APPLICATIONS OF NEW TECHNOLOGY

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Uses of Scanner Information for Food Industry Executives

by

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Introduction

Because of scanning technology, a great deal of data is available to food retailers, and translating these data into information for management decisions is a major concern. Tremendous possibilities exist for the generation of data and the use of such data at all levels of managerial decision-making (departmental level, store level, supervisory level, and senior management level). According to an executive task force set up by the Food Marketing Institute, the supermarket industry is in a position "to surge forward in the application of information technology" (*Supermarket News*, January 1987). Although the hardware and software are currently available, to date it appears that relatively few resources have been devoted to generating and/or organizing scanner data to be used in managerial decisions (Capps, Thomas, Long).

It has been estimated that less than 10 percent of firms with scanning systems are making use of the data for decision-making purposes (Capps). Indeed, there are barriers in the industry hindering the progress of the realization of the many benefits: (1) limited staff and financial resources; (2) the reluctance of managers and merchandisers to include the new information in their established decision-making process; and (3) restrictions in internal company coordination (*Competitive Edge*, November 1985).

Data and information are not synonymous. Information corresponds to data which have been "retrieved, processed, or otherwise used for inference purposes or as a basis for forecasting or decision-making" (Ross). Data transform to information only when collected, analyzed, and presented in a form resulting in the communication of intelligence (Symonds). Simply put, data are just facts. Information is something upon which action is taken. Along this line, little thought has been given to data collection and presentation in terms of which staff members need the information, what needs the various staff members have, and in what form the staff members could best use the information. Different levels of management are likely to have different needs for information relative to type, complexity, and time span.

The search for meaningful information was the focus of a *Supermarket News* symposium of food retailing leaders from across the United States (*Supermarket News*, December 1986). In a questionnaire developed by James Stevenson, Director of the Food Industry Management Program at the University of Southern California, and sent to retailers and manufacturers, the information explosion rated very high in importance. As to rank order, in-store scanning was number one, followed by personal computers in the store, computerized labor scheduling, shelf space management systems, direct product profitability, UCS/computer-to-computer, electronic mail, and warehouse automation.

The purpose of this paper is to discuss uses of scanner information for food industry

executives. The focus of the discussion centers on the development of a firm-wide information system which provides each management level with relevant information and coordinates total firm operations, but does not burden a particular level with large volumes of unnecessary data.

The aim of the management information system is to identify key performance areas and indicators for various managerial positions. Key performance areas refer to those "activities or functions vital to accomplishing firm objectives" (Vastine and Watkins). Such areas include inventory, profit, gross margins, expenses, and sales. Key performance indicators refer to quantitative measures used by management, either implicitly or explicitly, to make decisions required by the various levels of management (Vastine and Watkins). Key performance indicators include inventory turns, shrinkage as a percentage of sales, gross margin dollars, customer counts, and sales per customer. Importantly, key performance areas and indicators change with position in the management hierarchy. The identification of key performance areas and indicators allows for a management-by-objectives orientation.

Using scanner data has been compared to trying to take a drink of water from a hydrant: the sheer volume of data supplied is overwhelming. Part of the problem may be that industry leaders are not sure what information they desire from the wealth of information made available and thus are unable to focus on key indicators. Therefore, to keep from drowning in the data, it becomes necessary to develop an information management system that will provide managers with the information they need when they need it.

Current Applications

The increasing number of scanning systems in the grocery industry is indicative of the acceptance of this technology by the industry. Benefits derived from adoption generally have been separated into two categories: "hard" or tangible benefits, and "soft" or intangible benefits. Hard benefits refer to the savings accrued from scanning systems via the improved speed and accuracy in operations. Examples of "hard" benefits include (Capps):

(1) Increased check-stand productivity;

(2) Reduced shrinkage through improvements in price accuracy, reductions in theft, and improvements in produce margins via more accurate weighing;

(3) More efficient bookkeeping; and

(4) Reductions in labor costs through reductions in price marking and price changes.

In general, these hard benefits have provided the justification for investment in scanning systems. While it is generally believed these benefits have provided a good return on investment, most food retailers and industry analysts feel that the soft or intangible benefits offer an even greater return. Soft benefits include savings and/or increases in sales due to improved managerial and merchandising decisions made possible by the wealth of information provided by scanners. Examples of soft benefits include improvements in shelf space allocation, inventory shrink control, labor scheduling, direct-store-delivery (DSD) goods identification, new item evaluation, out-of-stock position, advertising and promotion results, pricing decisions, product mix selection, profitability analysis, and store security (Ricker, p. 27; National Grocers Association, pp. 9-10).

In general, these applications are placed into one of the following three categories based on the nature of the application (*Progressive Grocer Executive Report*):

(1) Tracking: These reports monitor the activities of the business and serve as a means for the manager to spot potential problems and opportunities;

(2) Analysis: These reports involve the reorganization and integration of data and other information to answer questions; and

(3) Experimentation: Searches for cause and effect relationships between merchandising actions and the change in sales or profit. It is different from analysis since it involves screening out factors through preplanned controls.

The use of scanning data as a management and merchandising tool did not begin until the late 1970s or early 1980s (*Chain Store Age Supermarkets*, June 1982). Perhaps the earliest application of scanner data of this type is the ScanLab project. The ScanLab project was initiated in 1981 as a joint effort between the General Foods Corporation and Dick's Supermarkets of Platteville, Wisconsin. The ScanLab system is designed to deliver information in the

form of three reports: the Store Topline Report, the Primary Summary Report, and the Trend Report. These reports can be used in a large number of applications including analysis of product assortment, new item tracking, item movement, retail sales dollars, gross profit, return on inventory investment, and shelf allocation (*Chain Store Age Executive*, May 1985).

A March 1985 publication by the Food Marketing Institute (FMI) entitled *Retailer Applications of Scanning Data* provides additional insight into current applications of scanner data in retail grocery stores. The documentation of these applications was the result of interviews with approximately sixty progressive companies to determine the type of applications in which they were involved. In this survey, the current applications of scanner data were found to address problems in one of five general categories: (1) shelf management, (2) managing promotional inventories, (3) profit improvement, (4) evaluating merchandising alternatives, and (5) setting buying guidelines. Importantly, 90 percent of the executives interviewed desired continued development of scanner applications in their companies (*Competitive Edge*, November 1985).

The ScanLab study and the applications by the handful of pioneering firms are representative of the benefits from scanner data that are currently being realized. These cases do not, however, indicate the current degree of use of scanner data in achieving potential benefits in the industry as a whole. There is considerable untapped potential for profit in the grocery industry in the form of the intangible benefits of scanning. These benefits have been identified, and to a degree have been realized in the industry by a limited number of pioneering companies. The limited involvement in the search to realize the benefits of scanning by the industry as a whole is surprising in view of the considerable success of the companies experimenting with applications to date.

Management Information System (MIS) Model

Firms have tended to focus on the tangible benefits realized through the implementation of a scanning system. Attempts to use scanner data for decision making have been thwarted by inappropriate forms of scanner information delivered to managers and by the lack of training on the use of the data. This section concerns the development of a generic firm-wide management information systems (MIS) model based on scanner data. This model may serve as a guide with which retail firms could develop in-house information systems.

A MIS is defined as an organized method of providing each manager with the information s/he needs for a decision, at the proper time, and in a form which aids understanding and stimulates action. The justification for developing a MIS is to identify sources, flows, and forms of information so that management personnel can improve decision making.

The answers to several questions may substantially affect the design of the MIS model:

(1) How, when, and by whom are firm objectives set?

(2) In what form is information communicated?

(3) What information flows exist in the firm?

(4) What are the key performance areas and indicators for each managerial position in the firm?

(5) What problems in communication exist?

Importantly, the MIS model rests on a number of explicit assumptions:

(1) Decision making requires relevant, reliable, timely, and concise information;

(2) Most managers have more information than they know how to use;

(3) Information required at various levels within the organization can be determined from management personnel;

(4) MIS reports are *one* of several sources that a manager uses to make decisions;

(5) A MIS has three major functions: data collection, data processing, and information delivery;

(6) Developing a MIS is primarily a matter of consolidation and presentation of available data in usable formats for the various levels of management;

(7) Retail food firms have enough common characteristics that a MIS model defining key performance areas and indicators can be used; and

(8) There exists an identifiable set of key performance areas and key performance indicators which can be classified into an operational MIS.

The majority of research on management information systems has been theoretically oriented. Consequently, it is extremely difficult to define what constitutes a reliable MIS in practice. Even more formidable is the task of identifying causal factors of a reliable MIS. However, several critical elements are noteworthy: (1) formally involve management; (2) formalize responsibilities (objectives); (3) prioritize information (identify key performance indicators); (4) formalize user involvement; (5) evaluate timeliness and accuracy of the information; (6) evaluate cost effectiveness; (7) evaluate the flexibility of the system to handle growth; and (8) conduct post-implementation evaluations.

There exists a variety of structural models of management information systems: (1) functionally oriented models; (2) pyramid-shaped models; (3) top-down models; and (4) bottom-up models (Moede). Information flows for functional areas of the organization characterize the functionally oriented approach. With regard to pyramid-shaped models, horizontal dimensions of the pyramid stress functional areas of the organization, while vertical dimensions of the pyramid emphasize various managerial levels. Advocates of the top-down approach suggest concentrating on resources that would be of immediate benefit to top management. Proponents of the bottom-up approach suggest improving existing information flows starting at the bottom of the organization and subsequently extending the system capability gradually upward into higher levels of the management hierarchy. The MIS model in this paper is a hybrid of the pyramid-shaped and bottom-up approaches. Additionally, the critical element of this model is the existence of a central data bank from which key reports are generated to various levels of management.

Importantly, most MIS models are based on the organizational structure of the firm. It is a two-way process in that the implementation of an information system not only affects the organization but also the organization affects the type of information system. To illustrate, a firm using decentralized management practices would need a different information system than one using highly centralized management practices.

To design an effective management information system, it is essential that managerial responsibilities be defined and stratified. Importantly, management must define what information is needed at present as well as in the future. Once done, analysis of the potential for scanner data in decision making as well as the design of the form, content, and timeliness for delivery of these data for each level of management of a retail food distribution firm may be determined.

The various levels of management include: (1) the chief executive officer (CEO); (2) the merchandiser; (3) the store manager; (4) the department manager; (5) the chief information officer (CIO) (in charge of information management); and (6) the scanning coordinator. The decisions of the various levels of management tend to go through a *funneling* process with the CEO responsible for general decisions and the subsequent levels of management responsible for specific decisions. The CIO holds a staff position at headquarters. The scanning coordinator is part of store-level personnel. Both provide support to the other levels of management.

In general, the informational system is designed to facilitate exception reporting, that is, to point out potential problem areas. Documents from the MIS are descriptive of the key performance indicators most often expressed at each level of management and in no way exhaust the total range of possibilities. The existence of certain key items that command a high degree of priority in information used to make management decisions is not new (Ross; Fleckinger; Dearden; Massy, Mintzberg). According to Symonds, "in any business situation, certain key elements or basic control points tend to dominate or essentially control the outcome of operations."

For each level of management, a description follows of particular reports from the MIS. For additional details, see the report by Capps, Thomas, and Long entitled, *Scanner Data in Managerial Decision-Making: A Case Study for Supermarkets.*

CEO

The responsibilities of the CEO are very general in scope and hence, information received should be general in nature. To assist the CEO, several scanner reports, separated according to category of responsibility (personnel; goals and strategies; or capital), are designed to be delivered on a monthly basis. The monthly time frame should provide the CEO with a general summary of firm operations without the burden of unwanted item specific

data. If an occasion arises when a CEO desires more specific data, special reports can be requested.

From Table 1, the Scanning Report and the Sales/Profitability Trend Report permit the evaluation of personnel such as merchandisers, zone managers or store managers. The Scanning Report provides the CEO with a measure of the operating discipline within the firm, zone, or store. Figures for the percent of items scanned and the price file accuracy are supplied for the firm, zone, or store, and for departments within these operating units. Separation of information into these categories facilitates the location of problems. Percentages for the number of items scanned and for the accuracy of the price file are given for the period just completed (PC) and for the previous period analyzed (PP). Also, the organization of the reports allows comparisons to be made from store to store and zone to zone.

The Sales/Profitability Report gives sales and profitability figures by department for individual stores and zones in the firm. Figures are provided for total sales and sales by department for each store and zone as well as for the entire firm. These sales figures are provided for the period just completed (PC), the previous period (PP), and for the same period in the previous year (PY). These three categories allow the CEO to compare the sales figures of a store or zone. These reports should be saved to form an historical file for charting sales over time.

For profitability analysis and capital management, the CEO can use the Sales/Profitability Trend Report as well as the Capital Management/Profitability Report (Table 2). These reports provide the CEO with a variety of sales and profitability figures as well as information on inventory turns, customer counts, and the average dollar sales per customer. In particular, the Capital Management/Profitability Report is designed primarily: (1) to give the CEO a general indication of the performance and profitability of individual stores, zones, and of the entire firm; and (2) to aid the CEO in developing operating budgets and evaluating the general product mix and pricing strategy for a store or zone.

Merchandiser

For the merchandiser, the Department Evaluation Report in Table 3 provides the merchandiser with basic data to evaluate the performance of personnel with merchandising duties in individual stores and zones. The report provides information on sales and profitability as well as the percent of items scanned and the degree of price accuracy for departments within stores and zones. Total sales, total department sales, and department sales as a percentage of total sales help determine if the department is achieving a "reasonable" sales volume. The figures for departmental gross margin, price accuracy and the percent of items scanned are indicative of operational effectiveness and discipline.

The Category Evaluation Report (Table 4) is the primary report to evaluate shelf sets, space allocation, and product mix. This report divides all the merchandise in a store into categories and supplies information on the performance of a category. For each category, information is provided on: (1) the number of items in the category; (2) the units moved; (3) unit movement as a percentage of department movement; (4) dollar sales; (5) category sales as a percentage of department sales; (6) gross margin; (7) gross profit dollars earned by the category; (8) category gross profit dollars as a percentage of department gross profit dollars; (9) the number of specialized items in the category; and (10) the dollar sales of specialized items as a percentage of category sales. From this report, categories are chosen, on the basis of performance, for reset or for consideration of price changes. The Category Evaluation Report also could be used to evaluate special displays or methods of packaging. To accomplish this task, the display or package type is set up as a category and tracked over weekly, instead of monthly, periods.

When a particular category is chosen, the Reset Report or the Pricing Report (Table 5) are generated. These reports contain more specific information to be used to reset shelves or to change item prices. For example, the Reset Report gives a description of each item in the category and lists the size, the number of units per case of the product, and the price. The report also provides weekly average figures (based on the previous period) as to: (1) unit movement; (2) unit movement as a percentage of category movement; (3) dollar sales; (4) dollar sales as a percentage of category sales; (5) gross margin; (6) gross profit dollars; and (7) gross profit dollars per item as a percentage of category gross profit dollars. Other reports used to evaluate product mix and to manage space allocation, once the category is selected, include the Slow Movement Report and the New Item Movement Report (Table 5). The Slow Movement Report lists items by category that have

Table 1

Personnel Evaluation Reports for the CEO

Scanning Report (Monthly)

	Total		Grocery		Produce		Meat		Deli	
	% Scan PC-PP	% Acc PC-PP	% Scan PC-PP	% Acc PC-PP	% Scan PC-PP	% Acc PC-PP	% Scan PC-PP	% Acc PC-PP	% Scan PC-PP	% Acc PC-PP
Firm										
Zone 1										
Store 1										
Store 2										
Zone 2										
Store 1										
Store 2										

Key Performance Indicators: (1) Percent of Items Scanned; (2) Price File Accuracy.

Sales/Profitability Trend Report (Monthly)

	Total		Grocery		Produce		Meat	
	Sales PC-PP-PY	GP PC-PP-PY	Sales PC-PP-PY	GP PC-PP-PY	Sales PC-PP-PY	GP PC-PP-PY	Sales PC-PP-PY	GP PC-PP-PY
Firm								
Zone 1								
Store 1								
Store 2								
Zone 2								
Store 1								
Store 2								

Key Performance Indicators: (1) Dollar sales; (2) Gross Profit Dollars

PC = Period Just Completed
PP = Previous Period
PY = Same Period the Previous Year
GP = Gross Profit Dollars

This format should inculde other areas of interest such as frozen foods, the bakery, or the deli.

Table 2

Capital Management/Profitability Report for the CEO

Capital Management/Profitability Report (Monthly)

	KPI-1 Sales			KPI-2				KPI-3			
		Meat	Prod	Groc	Gross Margin (%)				Gross Profit $			
	Total	% Total	% Total	% Total	Total	Meat	Prod	Groc	Total	Meat	Prod	Groc
Firm												
Zone 1												
Store 1												
Store 2												
Zone 2												
Store 1												
Store 2												

	KPI-4 Inventory Turns				KPI-5	KPI-6
	Total	Meat	Prod	Groc	Weekly Avg. Customer Count	Avg. $ Sales Per Customer
Firm						
Zone 1						
Store 1						
Store 2						
Zone 2						
Store 1						
Store 2						

* This format should include other areas of interest such as frozen foods, the bakery, or the deli.

Key Performance Indicators (KPI):

(1) Dollar Sales
(2) Gross Margins (Percentages)
(3) Gross Profit Dollars
(4) Inventory Turns
(5) Customer Counts
(6) Sales Per Customer

Table 3

Department Evaluation Report for the Merchandiser

Department Evaluation Report (Monthly)

Department: _____

	KPI-1 Total Sales	KPI-2 Dept. Sales	KPI-3 Dept. Sales % of Total	KPI-4 Dept. GM (%)	KPI-5 GP $	KPI-6 Inventory Turns	KPI-7 % Price ACC	KPI-8 % Scan
Firm								
Zone 1								
Store 1								
Store 2								
Zone 2								
Store 1								
Store 2								

Key Performance Indicators (KPI):

(1) Total Dollar Sales
(2) Department Dollar Sales
(3) Department Sales as a Percentage of Total Sales
(4) Department Gross Margin (Percent)
(5) Gross Profit Dollars
(6) Inventory Turns
(7) Price File Accuracy
(8) Percent of Items Scanned

Table 4

Category Evaluation Report for the Merchandiser

Category Evaluation Report (Monthly)

Store: _____ Dept: _____

Category	Item Description	# Items	KPI-1 Units Moved	KPI-2 % Dept	KPI-3 $ Sales	KPI-4 % Dept	KPI-5 GM (%)	KPI-6 GP ($)	KPI-7 % Dept	KPI-8 Special Items	KPI-9 Specials % of Total
aaa											
bbb											
ccc											

* This report is based on the ScanLab Store Topline Summary Report as printed in ScanLab: Scan for Merchandising Decisions, General Foods Corporation, 1984, p. 4.

Key Performance Indicators (KPI):

(1) Number of Units Moved
(2) Unit Movement as a Percentage of Department Movement
(3) Dollar Sales
(4) Category Sales as a Percentage of Department Sales
(5) Gross Margin (Percentage)
(6) Gross Profit Dollars Earned by the Category
(7) Category Gross Profit Dollars as a Percentage of Department Gross Profit Dollars
(8) Number of Specialized Items in the Category
(9) Dollar Sales of Specialized Items as a Percentage of Category Sales

Table 5

Sub-Category Reports for the Merchandiser to Evaluate Product Mix: Reset, Pricing, Slow Movement, and New Item Movement Reports

Reset Report (On Request)

Store: _____ Dept: _____ Category: _____

Item Description	Units Per Case	Price	KPI-1 Unit Movement	KPI-2 % CATM	KPI-3 $ Sales	KPI-4 % CATS	KPI-5 GM (%)	KPI-6 GP$	KPI-7 % CATGP

This report is based on the ScanLab Primary Report as printed in ScanLab: Scan Data for Merchandising Decision. General Foods Corporation, 1984, p. 5.

The Reset Report shows weekly average figures for the previous period.

Key Performance Indicators (KPI): (1) Unit Movement; (2) Unit Movement as a Percentage of Category Movement; (3) Dollar Sales; (4) Dollar Sales as a Percentage of Category Sales; (5) Gross Margin (Percentage); (6) Gross Profit Dollars; and (7) Gross Profit Dollars as a Percentage of Category Gross Profit Dollars.

Pricing Report (On Request)

Store: _____ Dept: _____ Category: _____

UPC	Item Description	KPI-1 Movement % Category	KPI-2 Price	KPI-3 GM (%)	KPI-4 GP$	KPI-5 GP % CAT

Key Performance Indicators (KPI): (1) Movement as a Percentage of Category Movement; (2) Price; (3) Gross Margin (Percentage); (4) Gross Profit Dollars; and (5) Gross Profit Dollars as a Percentage of Category Gross Profit Dollars.

Table 5 (Cont'd.)

Slow Movement Report (Monthly)

Store Firm or Zone: _____ Period: _____

Category	UPC	Item Description	KPI-1 Price	KPI-2 Movement

Shows items in each category within a department that move less than 6 units a month.

Key Performance Indicators (KPI): (1) Price; (2) Movement

New Item Movement Report (Monthly)

Store Zone or Total Firm: _____ Period: _____

Category	UPC	Item Description	KPI Movement (items or tonnage) Wk1	Wk2	Wk3	Wk4	Wk5

experienced movement of less than six items over a four-week period. The New Item Movement Report shows the weekly movement of new items over a series of consecutive weeks. These reports help to weed out slow moving items and to evaluate new items to determine if they should be continued.

Store Manager

Personnel management is a major responsibility of the store manager. Table 6 contains three reports produced from scanner data to assist the store manager in this area. The Department Evaluation Report and the Cashier Evaluation Report provide the store manager with information to evaluate personnel in the various departments of the store. The Department Evaluation Report gives weekly sales and profitability figures by department as well as figures indicating the operating discipline of the department (percent of items scanned and degree of price accuracy). The Cashier Evaluation Report provides weekly productivity figures (customers per hour, dollar sales per hour, and items checked per minute) as well as figures to determine operating discipline (scan percent) to be used in evaluating cashiers. The Department Evaluation Report and the Cashier Evaluation Report can be used for making wage and bonus decisions and for developing the store operating budget. The Labor Scheduling Report gives total sales, customer counts, and sales by department to aid in labor scheduling at the front-end and in various service departments such as the bakery or deli.

Inventory management is also an important part of the responsibilities of the store manager. Shelf replenishment is perhaps the primary responsibility concerning inventory management. To assist the store manager, the Movement Report (Table 7) is designed. This report enumerates characteristics of the distribution of movement of a particular product--average movement (mean), dispersion of movement (variance), minimum movement, and maximum movement. The Movement Report should be calculated on a regular basis. Further, this report should list only those items whose average movement fluctuates sharply, say in excess of two or three standard deviations from the mean.

Ordering for specials and holidays are special problems for the store manager. Thus, the Specials Report and the Holiday File exhibited in Table 7 are developed. The Specials Report provides price and movement information on items that previously had been specialized. This information could be used as an aid in ordering items the next time they are featured. The Holiday File would be used to track sales of specific items for several weeks prior to and after holidays. This information would be saved and used by the store manager as a guide to ordering for the holiday in future years.

Department Manager

Since the responsibilities of department managers are so similar to those of the store manager, similar reports would be useful to both levels of management. In fact, the Cashier Evaluation Report, the Labor Scheduling Report, and the Movement Report as well as the Specials Report and the Holiday file developed for the store manager should also be received by various department managers. However, the Department Evaluation Report developed initially for the store manager may be modified for department managers. The modified version is exhibited in Table 8. While the report for the store manager supplies information for departments, the report for department managers supplies information for categories within departments. Finally, for evaluation of displays or categories within a department, a Category Evaluation Report (Table 4) from the merchandiser could be requested.

Table 6

Personnel Evaluation Reports for the Store Manager

Department Evaluation Report (Weekly)

	KPI-1 $ Sales	KPI-2 Sales % of Total	KPI-3 Gross Margin %	KPI-4 Gross Profit $	KPI-5 Inventory Turns	KPI-6 % Items Scanned	KPI-7 % Price Accuracy
Grocery							
Produce							
Meat							
Fish							
Deli							
Bakery							
FF							
Dairy							
Total							

Cashier Evaluation Report (Weekly)

Cashier	KPI-1 Customer per Hour	KPI-2 $ Sales per Hour	KPI-3 Items per Minute	KPI-4 Scan %	KPI-5 Time in Subtotal	KPI-6 Hourly Wage

Labor Scheduling Report (Weekly)

Day	Time	KPI-1 Total Sales	KPI-2 Customer Count	KPI-3 Produce $ Sales	KPI-4 Deli $ Sales
	7:00a.m.-7:30				
	7:30a.m.-8:00				
	8:00a.m.-8:30				
	8:30a.m.-9:00				
	etc.				

The Labor Scheduling is delivered weekly but contains sales fitures and customer counts averaged over the pervious four weeks. The report gives figures for 30 minute intervals for each day.

Table 7

Inventory Management Report for the Store Manager

Movement (Monthly)

Dept.	Item	KPI-1 Average Movement	KPI-2 Variance of Movement	KPI-3 Minimum Movement	KPI-4 Maximum Movement

Special Report (Monthly: Save in File)

Department: _____

UPC	Decription	Units Per Case	KPI-1 Week of: Price	KPI-2 Movement	KPI-1 Week of: Price	KPI-2 Movement

Holiday File (By Request)

Department: _____

		Weeks of:		
		Units Per	KPI-1	KPI-2
UPC	Decription	Case	Price	Item Movement

The Holiday File should be kept by department and should include items requested by the store manager of merchandiser. The report is generated for a number of weeks prior to and after a holiday. The reports are keep on file to aid with the next year's ordering.

Table 8

Evaluation Report for the Department Manager

Category Evaluation Report (Weekly)

Store: _____ Dept: _____

Category	KPI-1 $ Sales	KPI-2 Sales % of Dept.	KPI-3 GM %	KPI-4 GP $	KPI-5 GP $ % of Dept.	KPI-6 Items Scanned	KPI-7 % Price Accuracy	KPI-8 Inventory Turns
aaa								
bbb								
ccc								

Key Performance Indicators (KPI):

(1) Dollar Sales
(2) Sales as a Percentage of Department
(3) Gross Margins (Percentages)
(4) Gross Profit Dollar
(5) Gross Profit Dollars as a Percentage of Department
(6) Percentage of Items Scanned
(7) Price Accuracy (Percentage)
(8) Inventory Turns

Table 9

Report for the CIO

Category Price Range Check of Master Price File (Weekly)

Department: _____

Category	KPI-1 Price Range	KPI-2 Items Outside Price Range	KPI-3 Price

An exception report that checks for prices outside a given range for a category. Manual checks of the price file may also be necessary.

Table 10

Percent Scanned Report for the Scanning Coordinator

Store:	Date:
Department:	
	KPI
Category:	Scan %
aaa	
bbb	
ccc	

CIO

The CIO has little use for actual scanner data other than to aid in monitoring the operating discipline of the firm concerning scanning systems and in checking the master price file. The Scanning Report exhibited in Table 1 received by the CEO should also be received by the CIO. This report enumerates scan percentages and degree of price accuracy by department. Consequently, this report provides the CIO with a means to monitor the operating discipline in the firm.

The only other report for the CIO is the Category Price Range Check of Master Price File (Table 9). This weekly report divides the master price file into categories. For each category, a price range is set to include all item prices in that category. The report is designed to list all items in a category that are outside a specified price range. Although this report cannot verify individual item prices, it is a way to quickly check the price file for errors. Items with inaccurate prices that fall inside the price range will have to be found and corrected by manually auditing the price file.

Scanning Coordinator

As with the CIO, actual scanner data are of little use to the scanning coordinator. However, scanner-derived information to monitor operating discipline would be useful to the scanning coordinator.

To monitor store discipline concerning the operation of the scanning system, the scanning coordinator should receive, with some changes, the same reports as the CIO. The scanning coordinator should receive weekly, rather than monthly, the Scanning Report exhibited in Table 1. If a problem with the scan percent in a department arises, the scanning coordinator can request a Percent Scanned Report shown in Table 10. This table simply shows the scan percent for each category in a department to help pinpoint problems.

The scanning coordinator also should receive a weekly report similar to the Category Price Range Check of Master Price File Report in Table 9. The report for the scanning coordinator should be set up similarly, but should only include items and categories from the price file of his/her particular store, which may differ from the master price file of the firm. Item prices should be checked against a price range for a category to help find pricing errors. While this report cannot take the place of manual price audits of the store price file and shelf price tags, it should help the scanning coordinator catch some pricing errors.

Operational Considerations

To establish an effective MIS, the retail firm must initially have a vision of where it is going in terms of marketing, operations, and distribution. Integrating an information-system plan into a total business plan can be difficult in the supermarket industry due to varying planning requirements of different parts of the business. Merchandising and operations, the lifeblood of the retail business, have relatively short planning horizons. Human resource, store development, and finance functions of the retail firm have longer-term planning requirements than operations and merchandising.

The differences in planning horizons must be recognized by management before beginning

the process of developing a MIS. The MIS model in this study centers attention primarily on the key performance areas of operations and merchandising. To implement this MIS, it is necessary to identify key performance indicators (e.g. movement, dollar sales, gross margins, gross profit dollars). In essence, then, management must prioritize information-system target areas. To accomplish this task, several factors (not necessarily inclusive) warrant consideration: (1) resources available; (2) look at what the competition is doing; (3) cost/benefit evaluations, and (4) risk assessment. Secondly, this information-system will need to be managed, presumably, by the chief information officer and scanning coordinator(s). Third, training personnel in the use of the information system is essential. Finally, management must realize that the development and implementation of the MIS is not a one-time event but an ongoing process.

Management of scanner data has traditionally been considered a mainframe application regulated by highly specialized technicians. However, supermarket firms may use personal computers to manage scanner data (6), particularly to evaluate product performance (gross profit dollars, retail dollars, unit movement) and sales trends as well as to track certain items. No direct link between personal computers and the mainframe is necessary. Although not the most efficient approach, data can be entered from a point-of-sale printout into any popular microcomputer spreadsheet program (e.g., LOTUS, SUPERCALC). Consequently, managing scanner data and hence information flows may be less difficult than before because of personal computers.

In agreement with Lodish and Reibstein, marketing decision support software must be able to leverage all the latest data, models, and statistical analysis procedures. The software must have the capacity for database management, analysis, graphics, flexible report generation, and modeling--all in a user-friendly environment. The database should be organized in ways that can be easily altered when situations or services change. For example, without doing massive reprogramming, a firm must be able to incorporate new products or changes in sales districts into the database. In addition, information about shelf space, and end-of-aisle displays, use of advertising, and use of coupons also should be retained so that impacts on sales, item movement, and net contribution can be made.

The software should have the capacity to allow many users to access the same integrated database. The system needs a wide variety of output capabilities, ranging from simple tables to presentation--quality graphics and reports. To be able to divide and aggregate the data simultaneously into such categories as product, region, salesperson, and time period is of paramount importance.

Either the chief information officer and scanning coordinators (internal support) or part-time or full-time consultants (external support) must understand enough about data analysis, statistical analysis, and modeling to make sure that the appropriate checks have been made and the appropriate questions have been asked when recommendations based on computer analyses are made. These people should report directly to top and middle management as part of staff groups.

Costs and benefits are the key components in the decision to continue, alter, or discontinue the MIS. Consequently, audits of benefits (hard and soft) received from the MIS are necessary. With regard to costs, according to an FMI information system study from 1985 (*Supermarket News*, January 1987), supermarket firms spend an average of 0.26 percent of dollar sales on information systems. The top 20 percent allocate 0.48 percent, however. This set of figures does not include automation equipment and maintenance costs. By comparison, wholesale firms spend 0.43 percent of sales on information systems; the top 20 percent allocate 0.68 percent. To quote Ross, "the value of any information system must ultimately be measured by the quality of management decisions. Anything less is inconclusive, anything more is unnecessary."

Possibilities for the Future

Several possibilities are evident for the future. These areas include: (1) the documentation of costs and benefits resulting from the implementation of the MIS; (2) the development of a training program for managers on the use of the reports in the MIS; (3) the potential benefits of connecting front-end (point-of-sale) scanning systems with direct store delivery systems to achieve a comprehensive inventory management system; (4) the general use of scanner data for consumer demand analysis; (5) the specific use of scanner data for the estimation of short-run own-price and cross-price elasticities for various commodities; and (6) the use of scanner data to achieve the

optimum use of limited resources of a firm through analysis of linear programming models.

The logical next step in the development of a MIS would be implementation into a retail environment. Initially, however, it is of merit to conduct research in regard to the documentation of costs and benefits from the implementation of a MIS. Such a feasibility analysis would be useful to managers considering a shift to an information system for management.

Another area of potential fruitful research might deal with the development of an effective, efficient training program. The training program should use specific examples and case studies. Additionally, this program might concentrate on optimizing use of scanner-derived information by managers.

Further, additional work on the design of management decision-making information distribution systems is desirable. One particular aspect might involve the most efficient way to incorporate the scanner management information system into the total information distribution system of the firm. A specific study might concern the integration of a scanner point-of-sale information system with a direct store delivery (DSD) system to form a single information system. Such a system would allow managers to track merchandise movement from the back door to the front end. This system would aid the manager in determining shrink and would help set up parameters for automatic reordering.

Scanner data have tremendous potential for use in the analysis of consumer demand for specific products or commodity classes. Scanner data possess obvious advantages over aggregate annual, quarterly, or monthly time-series data of prices and consumer purchases, traditional sources of data for empirical analyses. The time-series data are too general for product specific decision making and may not reflect current market conditions. For more detailed data for specific products, researchers typically rely on consumer panels and consumer surveys. However, such traditional cross-sectional data are expensive in terms of collection, and generally the collection of such data occur only periodically. Scanner data, on the other hand, provide researchers with a readily available, relatively inexpensive source of product-specific information of actual customer purchases at given prices. Thus, scanner data may prove to be the most detailed and definitive source of retail food industry statistics available to researchers. This detailed and timely source of information should lead to more reliable demand analysis for disaggregate food and non-food commodities.

The use of item-specific movement data permits the estimation of short-run own-price and cross-price elasticities of demand for various commodities. The estimation of demand elasticities for individual items has ramifications in pricing and ordering decisions. The knowledge of the respective elasticity measures could lead to more effective marketing strategies by aiding managers in predicting the effects of price changes for specific products. Additionally, scanning of uniform product codes provides feedback on optimal pricing of grocery items and other products.

The allocation of limited resources of a firm is a continual problem. For example, the allocation of limited shelf space to maximize profit is a constant concern of food retailers. Scanner data can provide item-specific information that could be used in analyses of linear programming models to determine the optimal allocation of shelf space. Optimization of product mix as well as advertising and pricing strategies could also be achieved through linear programming models.

Concluding Remarks

Scanners have been a profitable investment for supermarkets. However, there still exists great potential for additional bottom line dollars. These potentials lie largely in "soft" benefit areas, additional and more accurate information on which to base management decisions. This paper makes a case for firm management to develop and implement an informational system to better capture these benefits (dollars). Although the different aspects of the MIS are generic and probably not directly applicable to any specific firm, they do provide a structural framework which can be altered (deletions, additions, or other changes) to fit management informational needs of a particular firm.

Management in the retail food industry long has been considered an art that has been dominated by managers who make "seat of the pants" or "gut feeling" decisions. Because of these tendencies, structured and formal decision-making processes such as those represented by the application of scanner data have been shunned for the most part. Now, however, it is becoming necessary for food retailers to search for methods to improve their competitive position. Thus, retailers should begin to take serious actions towards achieving the intangible

benefits of scanning, not only because of the potential to attain a competitive edge, but also because the failure to do so could realistically result in the inability to remain competitive. Because scanning is a condition of doing business, management of information will likely be a decisive factor in determining which firms are best prepared to meet intense competition.

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