bakery, 19.6 minutes for snack-biscuit, and 17.4 minutes for soft drinks as shown in Table 1. It is customary for route drivers in these product groups to perform most of the ordering, stock rotation and shelving work for their product line. The in-store work performed by driver-salesmen represents a significant contribution to store labor requirements. There is usually only one person working in a convenience store during the morning and midday periods when 73 percent of all deliveries are made.

Table 1. Summary of Product Group Deliveries for One Week (Averages for 6 Convenience Stores)

	Supplier Firms	Average Delivery Value	Average Delivery Time	Average Deliveries	Estimated Total Weekly Delivery Time
	-number-	-dollar-	-minutes-	-number-	-minutes-
Bakery	7.2	14.33	12.8	26.7	342
Snacks-Biscuits	5.2	30.65	19.6	5.3	104
Soft Drinks	5.8	46.60	17.4	6.3	110
Grocery	1.3	680.53	27.3	1.3	36
Produce	1.2	25.17	9.1	2.0	18
Milk	1.2	150.05	34.4	3.5	120
Frozen Food	1.3	63.86	10.6	1.2	13
Ice Cream	1.5	94.00	25.0	1.7	38
Eggs	1.0	28.14	4.3	1.2	5
Deli-Meat	3.5	37.17	8.2	5.0	41
Tobacco-Candy	1.8	286.07	27.3	1.8	49
Nonfood	3.5	62.21	29.5	4.8	142
	34.5	--	--	60.8	1,018

Table 2. Average Number Weekly Deliveries to 6 Convenience Stores

Type of Delivery	Number of Deliveries Per Week -Number-
Bread	26.6
Snacks-Biscuits	5.2
Soft drinks	5.8
Deli-meat	5.0
Nonfood	4.8
All other	13.6
Total	61

Table 3. Deliveries Ranked by Wholesale Value

Wholesale Value of Deliveries -Dollars-	Number of Deliveries -Number-
Up to $10.00	127
10.01 - 20.00	56
20.01 - 50.00	97
50.01 -100.00	37
100.01 - 300.00	38
Over 300.00	11

Note: 366 deliveries to 6 convenience stores - one week.

Table 4. Product Group Purchases by Type of Supplies as a Percentage of Total Purchases

Average Total Weekly Wholesale Purchases Per Store - $3,571	
Product Group	Percent of Purchase
Eggs	0.9
Produce	1.4
Frozen Food	2.1
Deli-meat	5.2
Ice Cream	3.9
Milk	14.7
Grocery	24.7
Soft drinks	8.2
Snacks	4.5
Bakery	10.7
Nonfood	8.8
Tobacco-Candy	14.4

Note: Average 6 convenience stores

In most firms, store personnel presently prepare orders for dry groceries, processed dairy products, frozen food, eggs, produce, deli-meat, tobacco and candy. It is unlikely that store personnel at the present level of staffing, could effectively perform additional ordering work for high volume perishable lines.

The keys to realizing lower delivery costs in most of the product lines served by driver-salesmen lie first in developing an acceptable means of performing the driver's in-store work with equal effectiveness. The second and more challenging task will be devising a plan for the gradual changeover to a new delivery arrangement that will be acceptable to the management and employees of the supplier firms and small store operators.

There can be very substantial economic and environmental gains from

making changes in the present supply system. Perhaps this combination of incentives will be sufficient to attract the broad support required to plan and implement these changes. Some benefit could be realized in many existing small store supply operations by the adoption of better work methods, unitized handling equipment, concentration of purchasing where possible and changes in delivery scheduling. But realizing the major economic and environmental improvements that appear to be possible, will require extensive interorganizational cooperation between competing firms, specially designed and equipped facilities and possibly a new type of institution providing a contract order assembly and delivery service. Each of these would probably be involved in any program aimed at combining several brands or product groups into one delivery.

A single consolidated daily delivery of bakery, snack and biscuit products offers the largest potential for reducing the number of delivery trips per store and probably the largest cost saving among the several possibilities for consolidated delivery. For each of the study stores, this would reduce the number of weekly deliveries in these two product groups from 31.8 to 5.

An estimate of the costs anticipated in operating a consolidated delivery program based on the value and physical size of deliveries received by our 6 study stores is shown in Table 6. The basis for estimating present delivery costs is outlined in Table 5. According to these estimates, a saving in delivery costs of $98.00 per store per week would be realized. On an annual basis this would approximate $5,000. The annual average net profit before taxes for a convenience store has ranged around $6,000 in recent years.

Consolidating deliveries of other product groups having similar physical characteristics offer additional possibilities for reducing delivery costs. For example, produce could be combined with deli-meat and eggs. Frozen food and ice cream require similar expensive delivery equipment. Another possiblity is represented by the grocery, tobacco, candy and nonfoods groups accounting for a total of 7.9 weekly deliveries to study stores. As previously mentioned, there are several barriers to changing the present system. Some of these are extremely complex and will be more difficult to breach than others. A few could be implemented by store chains or suppliers.

There is both a public and a commercial benefit associated with the type of changes being proposed. Public pressures stemming from environmental concerns in urban areas aimed at reducing the volume of vehicular traffic are likely to become more intense. Also to be considered is the social responsibility of the food distribution industry, largely neglected in recent years, for providing efficient retail food outlets in inner-city neighborhoods.

The types of changes proposed have broad implications requiring industry wide support. A unique opportunity is afforded trade associations, government agencies and other researchers in food distribution to provide the leadership that is needed to eliminate wasteful duplication in store supply operations.

Table 5. Estimated Present Weekly Delivery Cost Per Store for the Average Quantities of Bakery, Snack and Biscuit Products Received by Six Study Stores

	Weekly Wholesale Purchases -dollars-	Average Weekly Deliveries -number-	Estimated Present Delivery Costs[a] -dollars-	Product Average Weekly Cube -cubic feet-
Bakery	383	26.6	95.75	117
Snacks and Biscuits	162	5.2	32.40	56
TOTAL	545	31.8	128.15	173

a/ Present delivery expenses are estimated to average 25 percent of bakery wholesale value and 20 percent of snack and biscuit wholesale value.

Table 6. Estimated Savings Per Store With Consolidated Daily Delivery of Bakery, Snack and Biscuit Purchases[a]

Order assembly and truck loading at distribution center (3½ hours @ $5.00 x 5 delivery trips)	=	$ 87.50
Truck: Weekly fixed lease charges	=	70.00
($.15/mile x 60 miles x 5 delivery trips)	=	45.00
Driver: (8 hours @ $7.00/hour x 5 delivery trips)	=	280.00
Total weekly delivery cost for 20 stores served[b]	=	482.50
Weekly delivery cost per store (482.50 ÷ 20)	=	24.12
Additional store labor checking and shelving deliveries (1.67 hours per week @ $3.50/hour)	=	5.85
Total weekly cost per store for consolidated delivery	=	30.00
Total weekly delivery cost per store present method	=	128.00
Potential weekly delivery cost saving per store	=	$ 98.00

a/ Based on quantities shown in Table 5.

b/ Nine hundred cubic feet truck capacity ÷ 35 cubic feet per store delivery = maximum 25 store orders per delivery trip. Assuming 80% average cube utilization = 20 store deliveries per 8 hour delivery route.

Footnotes

1/ Progressive Grocer, 40th Annual Report of the Grocery Industry, April 1973

2/ Convenience Store News, Convenience Store Industry Report - May-June 1973, Convenience Store Journal, Annual State of the Industry Report, March 1973, Progressive Grocer, 3rd Annual Report on the Convenience Store Industry, September 1973.

3/ Convenience Store Journal, Annual State of the Industry Report, March 1973.