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*Perhaps the most important contribution electronic data processors can make to the average retailing operation is their ability to improve the sales forecasting and ordering decisions.*

## HOW COMPUTERS CAN HELP THE RETAIL MERCHANDISER

*by Arthur M. Kramer and Lewis M. Weinstein  
Adler, Faunce & Leonard*

**T**HE RETAILING industry is just embarking upon a development that is already well under way in some other industries. Computers, first acquired to perform clerical and accounting functions, are beginning to be applied in the solution of operating problems.

For the retailer "operations" means the buying and selling of

merchandise. Major retailers like Sears, Macy's, and Korvette are already looking to computers for help in performing these vital merchandising functions.

This article examines the benefits that the merchandiser can derive from computer systems and some of the detailed mechanics of these systems. These benefits, it should be emphasized at the outset, are available to nearly all retailers through the use of computer service bureaus and the like; they are not limited to the largest organizations.

Retail merchandisers tradition-

ally perform both merchandising and clerical functions. As merchandisers they shop markets, select goods, and establish a line; decide on display promotions, advertising, and markdowns; and modify their lines to take advantage of "hot" items and get rid of poor items. However, they also are frequently involved in performing the clerical functions required to place orders, maintain unit control and retail inventory records, and determine reorder quantities.

The computer can help the merchandiser in two ways: (1) by doing much of this clerical work for him,

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Dept.	Category	Line	Sales	Gross Margin		Com- mission Expense	Adver- tising Expense	Floor Space Expense	Direct Contribution	
				%	\$				%	\$

PROFITABILITY REPORT

EXHIBIT 1

and (2) by giving him better information to use in performing his merchandising functions.

More specifically, the computer can relieve the retail merchandiser of many of his clerical duties in maintaining unit control and retail inventory records, in forecasting sales, and in reordering merchandise during a selling season. As a by-product of performing these functions, the computer can provide valuable information for the merchandiser to use in making decisions during the selling season and in planning for future seasons.

**In-season decision making**

The contribution the computer can make to merchandising information during the season may be divided into two categories. First, it can prepare those reports that most retail merchandisers are already getting now — open-to-buy reports, retail inventory reports, and unit control reports. In performing this service the computer ordinarily does not provide new information — although the reports it turns out may be more accurate, timely, and useful than those produced by manual methods. The beauty of a computer system, however, is that it can go much further; it can produce information that is not now available to most retail buyers.

Most buyers, for instance, have some “feel” for the contribution, after direct expenses, of each line. But when the number of lines being handled reaches into the thousands, as may happen even in small specialty shops, keeping track of gross margins, markdowns, sales commissions, advertising and pro-

motion, and the like gets to be a complicated job. The computer, however, has the time and the capacity to prepare a profitability report such as the one whose format is shown in Exhibit 1 appearing at the top of the page.

The computer can report the gross margin and direct contribution to total sales of each line and point out those lines that contribute the most and the least to store profits. Using the principle of exception reporting, it can prepare a list for the merchandiser that shows only these high- and low-profitability lines. Such a list brings to the merchandiser’s attention those lines where action (such as promotions or markdowns) is needed without his having to search them out. This gives him the time and the information with which to make better merchandising decisions.

Another example of in-season information is a report such as the one whose format is shown in Exhibit 2 below. This report could show for a category (such as sweaters) sales of the different styles (such as boat-neck, V-neck, etc.). When information is summarized in this way early in a selling season, a buyer may be able to pick up important trends early

enough to make profitable decisions. Similar reports could be prepared substituting color, sleeve length, material, or what have you for neck style.

This last point is important. Once the basic information has been entered into the computer system, it can be arranged, summarized, and reported in all conceivable ways at little cost. The merchandiser need only specify what he wants to know, and the proper reports can be prepared. This flexibility makes the computer an extremely valuable tool in the hands of a merchandiser who knows how to use it.

A final example of how the computer can help the retail merchandiser during the selling season is the sales exception report illustrated in Exhibit 3 on page 28. This report can ensure that the buyer becomes aware of those items that suddenly become “hot” in time to take whatever action is needed. For example, the computer can select all the items whose sales forecast changes more than 10 per cent or 20 per cent or by whatever figure experience has shown to be significant for the particular category of merchandise and retail operation.

Another method of selection

EXHIBIT 2

STYLE ANALYSIS REPORT

Dept.	Category	Style Classes									
		1	2	3	4	5	6				
		Sales %	Sales %	Sales %	Sales %	Sales %	Sales %				

## Kramer and Weinstein: How Computers Can Help the Retail Merchandiser

Item	Item Sales Forecast			% Relation to Category		
	This Week	Last Week	Increase	This Week	Last Week	Increase

SALES EXCEPTION REPORT

EXHIBIT 3

would be to establish a norm for what each item in a category should do in relation to the category as a whole. The computer then could report on all items that were doing substantially better than the norm. These reports are in addition to those prepared for the routine reordering of merchandise (explained later); their purpose is to let the buyer know about unusually good items that should be promoted, placed in branch stores, or handled in some special way.

### Planning information

After the selling season is over, much can be learned from operating results that can be used in planning the next year's operations. The problem with most manual systems is that clerks must begin to keep records for a new season as soon as the previous one has been completed. The computer, in contrast, has the time and the capacity to prepare analyses useful for planning.

The reports illustrated in Exhibit 4 on page 29 and Exhibit 5 on page 29 are typical of what the computer can do. The trend analysis report (Exhibit 4) would compare sales for the past several

selling seasons on the basis of style category, price range, or whatever other variables the merchandiser felt to be important. This would make it possible to evaluate more completely the important trends that have developed and the effect they might have on the next year's sales. The advertising analysis report, by relating advertising and sales, would show the merchandiser the effectiveness of advertising for particular categories of goods.

Again, the flexibility of the computer system is an important advantage. The computer can prepare whatever reports the merchandiser thinks would be of value to him. These reports, along with those shown previously, would all be produced as by-products of the clerical functions performed by the computer.

Let us now examine the mechanics of these clerical functions in some detail.

### Unit control

As a first step in building a computer system for the retailer, the computer can be used to maintain unit control records. Keeping track of each item's sales, inventory, and on order position is an extremely

tedious job, made to order for a computer. Information about purchases, transfers, receipts, and sales is fed into the computer, and unit control records are kept in storage, to be updated and printed out in report form as required.

Prepunched sales tickets are frequently used as a way of automatically generating input information. These prepunched tickets are similar to the ordinary sales tags that are usually attached to merchandise and removed at the time of sale, but they have specially coded holes containing information that can be automatically transferred to punched cards and thence to the computer.

### Frees retailer of routine

Thus the computer system takes over the tedious clerical job of maintaining unit control records, freeing the merchandiser of his duties in this area. The computer does the job more accurately than most manual systems (since much of the processing is automatic) and often at less cost, and it usually makes the information available on a more timely basis. Furthermore, "exception" reports can be prepared listing only those items that need special consideration (e.g., all out-of-stock items and all items whose sales are particularly low). Another time saver for the merchandiser, this serves to focus his attention on those areas where it is most needed.

### Forecasting logic

Once unit control records are on the computer, reordering can be done automatically if an accurate and complete forecast of sales de-



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mand for the balance of the selling season can be prepared. This is less of a problem than it might seem since the computer can make use of exactly the same logic that most buyers now use.

Before going into the details of how most buyers forecast (and how the computer can forecast in much the same way) it is important to establish certain facts about retail sales. This basic premise underlies all that follows: Retail sales follow a seasonal pattern, and this pattern does not vary from year to year. The volume of sales made by a particular retailer may vary considerably from year to year, but the pattern in which those sales are made does not vary.

### Seasonal pattern

For example, consider two years' sales for men's dress shirts in John Doe's Haberdashery, as shown in Exhibit 6 on page 30. This table shows that sales of men's dress shirts rose substantially in 1964, from 500 units in 1963 to 800 units in 1964. Yet the pattern of those sales, i.e., the percentage that was sold in October or in December, hardly varied at all. In 1963 38 per cent of the shirts sold during the entire fall season were sold in December. In 1964, although a great many more shirts were sold, the percentage sold in December was 39 per cent.

This phenomenon — the existence of relatively fixed sales patterns for each category of merchandise—has been verified many times, using data from a women's specialty chain, a large department store, and a chain of furniture stores. It is the basis of the forecasting method to be discussed.

How does a buyer determine how much more of a given item he must order to meet the needs of a selling season? A typical sequence of thoughts might go like this: "It is now the third week in September. Usually at this time in the season we have sold about 25 per cent of what we will eventually sell in Category X. Within that category, Item A has sales of 100

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Dept.	Category	Description	Sales for Season and % Change		
			1963	1964	1965
		(Style category) (Price range) Etc.			

TREND ANALYSIS REPORT

EXHIBIT 4

Dept.	Category	Sales	Advertising	Sales Total	Advertising Total	Advertising
				Sales	Advertising	Sales

ADVERTISING ANALYSIS REPORT

EXHIBIT 5

units to date. Based on that information, I will need 400 units of Item A (100 divided by 25 per cent equals 400) for the entire season. Subtracting the 100 units already sold means I must order 300 more units." Depending on the particular purchasing situation for the item (e.g., how many more re-orders it is possible to make), the buyer can go ahead and place his order.

### Computer forecasting

A computer system can use exactly the same logic. A historical sales pattern for a category of items (such as men's dress shirts) can be developed by plotting cumulative sales for the past three years by week for each selling season, as in Exhibit 7 on page 31. This is done for the past three years so that an average curve can be determined. A table of percentages by week for each category can then be calculated (see Exhibit 7) and stored in the computer. This pattern can then be used to predict the sales for each item in the category (i.e., each specific dress shirt).

For example, repeating the thought process followed by the

buyer, the computer proceeds as follows: Sales for Men's Dress Shirt Number 12 have been 10 dozen units through Week Number Four in the season. This dress shirt fits into the overall category "men's dress shirts," for which sales through the fourth week equal, on an average, 9.3 per cent of total sales for the season (Exhibit 7). Projecting this for the entire season for Shirt Number 12 shows that total sales should be 107 dozen shirts (10 divided by 9.3 per cent). Subtracting the 10 dozen units already sold yields a net demand for 97 dozen units for the remainder of the season, which must now be purchased.

### Two aspects of system

Two vital aspects of this forecasting logic that have not yet been made explicit should be mentioned now. First, the sales pattern developed for a category of merchandise (i.e., men's dress shirts) can be applied to each item within the category. The assertion that the sales patterns do hold for individual items has been proved many times, and its validity can be verified by calculating the relevant

MEN'S DRESS SHIRTS FALL SEASONS 1963-1964				
Month	1 9 6 3		1 9 6 4	
	Unit Sales	%	Unit Sales	%
August	30	6%	47	6%
September	50	10%	89	11%
October	80	16%	120	15%
November	150	30%	232	29%
December	190	38%	312	39%
Total	500	100%	800	100%

## HISTORICAL SALES PATTERNS

## EXHIBIT 6

*Another important characteristic of this forecasting method is that special events, such as promotions, can be isolated so that they do not affect the validity of the sales forecast.*

sales percentages. Secondly, substitute items can be reordered. Suppose that a particular men's shirt is selling extremely well. Since everyone else will probably want that exact style and there is a limited supply, it is likely that the buyer will have difficulty reordering it. He must then try to find a similar style and order that will meet his demand. The similar style will fit right into the sales pattern and cause no problems in making the next forecast.

The sales percentages in Exhibit 7 illustrate an important advantage of the use of the computer in forecasting sales demand. Although the computer goes through exactly the same procedure as the buyer in making the calculations, the computer does the job more completely and more accurately than the buyer has time to do. For example, the buyer is likely to round off to percentages such as 10 per cent, 20 per cent, and 50 per cent in estimating the percentage of season sales already achieved while the computer uses the more precise 9.3 per cent, 17.2 per cent, and 55.2 per cent. Similarly, the buyer is likely to round off sales figures (e.g., from 142 units to 150 units) and the results of his calculations (e.g., 25 per cent of 180 equals about 50 instead of 45). These errors, although they may seem small, accumulate and can result in significant costs through overstocking or understocking. The computer can perform the calculations quickly and with a high degree of precision.

Furthermore, the computer has the time to forecast every item in the line and check stock status several times a week. This helps to catch sales trends early in the selling season.

***Special event adjustment***

Another important characteristic of this forecasting method is that special events, such as promotions, can be isolated so that they do not affect the validity of the sales forecast. A big promotion of a particular category of merchandise, if not repeated regularly from year to year, will cause a distortion of the sales pattern for the year in which it occurs and will invalidate forecasts based on that pattern. To correct for this influence, the extra sales caused by the promotion are simply removed from the sales pattern. This is done by matching the pattern before and after the promotion with the patterns of other years and then subtracting the excess sales that cause a "hump" in the curve. These excess sales, of course, also show the merchandiser how effective his promotion was. The same kind of adjustment can be made for factors that reduce sales, such as bad weather or labor difficulties.

***Purchase orders***

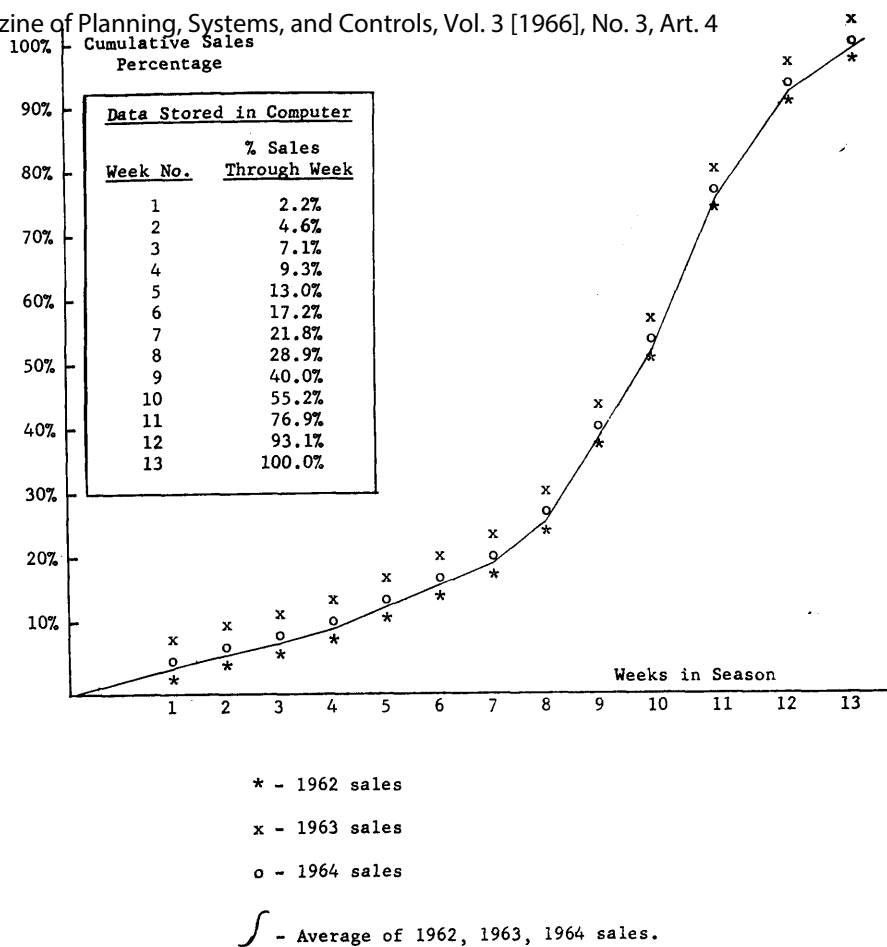
Thus we have seen how the computer performs the functions of maintaining unit control records and forecasting sales. The next step in the cycle is to have the computer

If this function is to be performed properly, the talents of both the buyer and the computer must be utilized. The computer can calculate sales demand on the basis of the sales pattern, and for most items it can go right ahead and place the reorders. But some items will no longer be available, and alternative items will have to be selected. In other cases it will be possible to make several reorders; then it may not be desirable to order the entire balance needed to fill the season's sales demand. There will also be a few cases, particularly those of low-volume items, where random fluctuations cause the forecast made in one week to be vastly different from that made the week before. All of these exceptions must be reported to the buyer so that he can exercise his judgment in placing purchase orders.

**Alternative methods possible**

There are many possible ways to handle the special situations just described. The computer could run a prelisting of all the items it was planning to purchase, and the list could then be edited by the buyer. Or the buyer could review the purchase orders after they had been prepared by the computer. The important point is that the computer system is flexible and can handle the problem in a way that suits the individual retailer's situation while still reducing his clerical work by preparing most of the purchase orders.

A further refinement in purchasing would be the use of economic order quantities for determining how much of various items to order. The EOQ concept has been described in many publications, including this one. (See "Inventory Control" by Robert D. Niemeyer, M/S July-August '64, p. 25.) It is basically an attempt to balance the costs of making purchases, which decrease as the size of the order increases, against the costs of carrying stock, which increase as the



SALES PATTERNS FOR MEN'S DRESS SHIRTS

EXHIBIT 7

size of the order increases. EOQ would be valuable in the case of staple items that are reordered frequently; it could provide a more economical balance of stock.

**Cost**

A considerable investment may be necessary to do the detailed work required to develop and implement a computer system similar to the one outlined in this article. However, this investment should show a significant return. Such a system often can pay for itself through clerical savings without even considering the additional profits that can be earned by more efficient operation and better decision making.

The actual costs of a computer can often be shared with other users, either by renting time from a computer service bureau or by

operating a computer jointly with other retailing establishments. (Arrangements can easily be made to ensure that valuable information does not fall into the hands of competitors.)

It is not always easy to implement a computer system, and retail businesses present special complications because of the many details involved. To be successful in this task, management must give formal and detailed consideration to analysis of just what its merchandising functions are and how the computer can help.

This can be a difficult process, but the benefits are significant, and the dollar costs are not prohibitive. As more and more retailers find that their competitors have already begun to make use of computers as an aid in merchandising, they will see what they can do to keep pace.