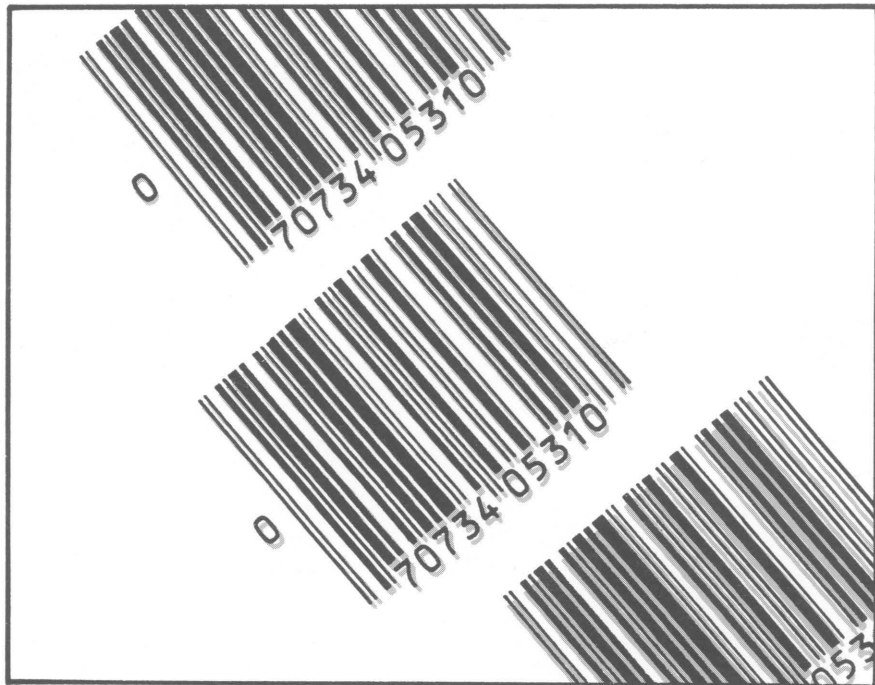


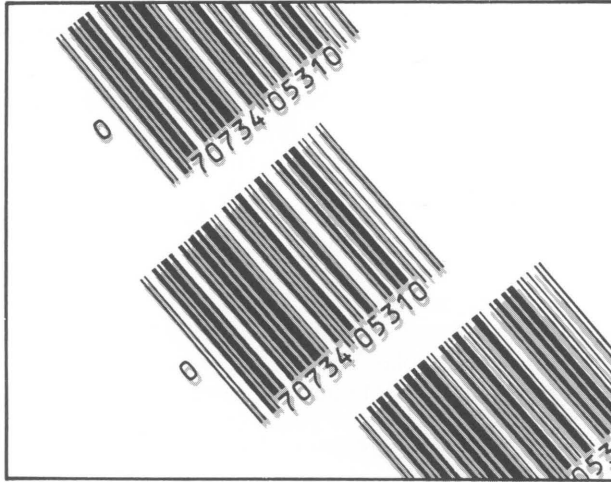
Scanner Data in Managerial Decision-Making:



A Case Study for Supermarkets

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A Case Study for Supermarkets by

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Executive Summary

Although the supermarket industry is in position to surge forward in the application of information technology, to date relatively few resources have been devoted to generating and/or organizing scanner data to be used in managerial decisions. This study addressed the lag in effective usage of scanner data in managerial decision-making. The purpose of this research was to clarify the informational needs of the various levels of management in supermarkets and to develop a management information system to deliver such information. The four specific objectives of this project were: 1) to identify the decision-making roles of the various levels of management in a firm (chief executive officer, merchandiser, store manager, department manager, chief information officer, and scanning coordinator); 2) to identify the present usage of scanner data in decision-making; 3) to identify specific scanner-derived information which could facilitate the decision-making process; and 4) to develop a generic firm-wide management information system that would provide each management level with the information it needs, coordinate total firm operations, but not burden a particular level with large volumes of unnecessary data.

The search for meaningful information has been the focus of a recent symposium and executive task force of food retailing leaders. Because of the 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. Changes in the managerial environment, the data, computers, human resources, and software dictate changes in managerial practices.

In creating a management information system, the aim is to identify key performance areas (e.g., profit, sales, gross margins) and indicators (e.g., sales per customer, shrinkage—theft, damaged goods, spoilage, and price inaccuracy—as a percentage of sales, gross margin in dollars) for various managerial positions. This identification allows for a management-by-objectives orientation.

To accomplish the objectives of this study, open-ended interviews were conducted with various levels of management within 17 cooperating retail grocery firms. The interviews placed emphasis on the current usages of scanner data and on how to facilitate the use of scanner data in managerial decision-making.

This research substantiated the hypothesis that little use had been made of scanner data for managerial decision-making in supermarkets. Also, barriers to the effective use of scanner data were documented. The specific informational needs of the various levels of management, as discovered through the discussions with managers of the cooperating firms, were used as the basis for the design of the management information system (MIS) model. The model in this study was a hybrid of the pyramid-shaped and bottom-up approaches. Additionally, the critical element of this model was the existence of a central data bank from which key reports were gen-

erated to various levels of management. 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.

Once the managerial responsibilities and the information needs for each level of management were defined, the form, timing, and content of various reports generated and distributed were discussed. In general, the information system was designed to facilitate exception reporting, that is, to point out potential problem areas.

To establish an effective MIS, the retail firm must initially have a vision of where it is going in terms of marketing, operations, and distributions. The MIS model in this study centered attention primarily on the key performance areas of operations and merchandising—the lifeblood of the retail business. To implement this MIS, management must prioritize information-system target areas (key performance indicators). Further, managing this information system, presumably by the chief information officer and scanning coordinator(s), is of paramount importance. Moreover, 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.

Marketing decision support system software must be able to leverage all the latest data, models, and statistical analysis procedures. The software must have the capacity for data base management, analysis, graphics, flexible report generation, and modeling, all in a user-friendly environment. The data base should be organized in ways that can be easily altered when situations or services change without doing massive reprogramming. Additionally, information about shelf space, end-of-aisle displays, use of advertising, and use of

coupons 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 data base. 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.

Management of scanner data has traditionally been considered a mainframe application regulated by highly

specialized technicians. However, supermarket firms may use personal computers to tame the scanner data monster, particularly to evaluate product performance and sales trends and to track certain items.

Cost 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 Food Marketing Institute (FMI), the top 20 percent of supermarket firms on average have allocated roughly 0.50 percent of dollar sales to information systems. To quote Ross (2), "the value of any information system must ultimately be measured by the quality of management decisions. Anything less is inconclusive, anything more unnecessary."

CHAPTER 1

Introduction

Background

Arguably, the development of Universal Product Bar Codes (UPCs), and concomitantly scanning checkout systems, may be the most important innovation in the retail food industry. With the introduction of scanning checkout systems, 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" (1). 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. Consequently, it is very likely that scanner data are under utilized from a managerial point of view.

Importantly, 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" (2). Data transform to information only when collected, analyzed, and presented in a form resulting in the communication of intelligence (3). 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 recent *Supermarket News* symposium of food retailing leaders from across the United States (4). 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, personal computers in the store number two, computerized labor scheduling number three, shelf space management systems number four, direct product profitability number five, UCS/computer-to-computer number six, electronic mail number seven, and last, warehouse automation. Because of the scanning technology, a great deal of data is available to food retailers, and translating data into information for management decisions is a major concern. Changes in the managerial environment—the data, computers, human resources and software—dictate changes in managerial practices.

Objectives

The purpose of this research was to clarify the informational needs, specific to scanner data, of the various

levels of management in retail grocery firms and to develop a generic management information system to deliver the necessary data. In this light, this study has four specific objectives:

1. To identify the decision-making roles of the various levels of management in a firm;
2. To identify the present usage of scanner-derived information;
3. To identify information which could improve decision-making (type of data, desired form of presentation, and desired timing); and
4. To develop 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" (5). 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 (5). 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.

Hypotheses

It appears that changes in scanning systems have been so rapid and varied that techniques for effectively incorporating the technology into managerial decision-making systems are lacking. Even after more than a decade, food retailers are still experiencing problems managing "the scan data monster" (6). This study addresses this lag in effective usage of scanner data in managerial decision-making. In this light, the following four hypotheses are put forward:

1. The implementation of applications of scanner data is difficult to achieve;
2. There has been relatively little use of scanner data by firms to capture the benefits available through applications designed to improve the decision-making process;
3. The industry lacks a management information system; and
4. The design of a management information system is feasible.

Literature Review

In the February 1986 issue, the grocery industry trade magazine, *Supermarket Business*, predicted that 1986 would be the year of the point-of-sale connection. That is, technological improvements would allow the scanning computer to be directly linked to the retail automation computer and that the resulting improvements in information management, both in store and at headquarters, would serve as a catalyst in resolving problems that have plagued the retail grocery industry (7). While such a prediction was quite optimistic, it was not one that is completely unattainable. Scanning, and the information it yields, already has led to broad changes in the retail food industry such as item non-pricing and evaluation of checker productivity.

Scanning has experienced considerable growth since its inception in July 1972 by the Kroger Company in Cincinnati, Ohio. Originally, growth was slowed by reluctance of managers to adopt scanning. Among the reasons for this reluctance was the expressed resistance by consumers and some consumer groups to item non-pricing. However, by 1985, more than 11,000 stores had adopted scanning and more than one-third of all supermarket purchases were checked by scanners (8). Table 1.1, reproduced from the September 1985 issue of *Progressive Grocer*, gives A.C. Nielsen estimates of past and projected future growth of scanning. The survey probably was taken in early 1985 and the figures for 1984 were preliminary estimates (Table 1.1).

Table 1.1. Growth of Scanner Installations

Year	Total Number Of Stores With Scanning	Percent Change Versus A Year Ago	Average Number Of New Scanning Stores Per Month	Scanning Sales As A Percent Of Total Sales
1979	1387	159	71	6
1980	2931	111	129	14
1981	4568	56	137	21
1982	6486	42	159	28
1983	8150	26	139	35
1984	9930	22	148	40
Future Projected Growth				
1985	11550	16	135	45
1986	12990	12	120	50
1987	14250	10	105	54
1988	15390	8	95	57

Source: A. C. Nielsen Estimates

From: *Progressive Grocer*, September 1985

The figures in Table 1.1 indicate the probable continued growth of scanning installations through 1988. If these predictions are accurate, and they seem consistent with current trends, by the end of 1988 there should be more than 15,000 stores with scanning capabilities which will handle approximately 60 percent of all supermarket sales. It should be noted that the growth of scanner installations is increasing at a decreasing rate and that scanning sales as a percent of total sales is monotonically increasing.

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 (9):

1. Increased checkstand 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 believe 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 (10, p.27; 11, pp. 9-10):

1. Improvements in shelf space allocation: Comparisons of sales, gross profit, direct product profit (DPP), etc. can be compared to facings or the amount of shelf space allocated and the location on the shelf;
2. Improved inventory shrink control: Shrinkage rates by item or category can be provided. Allows better monitoring of items on deal or allowance and in general allows for more price accuracy. If direct store delivery (DSD) is implemented, the combination of back door and front end information results in an extremely good inventory control system;
3. Improvements in labor scheduling: Accurate sales data indicate sales in certain departments and total sales as well as customer counts at a specific time of day or day of week. The result is improvements in departmental and front-end scheduling;
4. Improvements in DSD goods identification: A clear identification of all DSD merchandise sold at the store improves management control;
5. Improvements in new item evaluation: Obtain quick accurate assessment of new item performance;
6. Improvements in out-of-stock position: Improved product inventory control procedures should help reduce out-of-stocks;
7. Improvements in advertising and promotion results: Evaluate the impact of price specials and special displays immediately and more accurately;

8. Improvements in pricing decisions: Impacts of price changes are readily available;
9. Improvements in product mix selection: Product movement data, dollar sales, and margins help determine the optimum assortment of merchandise needed;
10. Improvements in profitability analysis: A department's contribution to the store's overhead or a store's contribution to a division's overhead can be readily calculated;
11. Improvements in customer relations: Descriptive receipt tape, increases in checkout accuracy, and increases in speed of checkout;
12. Improvements in store security: Ability to monitor checkers either on store terminals while processing transactions, or by statistical analysis of refunds granted, coupons accepted, overruns, etc. Item purchases can be compared to item sales to determine whether there is a noteworthy quantity of any item purchased but not sold. If there are large discrepancies, perhaps items brought into the store as inventory are not being sold but are disappearing through some form of theft or pilferage;
13. Design of fresh meat, poultry, seafood, and produce systems: Use of variable weight UPC symbols provides detailed data which allows control over sales, spoilage, and margins; and
14. Other uses: Monitor bad check information, automatic reordering, perpetual inventory, calculation of store gross profits by department and commodity class. Once item purchase (through direct store delivery) and sales data are available, perpetual inventories of items carried at the store level can be maintained. Automatic reorders are based on preparing orders from item sales movement.

In general, these applications are placed into one of the following three categories based on the nature of the application (12):

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 the 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.

Monitoring of item movement is an example of a tracking application. An analysis application differs from a tracking application in that it attempts to answer specific merchandising questions rather than simply showing the results of certain actions. For example, various display forms may have been used in different stores to determine the most beneficial method of introducing a

new product. An analysis application would not necessarily reflect a cause and effect relationship since other factors besides the display type would not be taken into account.

An experimentation application, then, would involve the removal of other influential factors so that the results of the various displays and price levels on sales and profits could be analyzed. It might be necessary for the experiment to be conducted in a number of similar stores in areas with similar socio-economic groups. Also, factors such as weather and competitors' actions must be taken into account.

The use of scanning data as a management and merchandising tool did not begin until the late 1970s or early 1980s (13). Even now only a few pioneering firms have begun to realize some of the intangible benefits of scanning. The following is a list of some applications, especially soft benefit applications, in use in various supermarkets around the country:

1. Giant Food, Inc., Landover Maryland, used scanner information to track sales of different cuts of meat to determine methods which increased sales and profits and reduced waste (14);
2. Ralph's Grocery Co., Los Angeles, California, used scanners to determine the optimum price level for profit maximization of test items (14);
3. Wegman's Food Markets, Rochester, New York, scan and print scannable coupons which reduces the cost of handling coupons and helps prevent the misuse of coupons (15);
4. Gromer's Supermarket, Elgin, Illinois, developed CASS (Computer Assisted Supermarket System). The program allows for more precise shelf space allocation, and gives reports such as return on inventory investment. CASS will also give the aisle and shelf location of every item plus a numerical code of 1,2, or 3 which indicates whether the customer must reach up, straight ahead, or down to choose a product. Gromer's was also the first store to scan DSD products at the back door and was one of the first stores to install a Toledo Meat Management system (16);
5. Lucky Stores, Dublin, California, and Ralph's Supermarkets, are using the space allocation software Spaceman II. This software produces color schematics or planograms for straight, staggered, or sloped shelves and for pegboards and freezer coffins. The program indicates sales, gross profit, return on inventory investment, and direct product profit (Supermarkets Launch and direct product profit (17); and
6. Shaw's Supermarket, Massachusetts, has created its own scanner driven shelf replenishment system. Shaw's also has a shelf management system. The system sets an order point based on the inventory required to meet consumer demands and the amount of the product sold from order point to delivery. When the actual inventory gets to the order point, an order is automatically placed by the computer (18).

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 groceries. The report was prepared for FMI by Willard Bishop Consulting Economists, Ltd. 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.

Seventy-five percent of the companies surveyed used one or more of five types of product movement report, with no single type of report clearly preferred. The three most popular reports, each being used in about 25 percent of the companies surveyed, were: 1) a direct store delivery report showing movement and price of direct store delivery items; 2) an advertised item report showing movement and price history for items advertised or displayed; and 3) a zero movement report which lists the items with no activity. The other two reports, used respectively by 10 and 15 percent of companies surveyed, were a retail price exception report which listed the items scanning at a price different from established headquarters prices and a profit report which matched item movement with gross profit (19).

The survey also indicated several applications currently being developed in a number of the surveyed companies. Shelf allocation applications were clearly the most popular area of development with 30 percent of the surveyed companies working in this area (19). The emphasis on shelf allocation is readily visible in the number of computerized shelf management systems on the market such as COSMOS (Computer Optimization and Simulation Modeling for Operating Supermarkets), HOPE (Higher Operating Profits Through Efficiency), SLIM (Store Labor and Inventory Management), Accuspan, and Spaceman II. Basically, all these systems determine space allocation and product assortment based on historical item movement. Other applications under development which involve the use of scanning data, as indicated by the survey, include a direct product profit report (15 percent of companies surveyed), automatic reorder systems (10 percent of companies surveyed), coupon scanning (10 percent of companies surveyed), and merchandise exception (10 percent of companies surveyed). The survey also indicated that 90 percent of the executives interviewed desired continued development of scanner applications in their companies (19).

It is evident from the preceding examples that supermarkets are capable of using scanner information as a managerial tool. If, however, a supermarket desires outside help to achieve some of the benefits available through scanner data, there are several market research firms with expertise in this area. TRIM Inc. and Behaviorscan are two notable examples. For example, the Los Angeles based TRIM Inc. was hired by a midwest retailer to determine the comparative advertising effectiveness of four competing newspapers (20).

The previous examples of practical usages of scanner data by various supermarkets and market research companies represent isolated cases of attempts to capture the benefits of scanning. The most comprehensive and up-to-date published report relative to applications of scanner data found in the literature 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 purpose of the project was to aid the retailer in achieving a more effective use of scanner data.

The ScanLab system was 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 using ScanLab alone or in conjunction with a packaged shelf management system (21). These reports were designed to be a comprehensive and functional managerial and merchandising tool. The reports can handle multiple departments, categories, and sub-categories and can be generated on command or on a regular basis.

The Store Topline Report (see Table 1.2) was designed to give management a tool to monitor department performance. The report gives performance by category or commodity class within a department. Also reported were the number of items tracked within each commodity class, the movement in absolute terms and as a percentage of department totals, sales volume in dollars and as a percentage of department totals, and gross profit in dollars and as a percentage of the department totals. In addition, the report also gave an estimated shelf inventory allocation, a figure on gross profit per cubic foot based on the estimated allocation, and the return on inventory invested (22).

The Primary Summary Report (see Table 1.3) was designed to be a tool for analysis of the performance of all items in each category. The report gives a description of the item and indicates factors that could influence the sale or gross profit such as allowances, direct store delivery items, and the occurrence of merchandising activities. Also, the report gives several measures of weekly performance such as unit movement, retail sales dollars, gross profit dollars, gross profit per cubic foot, estimated shelf inventory, and the return on inventory invested. This report could be used for shelf allocation, new item tracking, and seasonal and holiday product analysis (22).

The Trend Report (see Table 1.4) was designed to test new merchandising concepts or strategies. The report is able to evaluate item movement for a period of 13 weeks. Therefore, the effects of a merchandising change on profits or sales can be tracked to determine the profitability of the change. The report is provided on command, but can be set up for generation on a regular basis. In addition, the report gives retail price, retail sales dollars, gross profit dollars, gross profit dollars per cubic foot, estimated shelf inventory, return on inventory investment, unit movement, and purchase incidence on a by

Table 1.2. Store Topline Summary

SCANLAB™ PRIMARY SUMMARY REPORT												
STORE(S): DICK'S SUPERMARKET										DATE(S): 12/19/83 - 01/29/84		
04 BOSCOBEL										FISCAL WEEK(S): 30 - 35		
DEPT: 26 FROZEN										----- AVERAGE WEEK DATA -----		
CLASS	CLASS DESCRIPTION	TOTAL ITEMS	MOVEMENT	% TO DEPT	RETAIL SALES \$	% TO DEPT	GROSS PROFIT \$	% TO DEPT	GROSS PRFT \$ CU FT	EST SHELF INVEN	ROI DOLLARS	ROI INDEX
700	FROZEN CONC JUICES	92	1,003	20.7	1,000.42	13.7	180.16	13.0	2.91	3,073	4.16	146
701	ICE CREAM	232	499	10.3	1,150.34	15.7	207.33	15.0	0.52	881	6.53	229
702	FROZEN TOPPINGS & CREAMER	25	257	5.3	212.52	2.9	30.44	2.2	0.79	614	3.75	132
704	FROZEN FRUITS	19	28	0.6	31.34	.4	7.27	.5	0.71	289	1.20	42
705	FROZEN NOVELTIES	105	96	2.0	112.16	1.5	22.20	1.6	0.29	824	1.15	40
706	FROZEN VEGETABLES	210	542	11.2	472.37	6.4	102.08	7.4	0.94	3,140	2.21	78
708	FROZEN POTATOES	63	302	6.2	468.00	6.4	100.77	7.3	1.34	1,075	4.73	166
710	FROZEN POT PIES	21	180	3.7	103.50	1.4	27.87	2.0	1.87	561	5.94	208
711	FROZEN PIZZAS & SNACKS	142	621	12.8	1,594.25	21.8	261.21	18.9	2.25	1,625	4.49	158
712	FROZEN DINNERS	126	318	6.6	409.75	5.6	81.82	5.9	1.29	1,514	2.11	74
717	FROZEN MISC BAKERY	28	24	0.5	42.03	.6	5.72	.4	0.18	279	1.05	37
718	FROZEN BREAD DOUGH	80	192	4.0	211.57	2.9	54.86	4.0	0.79	1,027	3.39	119
719	FROZEN CAKES	72	21	0.4	43.96	.6	10.90	.8	0.26	526	0.64	22
720	FROZEN PIES AND CRUSTS	70	57	1.2	73.98	1.0	17.78	1.3	0.44	526	1.35	47
721	FROZEN SWEET ROLLS & DANİ	24	2	0.0	4.28	.1	1.12	.1	0.11	153	0.32	11
722	FROZEN SEAFOOD	122	111	2.3	276.13	3.8	61.76	4.5	1.03	1,276	1.37	48

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Source: ScanLab: Scan Data For Merchandising Decisions, General Foods Corporation, 1984, p. 4.

Table 1.3 Primary Summary Report

SCANLAB™ PRIMARY SUMMARY REPORT																
STORE(S): DICK'S SUPERMARKET 04 BOSCOBEL				DEPARTMENT: 01 GROCERY COMMODITY CLASS: 058 INSTANT POTATOES									DATE(S): 12/19/83 - 01/29/84 FISCAL WEEK(S): 30-35			
/ ----- AVERAGE WEEK ----- / / ----- / ITEM % OF CLASS ----- /																
* ITEM CODE	ITEM DESCRIPTION	PK	SIZE	TOTAL MOVEMENT	UNIT MOVEMENT	RETAIL SALES \$	GROSS PROFIT \$	GROSS PRFT \$ CU FT	EST SHELF INVEN	ROI DOLLARS	ROI INDEX	UNIT MOVEMENT	RETAIL SALES \$	GROSS PROFIT \$	SHELF INVEN CU FT	
A 2520410	BC MASHED POTATO BUDS	12	5 OZ	15	3	1.50	.40	1.03	13	3.54	44	1.4	.7	.8	1.8	
A 2520270	BC MASHED POTATO BUDS	12	13.75	45	8	9.71	2.31	1.86	17	7.11	89	3.7	4.3	4.5	5.6	
A 2520390	BC MASHED POTATO BUDS	12	28 OZ	98	16	38.55	12.93	3.99	24	17.67	220	7.3	17.1	25.4	14.6	
2518740	BC AU GRATIN POTATOES	12	11 OZ	35	6	10.73	2.33	1.69	16	5.31	66	2.7	4.8	4.6	6.2	
2518860	BC SCALLOPED POTATOES	12	11 OZ	27	5	8.28	1.80	1.38	15	4.33	54	2.3	3.7	3.5	5.9	
A 2519990	BC HICKORY CHEESE POTA	12	5.5 O	19	3	2.52	.54	1.14	14	3.04	38	1.4	1.1	1.1	2.1	
A 2519360	BC AU GRATIN POTATOES	12	5.5 O	221	37	26.60	3.93	3.02	40	8.24	103	16.9	11.8	7.7	5.9	
A 2519240	BC CREAMED POTATOES	12	4.75	14	2	1.77	.31	.72	13	1.90	24	.9	.8	.6	1.9	
A 2519480	BC JULIENNE POTATOES	12	4.75	48	8	6.28	1.28	2.20	18	5.90	74	3.7	2.8	2.5	2.6	
A 2520150	BC SOUR CRM/CHIVE POTA	12	4.75	126	21	14.65	1.80	2.24	28	5.39	67	9.6	6.5	3.5	3.6	
A 2519120	BC SCALLOPED POTATOTES	12	5.5 O	186	31	21.93	2.96	2.56	35	7.02	88	14.2	9.7	5.8	5.2	
A 2518980	BC HASH BROWNS W/ONION	12	5.5 O	55	9	6.80	1.22	2.26	19	5.37	67	4.1	3.0	2.4	2.4	
	TOTAL			889	148	149.31	31.80	2.48	250	7.87	98	67.6	66.2	62.4	57.7	
A 2520030	PIL MJ MASHED POTATOES	12	16 OZ	92	15	23.00	8.99	4.82	23	21.48	268	6.8	10.2	17.6	8.4	
2519750	PIL MJ MASHED POTATOES	12	26.7	36	6	12.63	1.71	.77	16	3.05	38	2.7	5.6	3.4	10.0	
	TOTAL			128	21	35.63	10.70	2.62	39	10.94	136	9.6	15.8	21.0	18.4	
A 2514050	FR REAL CHEESE SCALLOP	12	5.61	23	4	3.18	.68	.98	15	3.63	45	1.8	1.4	1.3	3.2	
A 2513930	FR TANGY AU GRATIN POT	12	5.5 O	23	4	3.18	.59	.83	15	3.09	39	1.8	1.4	1.2	3.2	
A 2514290	FR SOUR CREAM & CHIVE	12	5.5 O	17	3	2.34	.45	.67	14	2.48	31	1.4	1.0	.9	3.0	
	TOTAL			63	11	8.69	1.72	.83	43	3.07	38	5.0	3.9	3.4	9.3	
9000000	GENERIC SCALLOPED POTAT	12	5.5 O	90	15	10.20	2.10	2.78	23	8.79	110	6.8	4.5	4.1	3.4	
9000000	GENERIC AU GRATIN POTA	12	5.5 O	116	19	13.15	2.71	3.16	26	10.04	125	8.7	5.8	5.3	3.9	
9000000	GENERIC POTATO FLAKES	6	32 OZ	25	4	8.48	1.95	1.21	9	7.31	91	1.8	3.8	3.8	7.3	
	TOTAL			231	39	31.83	6.76	2.09	58	8.71	109	17.8	14.1	13.3	14.5	
	COMMODITY CLASS TOTAL			1311	219	225.46	50.98	2.29	390	8.02	100	100.0	100.0	100.0	100.0	

*COLUMN INDICATES: D = DSD ITEM
M = MERCHANDISING ACTIVITY OCCURRED (AD OR REDUCED SHELF PRICE)
A = ALLOWANCE IN EFFECT FOR ALL OR PART OF PERIOD

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Source: ScanLab: Scan Data For Merchandising Decisions. General Foods Corporation, 1984. p. 5.

Table 1.4 Trend Report

SCANLAB™ TREND REPORT

STORE(S): DICK'S SUPERMARKET
05 LANCASTER

COMMODITY CLASS: 015 PEANUT BUTTER

DATE(S): 11/21/83 - 01/29/84
FISCAL WEEK(S): 26-35

WK-26 WK-27 WK-28 WK-29 WK-30 WK-31 WK-32 WK-33 WK-34 WK-35

ITEM CODE: 1364260	UPC CODE: 03700000410									
ITEM DESCRIPTION: JIF CRUNCHY PEANUT BUTTER	SIZE: 18 OZ									
* COLUMN FLAGS	A A A									
UNIT MOVEMENT	3	6	9	5	13	47	2	4	6	3
PURCHASE INCIDENCE										
RETAIL PRICE	1.53	1.53	1.53	1.53	1.53	1.38	1.53	1.53	1.53	1.53
RETAIL SALES DOLLARS	4.59	9.18	13.77	7.65	19.89	64.86	3.06	6.12	9.18	4.59
GROSS PROFIT DOLLARS	.36	.72	2.07	1.15	2.99	1.41-	.24	.48	.72	.36
GROSS PROFIT DOLLARS/CU. FT.	.72	1.24	3.18	2.12	3.93	.83-	.51	.88	1.24	.72
EST. SHELF INVENTORY	14	16	18	15	21	47	13	15	16	14
ROI DOLLARS	.95	1.66	4.60	3.07	5.70	1.11-	.68	1.18	1.66	.95

ITEM CODE: 1363880	UPC CODE: 03700000411									
ITEM DESCRIPTION: JIF CRUNCHY PEANUT BUTTER	SIZE: 28 OZ									
* COLUMN FLAGS	A A A									
UNIT MOVEMENT	3	6	4	5	3	2	7	5	5	4
PURCHASE INCIDENCE										
RETAIL PRICE	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2.34
RETAIL SALES DOLLARS	7.02	14.04	9.36	11.70	7.02	4.68	16.38	11.70	11.70	9.36
GROSS PROFIT DOLLARS	.57	1.14	.76	.95	.57	.38	1.33	.95	.95	.76
GROSS PROFIT DOLLARS/CU. FT.	.71	1.25	.88	1.10	.71	.51	1.37	1.10	1.10	.88
EST. SHELF INVENTORY	14	16	15	15	14	13	17	15	15	15
ROI DOLLARS	.98	1.72	1.23	1.53	.96	.71	1.89	1.53	1.53	1.23

ITEM CODE: 1363640	UPC CODE: 03700000412									
ITEM DESCRIPTION: JIF CREAMY PEANUT BUTTER	SIZE: 40 OZ									
* COLUMN FLAGS	A A A									
UNIT MOVEMENT	5	11	12	9	7	3	11	8	8	7
PURCHASE INCIDENCE										
RETAIL PRICE	3.29	3.29	3.29	3.29	3.29	3.29	3.29	3.29	3.29	3.29
RETAIL SALES DOLLARS	16.45	36.19	39.48	29.61	23.03	9.87	36.19	26.32	26.32	23.03
GROSS PROFIT DOLLARS	1.50	3.30	3.60	2.70	2.10	.90	3.30	2.40	2.40	2.10
GROSS PROFIT DOLLARS/CU. FT.	1.68	2.53	2.60	2.38	2.00	1.11	2.53	2.12	2.12	2.00
EST. SHELF INVENTORY	11	16	17	14	13	10	16	14	14	13
ROI DOLLARS	2.37	3.59	3.68	3.35	2.81	1.57	3.59	2.98	2.98	2.81

ITEM CODE: 1363760	UPC CODE: 03700000413									
ITEM DESCRIPTION: JIF CRUNCHY PEANUT BUTTER	SIZE: 40 OZ									
* COLUMN FLAGS	A A A									
UNIT MOVEMENT	3	4	3	7	1	2	4	1	3	5
PURCHASE INCIDENCE										
RETAIL PRICE	3.29	3.29	3.29	3.29	3.29	3.29	3.29	3.29	3.29	3.29
RETAIL SALES DOLLARS	9.87	13.16	9.87	23.03	3.29	6.58	13.16	3.29	9.87	16.45
GROSS PROFIT DOLLARS	.90	1.20	.90	2.10	.30	.60	1.20	.30	.90	1.50
GROSS PROFIT DOLLARS/CU. FT.	1.11	1.34	1.11	2.00	.46	.82	1.34	.46	1.11	1.68
EST. SHELF INVENTORY	10	11	10	13	8	9	11	8	10	11
ROI DOLLARS	1.57	1.90	1.57	2.81	.65	1.16	1.90	.65	1.57	2.37

Source: ScanLab: Scan Data For Merchandising Decisions. General Foods Corporation, 1984, p. 6.

week basis for a period up to 13 weeks. Also, the report can be customized to include only those measures desired (22).

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 usage 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 bene-

fits 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 and is an issue that will be addressed in this study.

The use of scanner data as a viable tool for business decisions is moving from the experimental stage and entering the applications stage. The problem has become one of determining what management would like to do

with scanner data and finding if it can be done with a reasonable return on investment (23). The financial limitations placed on companies by the previously high initial investment necessary for installation have been reduced through the decreasing costs of scanner systems. For example, one study, based on a \$75,000 investment for a five unit installation, showed that a weekly sales figure of \$57,000 would be sufficient to recover the cost of installation in less than four years (24). This figure was based only on returns from hard benefits and therefore any realization of soft benefits would reduce the period for recovery.

Despite the apparent benefits, it was estimated that less than 10 percent of firms with scanning systems are making use of the data for decision-making purposes (9). It can be deduced, then, that there are barriers in the industry hindering the progress of the realization of the many benefits. In the previously mentioned survey by Willard Bishop Consulting Economists, Ltd., 70 percent of the surveyed companies cited limited staff and financial resources as the major barrier to progress in the use of scanner data. Other barriers cited were the reluctance of managers and merchandisers to include the new information in their established decision-making process (35 percent of companies) and restrictions in internal company coordination (15 percent of companies) (19).

It was generally agreed that these three areas posed the major barriers to the development of scanner applications. Opinions differed, however, between firms and industry analysts as to the largest barrier. Firms tended to cite limited staff and financial resources as the major barriers. However, an industry analyst at the Food Marketing Institute indicated that the reluctance of management to adopt the scanner applications, not financial limitations, was the major barrier to industry realization of the potential benefits (21).

The survey of literature, and the results of the study to be discussed, demonstrate that a large proportion of the real potential benefits from scanning have yet to be realized. Utilizing 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.

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 deci-

sion-making processes such as those represented by the application of scanner data have been shunned. 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 toward 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.

To summarize, many potential tangible and intangible benefits of scanning have been recognized and documented. To date, however, scanning has been used largely as a productivity tool, as seen by its use to reduce labor hours for pricing as well as for making price changes. The industry is just beginning to get beyond the experimental stage of attempting to develop uses of scanner data as a management information tool. As hypothesized, the literature does not indicate any concentrated effort to determine the responsibilities of the various levels of management or any effort to design scanning reports tailored to the specific needs of different managers. The prime objectives of this research, then, are to outline the responsibilities of the various levels of management in the retail grocery industry, from the chief executive officer to the departmental managers, and to develop a management information system that will deliver concise and timely information to management to allow them more informed decision-making.

Scope

The information used in this research was collected through in-depth interviews with managers of cooperating firms of the Virginia Food Dealers Association (VFDA) and Mid-Atlantic Food Dealers Association (MAFDA) as well as selected firms in Indiana and Kentucky. Interviews with various levels of management of each cooperating firm provided information on the present data-generating capabilities of the firms, as well as information on the present usages of scanner-derived data for managerial decision-making.

The remaining chapters focus on the interviews with the cooperating firms and the development of a management information system for scanner data. Chapter 2 covers the methodology of the collection of information for the project. Chapter 3 describes management responsibilities based on the interview sessions, the literature search, and other sources. Chapter 4 gives the results of the interview sessions, listing the commonalities and differences by management level for the various firms. Chapter 5 presents the design of a management information system based on scanner data for supermarkets. Finally, Chapter 6 summarizes the conclusions and implications of the study.

CHAPTER 2

Methodology

Introduction

This chapter describes the methodology used in this research and explains the rationale behind the methods used. An explanation of the constraints on the research is given as well as a discussion of advantages and limitations of the methods used.

Methodology

The information used for meeting the objectives for this research was collected through discussions with various levels of management within cooperating firms in the grocery industry. The principal aims were to determine the status quo of usages of scanner data in the industry and to develop a generic information management system with scanner data. The personal interviews conducted for this project included managers at various levels in each firm and placed emphasis on how use of scanner data could improve the performance of these managers. For this project, the managers were, when possible, interviewed individually rather than in groups to allow for individual responses and to reveal possible differences of opinion or different conceptualizations of questions among the various levels of management within a firm.

The discussions with managers of the various firms were designed so that information was secured pertaining to: 1) the general characteristics of the store, 2) the parameters of authority for decision-making, 3) present data-gathering capabilities, 4) present usages of scanner data for managerial decision-making by the various levels of management, 5) types of scanner data needs of each level of management, and 6) possible methods of securing these needs. The questions presented to the managers were intentionally open-ended. The purpose of open-ended questions was to provoke thought on a particular subject without soliciting a particular response. However, if the interviewee could not respond to the question, or seemed confused as to the gist of the question, it was rephrased for clarification and generally included examples of appropriate responses from previous interviews. When the interviewee responded to a question, the open-ended format permitted further inquiries to clarify the response.

In addition to determining the usages of scanner data, technical information was collected, including the type of scanner systems used, the type of computer programming language used, and types of computer applications

currently used. Each firm also was asked to list and evaluate any software used, to list any reports they generated (or received from a host), and to provide other assorted information. An outline of the questions and technical information covered in the discussions is included in Appendix A. The technical information section of Appendix A was developed by the National Grocers Association. Other questions were asked during the interview sessions, depending on the particular situation, but the questions in Appendix A were common to all interview sessions.

The discussions with various levels of management were conducted with cooperating members of the Virginia Food Dealers Association (VFDA), the Mid-Atlantic Food Dealers Association (MAFDA), and with selected firms in Indiana and Kentucky. The list of firms interviewed did not constitute a random sample. Potential firms were considered from lists provided by MAFDA and VFDA which included names of all firms in their respective memberships which currently used scanner systems. A sample of 19 firms was chosen from these lists to include wholesalers as well as various retail firms (independents and chains). Finally, the firms were contacted to determine their willingness to cooperate in the discussions. Participation was excellent among independents and smaller chains. However, the larger chains showed much less desire to participate. Consequently, only one large chain was included in the sample. Discussions were ultimately conducted with a total of 17 firms located in Virginia, Maryland, Pennsylvania, Indiana, and Kentucky. The sample of stores chosen for discussions was geographically limited because of cost considerations and time constraints. The list of the 17 cooperating firms is in Appendix B.

There was no statistical rationale behind the number of firms included in the sample. The rationale for selecting the firms was to include an appropriate mix to make the sample as representative as possible of the grocery industry. The sizes of the respective organizations ranged from a single store independent to a multidivisional chain. Operating philosophies of the companies, pertaining to the decision-making freedom of the various levels of management, ranged from almost complete control by headquarters to nearly complete autonomy for lower and middle management.

CHAPTER 3

Outline of Management Responsibilities

Introduction

An understanding of the responsibilities for each level of management is needed to develop a management information system based on scanner data. Since the literature revealed little information on such responsibilities, the first step toward developing the firm-wide management information system was to study and define the responsibilities for each level of management. This chapter presents a comprehensive outline of management responsibilities. The respective responsibilities constitute essentially key performance areas for the various levels of management.

Generic Organizational Structure of a Retail Grocery Firm

A major obstacle in the formulation of the outline of responsibilities lies in the non-unique organizational structures of firms. Because of differences in organizational structure, variations exist in the responsibilities of similar levels of management from firm to firm. Consequently, a simple, generic, organizational hierarchy of a retail grocery chain or store (as shown in Figure 3.1) was used as the basis for the outline.

Figure 3.1 Organizational Hierarchy of a Retail Grocery Firm (Chain or Store)

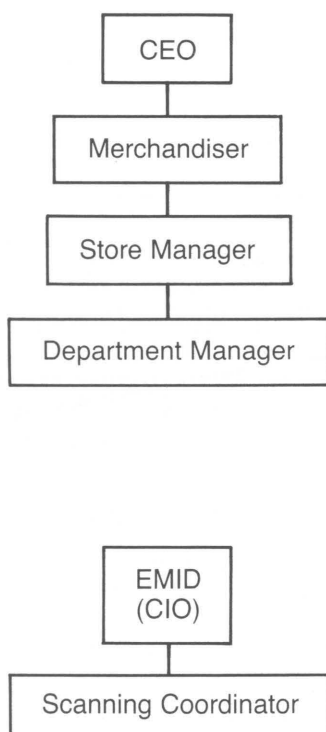


Figure 3.1 identifies the management levels of a firm as discussed in this research. The CEO level includes all upper management such as the president and vice-president(s). The merchandiser level includes the buyers and other positions responsible for merchandising activities such as space allocation and advertisement. The store manager level includes the store manager and assistant store managers. The departmental manager level includes only the managers of the departments within a store. The electronic management information director (EMID), or alternatively chief information officer (CIO) and the scanning coordinator include those positions in charge of computerized systems. The EMID or CIO is in charge of information management.

The EMID (CIO) and scanning coordinator basically provide support to the other levels of management and therefore are classified as staff personnel in the organizational chart shown in Figure 3.1. The EMID (CIO) holds a staff position at headquarters, while the scanning coordinator is part of store-level personnel and may be considered to have status equal to department managers or assistant store managers. The reason for using this generic organizational hierarchy was to separately describe the major responsibilities of the various levels of management. In this light, the responsibilities of a manager in a specific firm can be drawn from these general cases.

Although their responsibilities differ, the various levels of management are all working toward a common goal for the firm. Thus, decisions made by upper management tend to permeate the hierarchy affecting decisions at all other levels. 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. For example, the CEO might decide to operate on a low margin/high volume basis. Because of this decision by the CEO, the merchandiser would have to develop a pricing strategy to achieve an overall desired gross margin and would also be responsible for advertising strategies to achieve high customer counts at a low cost. Operating on a low margin/high volume basis would affect the number of labor hours needed to operate a store. Thus, the store manager would have to develop the store operating budget to ensure that each department would be provided with sufficient labor. Finally, the department managers would have to schedule the labor in their departments to adequately serve the customer and to stay within their operating budget.

The matrix of management responsibilities in Table 3.1 demonstrates this "funneling" process in managerial decision-making from general decisions made by the CEO to more specific decisions by store and departmental managers. The rows of the matrix concern general responsibilities divided into four categories: 1) Facilities

Table 3.1a General Management Responsibilities

Responsibility	Management Level											
	CEO		MER		STM		DPM		CIO		SCC	
	LR	LI	LR	LI	LR	LI	LR	LI	LR	LI	LR	LI
Facilities												
Real Estate	H	H	L	M	L	L	L	L	L	L	L	L
Buildings												
(1) merger	H	H	L	H	L	L	L	L	L	L	L	L
(2) new construction	H	H	L	M	L	L	L	L	L	L	L	L
(a) size	H	H	H	H	L	L	L	L	L	L	L	L
(b) design	H	M	H	H	L	L	L	L	L	L	L	L
(3) sale of existing sites	H	H	L	L	L	L	L	L	L	L	L	L
Equipment												
(1) purchase decision	H	L	H	H	L	L	L	L	L	L	L	L
(2) merchandising decision	H	L	H	H	L	L	L	L	L	L	L	L

Table 3.1b General Management Responsibilities

Responsibility	Management Level											
	CEO		MER		STM		DPM		CIO		SCC	
	LR	LI	LR	LI	LR	LI	LR	LI	LR	LI	LR	LI
Personnel												
Hiring Decisions	H	M	L	M	H	H	L	L	L	L	L	L
Wage/Salary	H	H	L	L	M	M	L	L	L	L	L	L
Incentives/Bonuses	H	H	L	L	H	H	L	L	L	L	L	L
Insurance & Retirement	H	H	L	L	L	L	L	L	L	L	L	L
Job descriptions	H	M	H	H	M	H	L	H	L	L	L	L
Supervision of Subordinates	H	M	H	H	H	H	H	H	H	L	L	L
Labor scheduling	L	L	L	L	H	H	H	H	L	L	L	L
Training	H	L	H	H	H	H	L	H	H	H	L	H
Employee evaluation	H	H	H	H	H	H	H	H	H	M	L	L

Table 3.1c General Management Responsibilities

Key: CEO = chief executive officer
 STM = store manager
 CIO = chief information office
 LR = level of responsibility

MER = merchandiser
 DPM = department manager
 SCC = scanning coordinator
 LI = Level of involvement

Level of responsibility or involvement: H = high
 M = medium
 L = low

Responsibility	Management Level											
	CEO		MER		STM		DPM		CIO		SCC	
	LR	LI	LR	LI	LR	LI	LR	LI	LR	LI	LR	LI
Capital												
Allocation												
(1) real estate	H	H	L	L	L	L	L	L	L	L	L	L
(2) building	H	H	L	L	L	L	L	L	L	L	L	L
(3) operating budgets	H	H	L	L	H	H	L	L	L	L	L	L
(4) equipment	H	L	L	H	H	M	L	M	L	H	L	L
(5) personnel	H	H	L	L	M	H	L	L	L	L	L	L
Inventory												
(1) product mix	H	H	H	H	M	M	M	M	L	L	L	L
(2) display	M	L	H	M	H	M	H	H	L	L	L	L
(3) processing & packaging	M	L	H	M	M	L	L	H	L	L	L	L
(4) ordering	L	L	H	H	H	H	H	H	L	L	L	L
(5) shrink	L	L	H	H	H	H	H	H	L	L	L	L
(6) price integrity	H	L	H	L	H	H	H	H	H	H	H	H

Table 3.1d General Management Responsibilities

Key: CEO = chief executive officer
 STM = store manager
 CIO = chief information office
 LR = level of responsibility

MER = merchandiser
 DPM = department manager
 SCC = scanning coordinator
 LI = Level of involvement

Level of responsibility or involvement: H = high
 M = medium
 L = low

Responsibility	Management Level											
	CEO		MER		STM		DPM		CIO		SCC	
	LR	LI	LR	LI	LR	LI	LR	LI	LR	LI	LR	LI
Goals & Strategies												
Merchandising												
(1) pricing	H	H	H	H	L	M	L	L	L	L	L	L
(2) advertising	H	L	H	H	L	L	L	L	L	L	L	L
Develop Image	H	L	L	H	L	H	L	H	L	L	L	L
Customer service	H	L	L	H	L	H	L	H	L	L	L	H
Sales objectives	H	L	M	H	L	H	L	H	L	L	L	L
Profitability												
(1) margins	H	L	M	H	L	H	L	H	L	L	L	H
(2) costs	H	H	H	H	H	H	H	H	M	M	L	L
(3) net profits	H	H	H	H	H	H	H	H	L	M	L	H
Support to other Managers	H	L	H	H	M	L	M	L	H	H	H	H

(land), 2) Personnel (labor), 3) Capital, and 4) Goals and Strategies. The columns concern the various levels of management. Each management level was then analyzed according to: 1) level of responsibility (LR) and 2) level of involvement (LI). LR indicates how much responsibility the manager has in the decision-making process for a specific area. LI indicates the amount of direct involvement by a manager in that specific management decision. For each general responsibility, by level of management, the LR as well as LI were denoted as high (H), medium (M), or low (L). These graduations indicate a relative level of responsibility or involvement. To illustrate, the level of responsibility of the merchandiser in regard to real estate decisions is low, but the level of involvement is medium. For the merchandiser, the level of responsibility in regard to customer service and image development is low, but the level of involvement is high. The responsibilities of the various levels of management are more specifically outlined in the remainder of this chapter.

Specific Responsibilities of the Levels of Management

The previous portion of this chapter defined the management levels to be discussed in this research and the rationale behind the selection of these levels. Also, the levels of responsibility and involvement were outlined for the various levels of management. However, the outline presented was very general in scope. Hence, the remainder of this chapter will specifically focus on the basic responsibilities of the chief executive officer, the merchandiser, the store manager, the departmental manager, the chief information officer, and the scanning coordinator.

Responsibilities of the Chief Executive Officer

The chief executive officer is responsible for setting the goals and objectives of the company. This responsibility basically involves the development of firm profitability goals, the management of capital allocation, the development of a firm image, and the design of firm operating strategies (Table 3.2).

Profitability goals, particularly return on investment, are perhaps the major endeavors of a business. Gross profitability is a function of gross margin times the number of inventory turns. This figure is adjusted for operating and fixed costs to achieve net profitability. Net profit is divided by total assets to give the return on investment (ROI) for the firm. If net profitability and ROI do not meet the goals of the firm, the CEO must develop strategies to bring them in line.

Another major responsibility of the CEO is the management of firm capital. The CEO is responsible for capital allocation to secure real estate and equipment for firm operation as well as decisions on the employment of personnel (especially upper and middle management) and for determining their salaries. The CEO must

Table 3.2 Responsibilities of the Chief Executive Officer

-
- (1) Profitability goals (for store, zone, and firm)
 - (a) desired gross margin
 - (b) gross profitability
 - (c) operating costs
 - (d) fixed costs
 - (e) net profit
 - (f) return on investment
 - (2) Capital allocation
 - (a) real estate
 - (b) buildings
 - (c) equipment
 - (d) personnel
 - (e) zone and store operating budgets
 - (3) Development of image
 - (a) margin/volume considerations
 - (b) advertising techniques
 - (c) level of customer service/cost considerations
 - (d) merchandise mix/quality considerations
 - (e) visual image of stores
 - (1) store design
 - (2) uniforms
 - (3) display styles
 - (4) Strategies
 - (a) pricing
 - (1) zone pricing
 - (2) store pricing
 - (a) blend method
 - (b) perimeter pricing
 - (b) sales objectives
 - (c) advertising
 - (1) chain
 - (2) zone
 - (3) store
-

also set zone and store operating budgets. These costs must be managed in such a way to allow the projection of firm image without compromising the profitability goal of the firm.

Another responsibility of the CEO is to determine what image the company needs to project. To project the desired image, the CEO must develop standards for employee appearance, the level of customer service (in line with acceptable costs), product quality and product mix, display methods, and advertising techniques.

Finally, it is the responsibility of the CEO to set certain operational strategies for the firm such as pricing methods, sales objectives, and advertising objectives. Pricing decisions are generally made on recommendations from staff members as to appropriate price levels for particular zones as well as techniques for pricing in stores (i.e., blend method or perimeter pricing). The decisions made on sales objectives and advertising strategies are largely tied to image and pricing strategy. Image and pricing strategy dictate the sales volume required by the operation and indicate an acceptable level of costs for a desired level of customer service.

Responsibilities of the Merchandiser

Once the CEO has determined general goals and objectives for the firm, it is the responsibility of the merchandiser to develop specific plans to achieve these goals. The merchandiser is highly involved with store layout, product mix, pricing decisions, advertising and promotion, methods of processing and packaging perishable products, inventory control (warehouse), and profitability (Table 3.3).

Store layout is a major responsibility of the merchandiser since it can directly affect the store sales volume. Store layout decisions include the location of departments within the store as well as the location of com-

modity groups and individual items within the department. Space allocation for departments and for items within departments are of prime importance. Other decisions for the merchandiser include the arrangement of selling fixtures and special displays. The purposes of specific store layouts are to control traffic flow past high margin products, to bring attention to items that may otherwise be overlooked, and to facilitate impulse purchasing.

Product mix is important for store image and customer satisfaction. For an effective product mix, the merchandiser must choose products by department or commodity class in a variety of brands, sizes, and qualities in order to meet the customer desires and project the firm image. For example, a store with a low-cost image and customers with low levels of disposable income may emphasize lower quality products and economy size packaged products. Also, the merchandiser must be continually concerned with the cancellation of products that are poor performers as well as concerned with the addition of new products. A good product mix and an effective store layout are necessary in order to take full advantage of the limited selling space of the store.

Pricing decisions by the merchandiser are generally made on the basis of a desired gross margin for the total store. Gross margins for departments, commodity classes, and individual items are set according to expected item movement and with allowances for expected shrink such that the desired gross margin for the store is achieved. Other pricing concerns include determining appropriate prices for advertised products. Proper pricing of advertised products is necessary so that the sale of specialized items does not substantially detract from the sale of other items or reduce the overall gross margin of the store.

The merchandiser has other considerations for advertising and promotions in addition to pricing. Considerations must be given to the theme of the advertisement or promotion as well as the timing and priority of the event. Advertisements and promotions are often planned to coincide with holidays or other special events and are generally given emphasis according to their potential to increase customer counts or total sales for the firm. For each advertisement or promotion, the merchandiser must choose the promotional technique (e.g., coupons or 2 for 1 sales), the type of media to use to best reach consumers, the items to promote (and their prices), and the appropriate point of sale technique to use. The purpose of advertisement and promotion is to promote store image and to increase customer counts as well as sales volume without sacrificing profits.

The decisions on methods of processing and packaging perishable items such as meat and produce are responsibilities of the merchandiser. Processing and packaging of such items can considerably increase costs. Thus, the merchandiser must determine what method of trimming and packaging meats (e.g., amount of fat trim) and produce (e.g., bulk or packaged) will be most profitable and in line with firm image.

Another major responsibility of the merchandiser is the amount of inventory kept on hand at the warehouse.

Table 3.3 Responsibilities of the Merchandiser

-
- (1) Store layout
 - (a) location of departments
 - (b) arrangement of selling fixtures
 - (c) display
 - (1) location of commodity groups
 - (2) location of individual items
 - (3) space allocation
 - (4) methods of display
 - (5) effects on traffic
 - (2) Product mix
 - (a) commodity groups
 - (1) brands
 - (2) sizes
 - (3) quality
 - (b) selection of new items
 - (c) cancellation of items
 - (3) Pricing decisions
 - (a) margins
 - (1) commodity groups
 - (2) individual items
 - (3) allowances for shrink
 - (b) markdowns
 - (4) Advertising and promotions
 - (a) theme
 - (b) media (type)
 - (c) point of sale
 - (d) premiums and promotional techniques
 - (e) special items
 - (f) timing and priority of sales
 - (5) Processing and packaging
 - (a) contribution to costs
 - (b) meat department
 - (1) trimming
 - (2) package appearance
 - (c) produce department
 - (1) trimming
 - (2) display
 - (a) bulk or packaged
 - (b) package size and appearance
 - (6) Inventory and costs of goods (at warehouse)
 - (a) ordering methods
 - (b) out-of-stocks
 - (c) turnover
 - (d) cost concerns
 - (7) Profitability
 - (a) price
 - (b) cost concerns
-

The merchandiser's goal in inventory control is to attempt to purchase products in quantities that reduce unit costs and ensure the reduction of out-of-stocks, while simultaneously preventing the build-up of excess stock.

Finally, the merchandiser is responsible for profitability goals. The merchandiser attempts to increase sales through store layout and advertising. The merchandiser sets the desired gross margin for items and then attempts to minimize costs in inventory control, in processing and packaging of perishable items, and in advertising and promotion.

Responsibilities of the Store Manager

The general responsibilities of the store manager include the maintenance of store standards set by the CEO as well as the implementation of specific directions of the merchandiser. Specifically, the store manager is responsible for store personnel management, general operations, merchandising, and profitability (Table 3.4).

The responsibilities of the store manager in personnel management include labor scheduling as well as the evaluation of store employees. Criteria for evaluation may include the evaluation of shrink, which indicates possible over-ordering by departmental managers or improper handling of perishable goods. The store manager also takes note of shelf and display appearance, store cleanliness (housekeeping), and the general appearance and attitudes of employees. Evaluation of cashiers includes scrutiny of appearance and manner as well as productivity, measured typically by the number of cus-

tomers handled per hour, the number of items scanned per minute, dollars checked per hour, the number of mistakes made, and the scanning percent of the cashier.

Moreover, the store manager is responsible for general store operations and in-store merchandising. General store operations include the management of housekeeping, stocking, customer service, and inventory. Inventory control includes establishing ordering criteria, the maintenance of inventory level to simultaneously decrease out-of-stocks and increase inventory turns by avoiding excess stock, and the supervision of vendors. The merchandising responsibilities of the store manager include carrying out the instructions of the merchandiser concerning shelf set, displays, and promotions. The store manager generally possesses some flexibility in merchandising decisions concerning local advertising (within guidelines), price markdowns to help move particular items, and in-store promotions.

Further, the store manager has responsibility for store profitability despite little control over price, merchandising techniques, or product mix. Nevertheless, the performance of the store manager affects profitability. For example, the store manager can control operating costs through efficient labor scheduling and inventory control.

Responsibilities of the Department Manager

In effect, the responsibilities of the department manager are similar to those of the store manager. The department manager is responsible for the general operations of his/her department (Table 3.5). These responsibilities include labor scheduling, the training of employees in operations such as stocking, display of items, procedures for customer service, and control of shrink through proper ordering (especially in perishables) and prevention of pilferage.

Table 3.4 Responsibilities of the Store Manager

-
- (1) Personnel management
 - (a) labor scheduling
 - (b) employee evaluation
 - (1) shrink
 - (2) stocking and displays
 - (3) housekeeping
 - (4) general employee appearance
 - (5) customer service
 - (a) cashiers
 - (i) customers per hour
 - (ii) dollars per hour
 - (iii) mistakes
 - (b) employees at other service stations
 - (2) General operations
 - (a) housekeeping
 - (b) stocking
 - (c) customer service
 - (d) inventory control
 - (1) ordering criteria
 - (2) out-of-stocks
 - (3) inventory level
 - (4) turnover
 - (5) vendor supervision
 - (3) Merchandising
 - (a) carrying out recommendations of merchandiser
 - (b) advertising locally using guidelines
 - (c) in store promotion
 - (d) limited pricing decisions (i.e. markdowns)
 - (4) Profitability
-

Table 3.5 Responsibilities of the Department Manager

-
- (1) Labor scheduling and training
 - (2) Inventory
 - (a) ordering
 - (b) stocking and display
 - (c) shrink
 - (i) deterioration
 - (ii) pilferage
 - (3) Merchandising
 - (a) location and display of items
 - (b) specials or suggestions for specials
 - (c) point of purchase promotion
 - (4) Customer relations and service
 - (5) Housekeeping
 - (6) Profitability
-

Although merchandising is largely controlled by the merchandiser and the store manager, the department manager has several important responsibilities in this area. These responsibilities include the location and appearance of the merchandise (particularly in the produce and meat departments), suggestions to the store manager for specials or promotions, and promotion within the department with the use of signs or special

displays. The department manager is responsible for housekeeping within his/her department and for proper customer service according to store guidelines. Further, the department manager has profitability responsibilities since performance in ordering can affect sales by preventing out-of-stocks. Also, in departments with perishable products, careful inventory control can prevent product loss and thus increase profits.

Responsibilities of the Chief Information Officer and Scanning Coordinator

The responsibilities of the chief information officer (CIO) and scanning coordinator are divided into two categories, those of the CIO at headquarters and those of the scanning coordinator at the store level. In general, the CIO is responsible for scanning and computer operations for the entire firm, while the store level subordinate is responsible for item price accuracy and the general upkeep of the price file of the store (Table 3.6).

The CIO is responsible for maintaining the master price file so that: 1) the file contains only authorized products, 2) all products in the file have the correct corresponding Universal Product Code, (UPC), and 3) all product prices in the file are accurate. The CIO also serves as a supervisor to the store level scanning coordinator and helps resolve problems with UPCs. Finally, the CIO is responsible for the collection and consolidation of scanner sales data into useful reports for dissemi-

Table 3.6 Responsibilities of the Chief Information Officer (CIO) and the Scanning Coordinator

-
- (1) CIO (headquarters staff)
 - (a) Upkeep of master price file
 - (1) all items approved by headquarters
 - (2) correct UPCs
 - (3) correct prices
 - (b) supervise store level scanning coordinators
 - (c) collect scanning sales data
 - (d) provide reports to headquarters staff and store managers.
 - (2) Store level scanning coordinator
 - (a) price integrity
 - (1) shelf tag price
 - (2) price marked items (if applicable)
 - (3) correct computer file prices
 - (b) price changes
 - (c) report UPC and file problems to headquarters
-

nation to appropriate headquarters and store-level management personnel.

The major responsibility of the store level scanning coordinator is overall maintenance of the store price file to ensure price integrity. This maintenance includes verifying that shelf tag prices, individually priced items, and the computerized price file are accurate. The scanning coordinator is responsible both for changing shelf price tags and the reporting of price and UPC problems to his/her supervisor, the CIO.

CHAPTER 4

Commentary on the Interview Sessions

Introduction

The purpose of this chapter is to present the findings of the interview sessions with the firms listed in Chapter 2. The findings of the individual interviews were compiled by management level into one of the following categories according to the position of the manager providing the specific information: 1) CEO, 2) Merchandiser, 3) Store Manager, 4) Department Manager, 5) CIO, and 6) Scanning Coordinator. A category representing the compiled views of wholesalers interviewed also was included. In cases in which a single individual was responsible for more than one management level, the particular responses were evaluated to determine the appropriate managerial level of representation. For example, if a single manager was in fact the CEO, the merchandiser, and the store manager, each of his/her individual responses was evaluated to determine the appropriate level of authority.

By separating the responses into the various categories, a clearer picture of the current usages of scanner data by the various levels of management is presented. Also, this partition allowed a better understanding of the specific needs and desires of the levels of management concerning scanner-derived information. These needs and desires were the basis for the information management system presented in Chapter 5.

Responses from Chief Executive Officers

This section presents the findings of the compiled responses from chief executive officers (CEOs). The following statements made during the interview sessions indicate general attitudes of the CEOs toward scanning systems and the use of scanner data:

- "I don't get any reports; I'm a gut-feeling manager."
- "The reports can be used for planning, but they are too slow for immediate decisions."
- "Scanning is a tool to better evaluate a department's contribution to a store's performance."
- "Cooperation and communications in our stores have increased because of scanning."
- "A good scanning coordinator is the key to success."
- "We're in business for customer satisfaction. This is where scanning helps us the most."
- "We don't want to depend on warehouse movement data. We want to know what goes out the front end, not what we bought."

Almost all CEOs interviewed said they either received or used very little information from scanning, the exception being CEOs who also acted as merchandiser and/or store manager. Of the information occasionally looked at or used, sales recaps by store and item movement by store were mentioned most frequently. Although some CEOs indicated that they did not need any information

available from scanning, the majority felt that it could be useful to them if certain problems were overcome.

According to the CEOs, there are a number of problems that need to be solved for the scanner data to be more useful. Of these problems, the one most often mentioned seemed to be data overload. The data were too voluminous and needed to be condensed and consolidated into a more useful form. CEOs of firms using outside host service indicated that they were not pleased with such services. The information received from the hosts was not in an easily usable form. In addition, there were problems with the timeliness of reports from the host as well as the inability to retrieve data from past time periods.

Other problems noted by the CEOs included difficulties in developing a technical communications system using their data. This problem seemed partially due to some limitations of scanner technology but probably was largely due to a lack of funding for proper equipment, software, and personnel. This lack of funding could stem from a resistance on the part of CEOs to increase their capital investment in scanning services until the magnitude of soft benefits is better documented. CEOs also indicated that vendors changing UPCs, limited computer capacity, and limited computer time were problems that needed to be solved.

In discussing possible improvements in the scanning information they received, the CEOs indicated several types of data they would like to receive: 1) gross margins and sales by department (monthly), 2) item tracking for shrinkage reports, 3) evaluation of specials (movement), 4) store inventory turns, and 5) the percent of items scanned per store by department (for evaluation of store discipline). The CEOs also noted several goals in regard to scanning for their firms. The most popular goals dealt with space management in the form of product location, space allocation, and shelf sets. Other goals included improved labor scheduling (front end and other), shrink management, recording of seasonal and holiday movement, improved inventory control, and possible automatic reordering after the front end is connected with direct store delivery systems.

In discussing the benefits of scanning currently being realized, it was obvious that improvements in price accuracy, store discipline, and labor efficiency were considered the primary benefits. The CEOs cited these as the major reasons for the improvements in their bottom line (profit) resulting from scanning. All CEOs indicated an improved profit since the installation of scanner systems. Though no CEO provided an exact figure on the improvement in the profit achieved by their firm, a 1 percent improvement was the figure most frequently mentioned, with a range from 1 percent to 10 percent.

Labor savings through reductions in item price marking and increased checker efficiency have traditionally been billed as the major benefit of scanning. Con-

sequently, it was surprising to find that CEOs were vague in regard to the amount of labor savings arising because of the installation of scanning systems. Most CEOs indicated that some labor savings were obtained, but the savings were reduced because of the necessity of hiring additional personnel, for example, a scanning coordinator. Others indicated labor savings of up to 30 percent, even though they still marked the prices of individual items. Apparently, labor savings generally did occur with the implementation of scanning, but were not as substantial as originally anticipated because of the additional labor required to verify prices and upkeep the price file.

Estimated figures for labor savings in terms of time were roughly 40 hours per week in a store with approximately \$70,000 weekly sales, 80 hours per week for a store with a weekly volume of \$120,000, and 140 hours per week for a store of approximately \$350,000 to \$450,000 in weekly sales. In most cases, labor hours for price verification and file upkeep probably had not been subtracted from these figures. Other direct benefits mentioned included reductions in theft by store personnel as well as improved dealings with vendors resulting largely from the analysis of movement data. In general, practically all the benefits mentioned by the CEOs were hard benefits.

When questioned as to the extent of training in their firm on the uses of scanner data, the CEOs indicated that there had been little training beyond the operational training provided by scanning vendors. There was almost no formal training on the uses of scanner data. Two firms did have some form of committee to discuss the uses of scanner data. A majority of CEOs indicated that additional training was very much needed.

A discussion of potential sources of additional training brought a variety of opinions on who could, or should, provide the service. Several CEOs felt that additional training should be provided by various grocery associations, wholesalers, or perhaps by private consulting firms. Some felt that the training was going to have to come from inside the firm. Still others indicated that scanning vendors such as NCR, IBM, or SWEDA should provide additional training. Several CEOs indicated major dissatisfaction with the services available from their scanning vendor. They felt that the company from which they purchased the system should at least show them how to use the data. The discontent with scanning vendor services is best illustrated by the following statement from a CEO:

"Vendors don't know what we need. We need more help from them . . . or someone."

An area of disagreement among the CEOs was what capacity the CIO and the scanning coordinator should fill within the firm. Opinions were divided as to whether the CIO should fill a staff or a line position, or perhaps a combination of the two. The opinions concerning the managerial ranking for the scanning coordinator were about equally divided between department manager status and assistant store manager status. Also, reactions varied as to whether the scanning coordinator should be a direct store employee or whether the coordinator

should primarily report to the CIO at headquarters. There were concerns of possible animosity between store employees and the scanning coordinator if the coordinator reported to the CIO at headquarters. There was general agreement, however, that both the CIO and the scanning coordinator should have practical operational experience.

Despite the problems involved in operating scanning systems, all CEOs were pleased with them. They stated that scanning generally improved their operations by forcing them to be more disciplined. They also stated that scanners had more than paid for themselves. These favorable impressions persisted even though very little of the potential benefits of scanning had been realized beyond the hard benefits. Even the hard benefits realized by the firms had not been fully documented and may not have been fully realized.

Responses from Merchandisers

This section presents the compiled findings from the interviews with the merchandisers of the various firms. The following statements are descriptive of the general attitudes of merchandisers toward the use of scanner data:

- "My job is to decide what items to sell and what prices to sell them at. I fly by the seat of my pants and 20 years of experience. I don't need scanner data."
- "I don't know what scanning has to offer."
- "Using scanning information will work if you determine what the hell you want from it."
- "No one in our organization has a good understanding of how scanner data can be used."
- "As far as useful scanning reports go, I'm getting next to nothing."
- "We need full time people working on scanning applications."
- "We want to get control of the shelves away from the vendors and we feel scanning can help us here."
- "Scanning is a good tool for price accuracy and attributing sales to the correct department."

As suggested by these quotes, a majority of merchandisers either received no scanning reports or made very little use of the reports they did receive. Those merchandisers receiving reports said they rarely used scanner data to help make buying decisions, though isolated examples of such uses were given. The merchandisers indicated that warehouse movement reports were usually used for such decisions.

The basic reports being received by merchandisers were various types of movement reports. Typically, they received weekly movement reports concerning the number of items or tonnage sold. Some also indicated that they received weekly reports on vendor margins, spot movement reports on request, or quarterly movement reports. Several merchandisers did give examples of using this information for shelf sets. However, these were isolated examples of item tracking since none of

the merchandisers indicated that they made regular use of scanner data for such purposes.

The merchandisers indicated several other specific uses they had made of scanner data, none of which was practiced on a regular basis. The most frequently mentioned use of scanner data, other than for shelf sets, was in dealings with vendors. Four merchandisers indicated that they had used movement data for this purpose. The usefulness of scanner data for this purpose was indicated by the following statement:

“Before scanning, we had to take a vendor’s word on how a product was moving. Now when they come to us, we can show them what is actually selling.”

Other limited usages of scanner data (specifically movement data) included evaluation of allocation of shelf space, evaluation of display performance, evaluation of advertised items, new product evaluation, measurement of shrink, and the recording of seasonal and holiday item movement to aid in ordering the following year. Again, none of the firms interviewed conducted these applications on a regular basis.

The merchandisers indicated they would like to receive more information pertaining to item velocity, new item movement, slow moving items, the top 500 movers in a store, shelf allocation and space management, advertising effectiveness, and a contribution to departmental profit by item. The merchandisers also indicated they would like to have automatic reordering, information on display evaluation, information on direct product cost and direct product profit, and information on the bottom line profits of a department. Obviously, many of these desires require information beyond what scanning systems are able to supply.

There was a consensus among the merchandisers that the singular problem with scanner data was sheer volume. The amount of data and the form in which the information was received, made effective utilization difficult. Several suggestions to help alleviate this problem included converting the movement information into case movement rather than individual item movement. Also, the merchandisers indicated that their ordering responsibilities would be aided by aggregating individual store movement into total firm movement. They also suggested that the various reports be better categorized to suit their needs (e.g., item or case movement by vendor or manufacturer). The merchandisers also indicated that problems with vendors and manufacturers changing UPCs without informing the retailer would have to be corrected in order to more effectively use scanner data.

Other comments by merchandisers reiterated some made by the CEOs. The merchandisers verified that they had received little training on the uses of scanner data. Most indicated that they were self taught and that additional training would be helpful. The merchandisers also indicated that, to date, the greatest benefits from scanning had come from increased price accuracy and improved discipline. Labor savings were also usually mentioned. A produce buyer indicated that the most noteworthy advantage of scanning to the merchandiser was the credit given for all the sales in his/her depart-

ment. While the merchandiser was concerned for getting credit for the sales in his/her department, the CEO was concerned with the accurate assessment of sales to the proper department so that a clearer picture of departmental profitability would be available for planning purposes.

Although few merchandisers had made use of scanner data, the discussions with them seemed to indicate that most recognized the potential benefits and would make better use of the information if it were presented to them in a useful form. Also, additional efforts in training merchandisers on the uses of scanner data should result in more use of the data. There apparently was some resistance among merchandisers (as well as CEOs) to adopting the use of scanner data. This phenomenon, however, is generally encountered with the introduction of new technology. In general, because scanning had benefited their respective firms, merchandisers seemed to be in favor of the use of scanning checkout systems even though they had made little use of the data.

Responses from Store Managers

This section presents the commonalities found in the discussions with the store managers of the various firms. The purpose of this section is to shed light on the current and desired usages of scanner data by store managers. The following statements by store managers are given to indicate their attitude towards scanning and the use of scanner data:

- “Scanning doesn’t increase production, but it does help you find mistakes quicker.”
- “After managing a store with scanning, I wouldn’t want to manage another store without it.”
- “Scanning movement reports helps keep salesmen honest.”
- “Price integrity with scanning is very important. Without it you lose customer confidence.”
- “Store managers should probably move up from the scanning coordinator position.”
- “Scanning helps us maintain margins and price accuracy.”

As suggested by these quotes, the store managers used scanner information more than upper management levels. Even so, the store managers did not make regular use of scanning information to aid in many decisions where it could be useful. Some indicated they received few reports based on scanner data (or no reports). However, the number of store managers indicating that they received no reports was smaller than the number of CEOs or merchandisers making similar indications.

Store managers generally had a more positive attitude toward scanning than CEOs or merchandisers. Scanner data were probably more useful to the store manager in day-to-day activities. According to store managers, scanning provided a tool for greater price accuracy and discipline for the store. As indicated by the preceding quotes, scanning allowed store managers to maintain their margins and to find mistakes more quickly.

Most store managers indicated they were using scan-

ner data for labor scheduling (generally front-end scheduling) and to monitor checker productivity. They also used the information to check sales and gross margins by department. Fewer store managers, though still a majority, indicated that they had made limited use of scanner data for shelf allocation, shelf sets, and item tracking. Other occasional uses of scanner data included keeping seasonal and holiday movement files to aid in ordering the following year, checking movement to decide on store operating hours, display evaluation, and monitoring of shrink (usually in produce).

Store managers indicated that scanning systems also helped to reduce shrink at the front end to reduce the number of bad checks accepted, to better allocate sales to the appropriate department, to reduce labor costs, and to improve the general attitude of employees. Of all these benefits, store managers cited improvements in price accuracy and increased discipline as the principal advantages to date. As with the CEOs and merchandisers, store managers predominantly cited hard benefits as the only substantial benefits of scanning to date.

Store managers indicated that they would like scanner-derived information that could be used for space and inventory management and for improved dealings with vendors. For example, store managers indicated they would like automatic reordering, zero movement information, evaluation of specials, a vendor movement report, and coupon scanning. Store managers also indicated they would like a report to evaluate store employees, similar to the productivity measures used to evaluate checkers. The percent of items scanned by department was indicated as a useful figure for evaluating the operating discipline within departments.

The most difficult problem in trying to use scanner information, according to store managers, was the form of the reports. Other problems included the limited capacity of the store price file, breakdowns of the system, UPC changes by vendors, difficulty in scanning some items, limited cooperation from upper management, and a lack of training on the use of scanning data. Most store managers indicated that their only training with scanning had come from the scanning vendor concerning operational methods. All store managers indicated they were largely self-taught as far as applications of scanner data were concerned. Importantly, store managers indicated that customer acceptance of scanning had become much less of a problem.

The position of scanning coordinator was found to be very important in the opinion of store managers. Several store managers felt that the scanning coordinator was probably the most important store employee. Store managers tended to feel that the scanning coordinator should be a direct store employee rather than reporting to the CIO at headquarters. Also, it was generally agreed that the scanning coordinator should have operational experience.

The store managers generally agreed that implementing scanning systems had been cost-effective. They also believed that such systems could be even more cost-effective if scanning reports were compiled into a more usable form and if training on the uses of scanner data was provided.

Responses from Department Managers

This section reports the results of the discussions with departmental managers of the various firms. In general, the statements of the department managers on the uses of scanner data reiterate those of the store managers. The following statements made by department managers give an indication of their general attitudes toward scanning:

- “Scanning gives me time to do things I didn’t use to have time to do. Labor savings aren’t that great since we use the time to do other jobs.”
- “Scanning gives me better communication with the front end coordinator and the store manager.”
- “Scanning has helped me in two ways. I get the proper price at the front end and I get credit for all produce sales.”
- “Price accuracy is necessary or you lose customer confidence.”
- “Movement information helps me keep salesmen honest.”

The department managers who received reports (about half) indicated that they basically received daily or weekly movement data, margin information, and department sales as a percentage of store sales. The only other report received was a price change report. If the department managers wanted additional information, they had to request it specifically. In several cases, the department manager pulled his/her own reports from an in-store computer, and these were the only reports received. In general, most department managers indicated that they were receiving very little information.

As far as uses of scanner information were concerned, there was no indication of any application by department managers on a regular basis. There were, however, a number of applications conducted on an occasional basis. These applications included ordering for specials, space allocation, shelf sets, item elimination, and shrink measurement (two cases in produce departments and one in a meat department). Surprisingly, the majority of these applications occurred in smaller firms. In larger firms most of these applications were under the authority of the merchandiser.

The department managers indicated a number of areas where they felt that proper scanner information could help them. These areas included ordering or inventory management (goal: automatic reordering), more information on product movement (including zero movement), evaluation of specials, information on shrink, vendor movement, and information for labor scheduling.

Obviously, some of this information could be pulled from regular movement reports. However, most reports were voluminous and, thus, extraction of such information would require a considerable portion of the department manager’s time. Therefore, it was not surprising that the department managers indicated that the form in which they received their information was one of the key problems in trying to use scanner data. Delays in receiving reports from headquarters or from a host system was

also a problem cited by department managers. Additionally, a lack of training on how to use the information they received seemed to be a major problem. Nearly all the department managers said that they had received no formal training on the uses of scanner data. They indicated that they were basically self-taught in regard to scanner applications, but that they had been able to get some help from other department managers, the scanning coordinator, or the store manager. The only other noteworthy problem with using scanner data indicated by department managers was with vendors and manufacturers changing UPCs without notifying the store.

In general, department managers were pleased with the scanning systems. The departmental managers indicated that price accuracy and increased discipline had been major benefits to date. The department managers also emphasized the allocation of sales to the proper department as a benefit (especially the produce and meat managers). Basically, scanning had forced them to tighten up their operation, and they were therefore operating more profitably. These feelings were evident even though the majority of the benefits to date had been hard benefits. The department managers generally felt that they could further improve performance if they could receive timely information in a useable form and if they could be instructed on how to use this information.

Responses from CIOs and Scanning Coordinators

This section presents the results of the discussions with the chief information officers (CIOs) and the scanning coordinators of the various firms. The following statements by CIOs and/or scanning coordinators illustrated their general attitudes toward the use of scanning systems and scanner data:

- “Reports have been based on what other people thought managers should have, not what the managers felt they should have.”
- “The needs of each manager should be identified and the reports based on these needs.”
- “So far, scanning has been a glorified toy.”
- “Our people in the stores aren’t using reports. We haven’t told them how to use them. Actually, we don’t even know.”
- “The problem with hosting is the machine and operator time required.”
- “Nobody knows for sure what they are going to do; they’re looking for the ideal system.”
- “Managers want specific information immediately.”

The discussions with the CIOs and scanning coordinators verified the degree of usage of scanner information claimed by the other levels of management. CIOs and scanning coordinators noted very little use by CEOs; slightly more use by merchandisers with regard to shelf sets, space allocation, and for vendor dealings; and generally more use at the store level with managers using the information for labor scheduling, employee evaluation, and limited use of the information for space man-

agement. However, there was generally more emphasis in the discussions with the CIOs and scanning coordinators on the inadequacy of the form of the data supplied by the scanning systems as well as by the host services. Practically all the CIOs recognized data overload and the current form of the reports as major barriers to the use of scanning information. In the survey sample, only one firm interviewed was attempting to compile the information into short reports usable by the various levels of management.

Other problems mentioned in these discussions included the limited capacity of computers, problems in developing a (technical) communications system, and problems with corporate acceptance of the uses of scanner data. These discussions indicated that resistance on the part of CEOs to either use or promote use of the scanner information with other levels of management was a major barrier. The CIOs felt that headquarters needed to control and promote the use of scanner data.

The CIOs indicated that the CEOs could promote the use of scanning data in several ways. These ways largely dealt with instituting some form of training for managers on the use of scanner information and with taking steps to improve the form of the reports managers were currently receiving. The CIOs and scanning coordinators verified that there had been very little training made available to any of the levels of management, other than training on the basic operations of the scanning system.

The CIOs and scanning coordinators described a number of reports that they either pulled themselves or received from their hosts to deliver to the various levels of management. The reports most often delivered were a sales recap by store broken down by department, sales and customer count by cashier, price (change) maintenance reports, and some form of movement report. The movement reports varied from firm to firm. Some firms pulled a movement report on the entire file weekly, others pulled it quarterly, and still others pulled only specific item movements on request. A few of the firms interviewed either pulled no reports or only did so rarely. Other reports used less frequently and by fewer firms included zero movement reports, a report on the percent of items scanned for each store by department, a report on coupons scanned, a movement report of advertised items, and tonnage reports on produce and meat products.

Not all reports were delivered to all levels of management. The CIOs and scanning coordinators indicated that the CEOs basically received total sales recaps for stores by department, weekly scanning rates by department, and occasionally some reports on advertised items. The merchandiser generally received this information as well as more detailed movement information. Finally, the store level manager generally received sales recaps, price change reports, shelf tags for price changes, scan rates by department, information on checker productivity, and some information on product movement.

CIOs and scanning coordinators agreed with the other levels of management in regard to the most substantial benefits to date resulting from the implementation of

scanning systems. Again, improved price accuracy and increased store discipline were cited as the greatest benefits, with better evaluation of departmental performance, labor savings, and more control over gross margins also mentioned.

All the CIOs and scanning coordinators interviewed emphasized price accuracy and upkeep of the price file as their major responsibility. All firms used some form of price verification. This verification generally included a check of the master file at headquarters with the store price file as well as a check of the store price file with the shelf tag prices. Prices were changed once to twice a week to take care of general price changes due to items either going on sale or coming off promotion. There was generally a continual check to ensure that shelf price tags coincided with the store price file. The price checks were conducted using a method that ensured that the entire store was covered every 4 to 6 weeks. Also, the majority of the firms conducted surprise audits to ensure diligence in efforts toward maintaining price accuracy.

The CIOs indicated that they felt their position, as well as the position of scanning coordinator, should be filled by someone with operational experience. This experience would enable them to have a better understanding of their jobs as well as a better understanding of the needs of the managers they are assisting. Also, operational experience would better enable the CIO to conduct research with the scanner data. The CIOs indicated this research should be conducted by headquarters personnel.

The CIOs agreed that scanning systems have paid for themselves from the savings accrued in the form of increased price accuracy, reductions in front end shrink, and labor savings. However, they also recognized that for additional benefits to be realized, beyond predominantly hard benefits, improvements needed to be made in the form of reports sent to managers. Additionally, the various levels of management needed to be trained to use the scanner data. The CIOs recognized that for this situation to occur, it would be necessary for upper management to promote the use of scanner data.

Responses from Wholesalers

This section presents the findings of the discussions with the three firms interviewed that provided wholesaler and scanning host services. Since none of these firms used scanner data to facilitate buying activities, the emphasis in this section is focused on the scanning services they offered and their general opinions concerning the uses of scanner data by retail firms.

The wholesalers indicated that their scanning services basically included supplying retailers with price changes, sales recaps, and various information on product movement. The product movement information included weekly and quarterly recaps of units (or weights) sold along with the corresponding UPC, an item description, and the current retail price of the items. The process for data handling by the wholesaler was fairly simple. They received the information from the store and proceeded to massage and abridge the data. The abridged file was then sent back to the store or headquarters where microcomputers were used to develop reports.

The wholesalers indicated that they were aware of some limited use of data for shelf and space management, labor scheduling, evaluation of special item movement, and for dealings with vendors. They were not aware of any research on item movement and price relationships.

The need for simplified reports was recognized by the wholesalers as well as the need for a training program for retail firms on the uses of scanner data. There was, however, no indication from the wholesalers of intentions to provide such services.

The following comments and recommendations were made by the wholesalers concerning scanning operations by retail firms:

- "In the future only small operations will pay for host services. Larger stores will have their own host system." No indication of firm sizes were given.
- "Scanner data become more valuable as you get closer to the store level."
- "For effective inventory control there is a need for a total system, DSD, and front end scanning."
- "Retailers seem to be using scanning only for price verification. There is very little analysis occurring."
- "The scanning coordinator (in-store) is essential and many independents don't have them...they should have an operational background."
- "Store personnel will do little, if any, research."
- "Software has been developed by people not familiar with the grocery industry."

As indicated by their quotes, the wholesalers seemed to emphasize the same general areas as the retail firms, namely data overload and the lack of training concerning the uses of scanner data. Although cognizant of the problems with scanner data, the wholesalers believed they had no responsibility to circumvent such problems. However, they did agree that a competitive edge would be available to those firms that could resolve the problems and thus take advantage of the soft benefits of scanning. Finally, wholesalers generally showed no indication of compiling the scanner data from the firms they hosted to use for their own purposes.

Summary

The discussions with the various levels of management of the cooperating firms provided information on the current usages of scanner data. All levels of management generally agreed that the benefits from the implementation of scanning systems have been limited primarily to the hard benefit category, specifically improved price accuracy, increased discipline, and labor savings. The hypothesis that there has been little use made of scanner data in managerial decision-making was substantiated. The use of such data for decision-making purposes was limited primarily to front-end labor scheduling and personnel evaluation as well as for shelf sets and dealings with vendors.

From the interview sessions, several major barriers to the effective use of scanner data were revealed. Consistent with those reported by Capps (9), these barriers in-

cluded: 1) the inappropriateness of the form and content of scanning reports received (data overload), 2) a lack of understanding on the potential usages of scanner data, 3) a lack of training by management on the potential uses of scanner data, 4) a lack of resources to capture the benefits available from scanner data and 5) an

unwillingness on the part of some to fully investigate the applications of scanner technology.

Obviously, additional work is needed to develop a management information system for scanner data that would deliver timely and concise information. Chapter 5 deals with the development of such a system.

CHAPTER 5

A Management Information System Model Based on Scanner Data

Introduction

Currently, according to FMI, several aspects of supermarket operations appear to be particularly ripe for use of information technology. These areas include: 1) customer service; 2) communications between distributor and manufacturer; 3) marketing data; 4) cost reduction opportunities; 5) improved monitoring of human resources; 6) inventory and capital control, and 7) new market development. However, the real task lies in developing a total firm strategy for information technology (1). In this light, this chapter presents a generic firm-wide management information system (MIS) model based on scanner data. This model may serve as a guide with which retail firms could develop in-house information systems.

The design of the MIS model was based on the outline of management responsibilities developed in Chapter 3 together with the commentary on the interview sessions with various levels of management as presented in Chapter 4. From Chapters 3 and 4, several key questions were evident, the answers to which 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.

Background on Management Information Systems

A management information system (MIS) is defined as an organized method of providing each manager with the information he needs for a decision, when he needs it, and in a form which aids his understanding and stimulates his 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 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 (25). 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 model in this study 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.

Potential Use of Scanner Data in Managerial Decision-Making

The first step in developing the MIS was to determine the potential usefulness to managers of scanner data in fulfilling their various responsibilities (Table 5.1). Using the same matrix of responsibilities as Table 3.1, the po-

tential usefulness of scanner data to the various managers for each responsibility was defined as high (H), medium (M), low (L), or not applicable (*). The gradations—high, medium, and low—were indicative of relative levels of potential usefulness. “Not applicable” indicated that the manager had little or no responsibility in this area. Thus, Table 5.1 indicated a combination of the level of involvement of a manager concerning certain responsibilities and the potential usefulness of scanner-derived data to aid a manager in the decision-making process for that responsibility. For example, scanner data have considerable potential to aid the merchandiser in the key performance areas of inventory management, the evaluation of goals and strategies, and personnel evaluation. Also, the decision-making responsibilities of the store manager in the key performance areas of personnel management, management of store operations, store merchandising, and store profitability can be facilitated by the use of scanner data. The MIS presented in the remainder of this chapter focuses on the responsibilities labeled as high or medium for a particular manager since these are the key performance areas where informational needs can be at least partially fulfilled by scanner data.

Table 5.1a Potential Contributions of Scanner Data to Managerial Decision-Making

	Level of application:					
	CEO	MER	STM	DPM	CIO	SCC
Key: CEO = chief executive officer						
STM = store manager						
CIO = chief information office						
				H = high		
				M = medium		
				L = low		
				* = not applicable		
	Management Level					
	CEO	MER	STM	DPM	CIO	SCC
Facilities						
Real Estate	L	*	*	*	*	*
Buildings						
(1) merger	L	L	*	*	*	*
(2) new construction	L	L	*	*	*	*
(a) size	M	M	*	*	*	*
(b) design	L	M	*	*	*	*
(3) sale of existing sites	L	*	*	*	*	*
Equipment						
(1) purchase decision	L	M	*	*	*	*
(2) merchandising decision	M	M	*	*	*	*

Table 5.1b Potential Contributions of Scanner Data to Managerial Decision-Making

Personnel	Management Level					
	CEO	MER	STM	DPM	CIO	SCC
	Hiring Decisions	L	L	*	*	*
Wage/Salary	L	*	L	*	*	*
Incentives/Bonuses	M	*	M	*	*	*
Insurance & Retirement	L	*	*	*	*	*
Job descriptions	L	L	L	L	*	*
Supervision of Subordinates	M	M	H	M	H	*
Labor scheduling	L	*	H	H	*	*
Training	L	M	M	M	M	M
Employee evaluation	M	M	M	L	L	*

Table 5.1c Potential Contributions of Scanner Data to Managerial Decision-Making

Capital	Management Level					
	CEO	MER	STM	DPM	CIO	SCC
	Allocation					
(1) real estate	L	*	*	*	*	*
(2) building	L	*	*	*	*	*
(3) operating budgets	M	*	M	*	*	*
(4) equipment	L	L	L	L	L	*
(5) personnel	L	*	M	*	*	*
Inventory						
(1) product mix	M	H	L	L	*	*
(2) display	M	H	M	M	*	*
(3) processing & packaging	*	H	L	M	*	*
(4) ordering	*	H	H	H	*	*
(5) shrink	*	H	H	H	*	*
(6) price integrity	M	M	M	M	M	M

Table 5.1d Potential Contributions of Scanner Data to Managerial Decision-Making

	Management Level					
	CEO	MER	STM	DPM	CIO	SCC
Goals & Strategies						
Merchandising						
(1) pricing	H	H	L	*	*	*
(2) advertising	H	H	*	*	*	*
Develop Image	L	L	L	L	*	*
Customer service	L	L	L	L	*	*
Sales objectives	H	H	H	H	*	*
Profitability						
(1) margins	H	H	H	H	*	*
(2) costs	M	M	M	M	L	*
(3) net profits	H	H	H	M	L	L
Support to other Managers	L	L	L	L	H	H

Design of a Generic Management Information System

Once the managerial responsibilities and the information needs for each level of management were defined, the form, timing, and content of the scanner-derived information distribution system could be developed. Simply put, the design of a generic MIS was accomplished by integrating the outline of management responsibilities (Table 3.1) with the managerial information needs for each level of management (Table 5.1). Among the various reports which could be generated and distributed to each level of management are those exhibited in Tables 5.2-5.14. In general, the informational system is designed to facilitate exception reporting, that is, to point out potential problem areas. These tables 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 (2, 26, 27, 28, and 29). According to Symonds, "in any business situation, certain key elements or basic control points tend to dominate or essentially control the outcome of operations."

CEO

The responsibilities of the CEO are very general in scope, and hence, the scanner-derived 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), were designed to be delivered on a monthly basis. Table 5.1 indicates that scanner data have limited potential for contributing to the decision-making of the CEO in the facilities category of responsibilities. Importantly, all of the reports for the CEO are monthly reports. 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 arose when a CEO desired more specific data, special reports could be requested.

From Table 5.2, 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 a 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 5.3). 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 was 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.

For evaluation of advertising within the firm, the Advertising Report (Table 5.4) was developed. This report gives the CEO an overview of the performance of advertising efforts on the basis of dollar sales of specialized items, the percent of customer buying specials, the per-

cent of customers buying only specials, and the gross margin (percent) on specialized items.

In sum, the Sales/Profitability Trend Report, the Capital Management/Profitability Report, and the Advertising Report combine to aid the CEO in pinpointing problems with profitability. The CEO, by recommendation, should receive the various reports for individual stores, for zones, and for the entire firm. This breakdown allows for comparison among various stores or zones. Also, by recommendation, a firm should develop historical files from the various reports in order to evaluate the performance of the organization over time.

Table 5.2 Personnel Evaluation Reports for the CEO

Scanning Report (Monthly)										
	Total		Grocery		Produce		Meat		Deli	
	% Scan	%Acc	% Scan	% Acc	% Scan	% Acc	% Scan	% Acc	% Scan	% Acc
	PC-PP	PC-PP	PC-PP	PC-PP	PC-PP	PC-PP	PC-PP	PC-PP	PC-PP	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	GP	Sales	GP	Sales	GP	Sales	GP	
	PC-PP-PY	PC-PP-PY	PC-PP-PY	PC-PP-PY	PC-PP-PY	PC-PP-PY	PC-PP-PY	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 include other areas of interest such as frozen foods, the bakery, or the deli.

Table 5.3 Capital Management/Profitability Report for the CEO

Capital Management/Profitability Report (Monthly)												
KPI-1 Sales				KPI-2 Gross Margin (%)				KPI-3 Gross Profit \$				
Total	Meat % Total	Prod % Total	Groc % 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 Weekly Avg. Customer Count				KPI-6 Avg. \$ Sales Per Customer				
Total	Meat	Prod	Groc	Total	Meat	Prod	Groc	Total	Meat	Prod	Groc	
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 | (3) Gross Profit Dollars | (5) Customer Counts |
| (2) Gross Margins (Percentages) | (4) Inventory Turns | (6) Sales Per Customer |

Table 5.4 CEO Report for Evaluation of Advertising

Advertising Report (Monthly)																			
KPI-1 # Specials				KPI-2 \$ Sales Specials				KPI-3 % Special Sales to Total				KPI-4 GM (%)				KPI-5 GM on Specials			
Total	Groc	Meat	Prod	Total	Groc	Meat	Prod	Total	Groc	Meat	Prod	Total	Groc	Meat	Prod	Total	Groc	Meat	Prod
Firm																			
Zone 1																			
Store 1																			
Store 2																			
Zone 2																			
Store 1																			
Store 2																			
KPI-6 # Coupons Redeemed				KPI-7 Customer Count				KPI-8 Avg. \$ Sales Per Customer				KPI-9 % Customers Purchasing Specials				KPI-10 % Customers Purchasing Only Specials			
Total	Groc	Meat	Prod	Total	Groc	Meat	Prod	Total	Groc	Meat	Prod	Total	Groc	Meat	Prod	Total	Groc	Meat	Prod
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) Number of Specials | (6) Number of Coupons Redeemed |
| (2) Dollar Sales of Specialized Items | (7) Customer Count |
| (3) Percentage of Dollar Sales of Specialized Items | (8) Sales Per Customer |
| (4) Gross Margins (Percentages) | (9) Percentage of Customer Purchase |
| (5) Gross Margins on Specials (Percentages) | (10) Percent of Customers Purchasing |

Merchandiser

Although scanner data have little potential to aid the merchandiser in the management of facilities and personnel, there exists considerable potential in the areas of inventory management and the evaluation of goals and strategies. The Department Evaluation Report in Table 5.5 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.

In the area of capital management, the merchandiser has considerable responsibility in inventory management. Responsibilities in this area include shelf sets and product mix, display of merchandise, ordering, and shrink control. The Category Evaluation Report (Table 5.6) 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 5.7) 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 5.7). The Slow Movement Report lists items by category that have experienced movement of less than 6 items over a 4-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.

To aid the merchandiser in ordering, the Warehouse Ordering Report (Table 5.8) was developed. This report compares total retail movement with movement from the warehouse. The Warehouse Ordering Report is designed to be delivered weekly and contains the UPC, item description, and item size for each item in every category. Movement information for the entire firm is compiled and presented to the merchandiser as total cases of product moved. The information provided includes: 1) total firm movement in cases for the previous week;

Table 5.5 Department Evaluation Report for the Merchandiser

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

Key Performance Indicators (KPI):

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

Table 5.6. 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 5.7 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
- (7) Gross Profit Dollars as a Percentage of Category Gross Profit Dollars

Table 5.7 (Continued)

<u>Pricing Report (On Request)</u>						
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
- (5) Gross Profit Dollars as a Percentage of Category Gross Profit Dollars

<u>Slow Movement Report (Monthly)</u>				
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

Table 5.7 (Continued)

New Item Movement Report (Monthly)

Store Zone or Total Firm: _____ Period: _____

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

Table 5.8 Sub-Category Reports to Aid the Merchandiser in Ordering: Warehouse Ordering, Specialized Item, Holiday File, and Vendor Reports

Warehouse Ordering Report (Weekly)

Department: _____

Category	UPC	Item Description	KPI-1	KPI-2	KPI-3
			Total Firm Movement	Warehouse Movement	Warehouse Inventory

All indicated movement is case movement.

Key Performance Indicators (KPI):

- (1) Total Firm Movement
- (2) Warehouse Movement
- (3) Warehouse Inventory

Table 5.8 (Continued)

Specialized Item Report (Monthly: Place on File)

Department: _____

Week of: _____ Week of: _____

UPC	Item	Price	Gross Margin %	Movement	Price	Gross Margin %	Movement

Key Performance Indicators (KPI):

- (1) Price
- (2) Gross Margin (Percentage)
- (3) Movement

Holiday File Report

Department: _____

UPC	Description	KPI-1 Price	KPI-2 Item Movement	KPI-3 Gross Margin %	KPI-4 GP \$

The Holiday File should be collected for items indicated by the merchandiser and for weekly periods prior to and after a holiday. The reports should be filed for later use.

Vendor Report

Vendor: _____

UPC	Item	KPI-1 Price	KPI-2 Unit Movement	KPI-3 Gross Margin %	KPI-4 Gross Profit \$

Key Performance Indicators (KPI):

- (1) Price
- (2) Item Movement
- (3) Gross Margin (Percentage)
- (4) Gross Profit Dollars

2) average weekly movement (cases) over the past 8 weeks; 3) warehouse movement for the previous week, 4) average weekly warehouse movement over the past 8 weeks; and 5) estimated warehouse inventory. The weekly movement figures, compared to the warehouse movement, should help the merchandiser estimate the total amount of store inventory. The estimated warehouse inventory figure provides the merchandiser with an indication of the amount of a product to order so that *the inventory at the warehouse will be sufficient to meet the expected demand by the stores for the following week.*

Other reports to aid the merchandiser in ordering for specials and for holidays also were developed. The Specialized Item Report (Table 5.8) depicts items that have previously been specialized and gives price and movement information for the merchandiser to use as a basis to place future orders. The Holiday File (Table 5.8) gives similar information but is designed to show the performance of seasonal items or items of special interest at a particular holiday (e.g., cranberry sauce at Thanksgiving). The Holiday File is designed to collect information several weeks prior to and after a holiday. By recommendation, a historical file of this report should be constructed as an aid in ordering for the holiday in future years. Finally, the Vendor Report (Table 5.8) was designed to compile information on all items represented by a particular vendor. This report, which supplies information on movement in the previous month, gross margin, and gross profit dollars, should be used to facilitate dealings with the various vendors.

Scanner data have considerable potential in decisions of the merchandiser in regard to goals and strategies of the firm. Specific areas where scanner data could prove beneficial to merchandisers include profitability analysis, evaluation of sales goals, and evaluation of merchandising strategies such as pricing and advertising. The Advertising Report (Table 5.9) provides information on the

attractiveness of advertising efforts by giving figures on the sales of specialized items and the percent of customers purchasing specialized items. The report also gives profitability figures to indicate whether or not the items on special are adversely affecting profitability.

Store Manager

Personnel management is a major responsibility of the store manager. Table 5.10 contains three reports produced from scanner data to assist the store manager in this area. The Department Evaluation Report (Table 5.10) and the Cashier Evaluation Report (Table 5.10) 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 (Table 5.10) 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 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 Average Movement Report (Table 5.11) was designed. This report enumerates characteristics of the distribution of movement of a particular product—average movement (mean), dispersion of movement (variance), minimum

Table 5.9 Advertising Report for the Merchandiser

Advertising Report (Monthly)								
Department: _____								
	KPI-1 # Items Specialized	KPI-2 \$ Sales Specials	KPI-3 \$ Special Sales to Total	KPI-4 Dept. GM %	KPI-5 GM Specials	KPI-6 # Coupons Redeemed	KPI-7 Purchasing Specials	KPI-8 Purchasing Only Specials
Firm								
Zone 1								
	Store 1							
	Store 2							
Zone 2								
	Store 1							
	Store 2							

Key Performance Indicators (KPI):

- | | |
|---|--|
| (1) Number of Items | (5) Gross Margins on Specials (Percentage) |
| (2) Dollar Sales of Specialized Items | (6) Number of Coupons Redeemed |
| (3) Percentage of Dollar Sales of Specialized Items | (7) Percentage of Customers Purchasing Specials |
| (4) Gross Margins (Percentages) | (8) Percentage of Customers Purchasing Only Specials |

Table 5.10 Personnel Evaluation Reports for the Store Manager

<u>Department Evaluation Report (Weekly)</u>							
	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							

<u>Cashier Evaluation Report (Weekly)</u>						
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

<u>Labor Scheduling Report (Weekly)</u>					
Day	Time	KPI-1 Total Sales	KPI-2 Customer Count	KPI-3 Produce \$ Sales	KPI-4 Deli \$ Sales
	7:00 a.m.–7:30 a.m.				
	7:30 a.m.–8:00 a.m.				
	8:00 a.m.–8:30 a.m.				
	8:30 a.m.–9:00 a.m.				
	etc.				

The Labor Scheduling Report is delivered weekly but contains sales figures and customer counts averaged over the previous 4 weeks. The report gives figures for 30-minute intervals for each day.

Table 5.11 Inventory Management Report for the Store Manager

<u>Movement (Monthly)</u>					
Dept.	Item	KPI-1 Average Movement	KPI-2 Variance of Movement	KPI-3 Minimum Movement	KPI-4 Maximum Movement

<u>Special Report (Monthly: Save in File)</u>						
Department: _____						
UPC	Description	Units Per Case	KPI-1 Week of: Price	KPI-2 Movement	KPI-1 Week of: Price	KPI-2 Movement

<u>Holiday File (By Request)</u>				
Department: _____				
Weeks of: _____				
UPC	Description	Units Per Case	KPI-1 Price	KPI-2 Item Movement

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

movement, and maximum movement. The Average 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 5.11 were 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 Average 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 5.12. 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 5.6) from the merchandiser could be requested.

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 5.2 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 5.13). 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 5.2. If a problem with the scan percent in a department arises, the scanning coordinator can request a Percent Scanned Report shown in Table 5.14. 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 5.13. 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 informa-

Table 5.12 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 5.13 Reports for the CIO

Scanning Report (Weekly)
 *This Report is the same as the Scanning Report for the CEO in Table 5.2.

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 5.14 Percent Scanned Report for the Scanning Coordinator

Store: _____

Department: _____

Category: _____ KPI Scan % _____

aaa
 bbb
 ccc

tion-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 dol-

lars). 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.

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 (1), 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 unnecessary."

Summary

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 chapter 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 chapter (Table 5.1, as well as Tables 5.2-5.14) 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.

CHAPTER 6

Conclusions and Implications

Introduction

The focus of the research has been on the identification of the decision-making roles of the various levels of management in a supermarket, the identification of present and potential usage of scanner-derived information, and the development of a firm-wide management information system based on scanner data. The information was gleaned through discussions with managers of retail grocery firms in the five-state area of Virginia, Maryland, Pennsylvania, Kentucky, and Indiana. The firms were among the most progressive in this region. Conclusions are presented as well as the implications of these findings to the retail food industry. Finally, this chapter serves to document further research topics.

Conclusions

The findings of this research substantiated the hypothesis that there has been little use of scanner data by firms to aid in managerial decision-making. Firms have tended to focus on the tangible benefits realized through the implementation of a scanning system. Attempts to utilize 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 usage of the data.

This research also substantiated the hypothesis that 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. In this research, a generic management information system (MIS) was designed to provide each management level with the information it needs without burdening a particular level with large volumes of unnecessary data. The success of the MIS will depend largely on the communication and data infrastructure, the base for all information required by the organization. In general, reports were developed primarily to facilitate management by exception. The monthly or weekly reports to managers were tailored to point out potential problem areas. When these problem areas were identified, more specific reports could be requested to aid a manager in correcting problems. In short, the goals of this MIS were twofold: 1) to generate useful reports but simultaneously minimize review time by management personnel; and 2) to direct attention to critical areas (key performance indicators).

Potential Implications for Food Retailers

This research offers a firm the basic framework to use in analyzing its specific decision-making process and for designing a MIS tailored to the structure of the firm. Because scanning is a condition of doing business, man-

agement of information will likely be a decisive factor in determining which firms are best prepared to meet intense competition.

On the basis of the search of literature and the discussions with managers, firms that have implemented scanning systems have improved profits even though the benefits realized have been limited to tangible benefits. The implementation of a MIS outlined in Chapter 5 should result in additional increased profits. The intangible benefits that can be realized through improvements in managerial decision-making resulting from such a system take the form of both increased revenue and decreased costs. Increases in revenue should accrue from improvements in inventory management, shelf and space allocation, and from improvements in pricing and advertising. Decreased variable costs should result from improved labor scheduling and improved loss (shrinkage) control. The realization of these intangible benefits could result in some additional labor costs since additional staff members may be needed for the compilation of reports. These costs, however, should be minimal when compared to the original costs of implementing scanning systems. Thus, the realization of the intangible benefits could result in greater profits than those realized to date through tangible benefits.

Another potential application concerns the analysis and adaptation of the reports outlined in the generic MIS. Reports may be analyzed in terms of needs—content, form, timeliness—for specific management levels and/or responsibilities. 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 data base management, analysis, graphics, flexible report generation, and modeling—all in a user-friendly environment. The data base 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 data base. In addition, information about shelf space, 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 data base. 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.

Implications for Further Research

Work on this project brought to light several possibilities for future significant research. 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 utilize specific examples and case studies. Additionally, this program might concentrate on optimizing usage 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 nonfood 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.

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Appendix A

Set of Questions Used in the Personal Interview Sessions

1. General Information
 - Store
 - Location
 - Characteristics (Organization, Type, Square Footage, Sales Volume/ Week, Number of Items in Store)
 - Managerial Levels
2. Parameters of Authority for Decision-Making
 - (i) Labor Scheduling
 - (ii) Pricing Decisions
 - (iii) Decide Specials and/or Merchandising Schemes
 - (iv) Ordering Decisions
 - (v) Markdown Decisions
 - (vi) Other
3. What computerized reports do you presently get in these areas?
4. Give specific examples of how you use each.
5. Why don't you make more use of these reports?
6. For the operating responsibilities you outlined above, what kind of fast, accurate information would you like to help you better manage your store?
7. Technical Information
 - (i) How much influence in the operation?
 - (ii) How are reports developed?
 - (iii) Standard software?
 - (iv) Form?
 - (v) Do you write own software?
 - (vi) Why don't you think your reports are more widely read or used?
 - (vii) Additional things that may be used?
8. Scanner information used for personal evaluation?

Technical Information

I. General Systems Information

A. Description of Computer Equipment:

Manufacturer
Model
Installation Date
Core Storage (e.g., 24K, 36K)
Disc Capability (# of megabytes)

B. What computer programming language do you use?

Cobol RPG Basic Other

C. Are you using the telecommunication capability of the computer?

Yes No

D. Current Computer Applications:

Please check each of the applications currently operating on your computer.

Accounts Payable	Labor Scheduling
General Ledger	Personnel Administration
Payroll	Director Store Delivery
Operating Statements	Scan Support
Labor Analysis	Other
Sales & Gross Profit Analysis	

II. Application Software

A. Application Package(s):

Package Name(s)	Vendor	Person Operating	Memory Requirements
-----------------	--------	------------------	---------------------

B. Assessment of Purchased Application Packages:

Package Name(s)	Easy to Use	Easy to Learn	Well Documented	Some Problems	Many Problems	Comments
-----------------	-------------	---------------	-----------------	---------------	---------------	----------

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

C. Self Developed Package(s):

Name/Type of Package	Computer Vendor	Operating System	Source Language	Memory Required
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- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

Yes No

7. Are you willing to Trade?

Sell?
Give?

III. Scanning/Micro Application Software Questionnaire

A. What type of scanning equipment do you currently operate in your store(s)?

Yes No Model Number

1. NCR
2. IBM
3. Datachecker
4. DTS
5. Sweda
6. TEC

B. Who performs your host support?

Yes No

1. Wholesaler
2. Yourself
3. No Host Support

C. If yourself, what equipment do you use?

Vendor	Model	Number	Software	Package	Name
--------	-------	--------	----------	---------	------

- 1.
- 2.
- 3.
- 4.
- 5.

D. Does your host support DSD items? Yes No

E. Does your host support custom price files? Yes No

F. What reports are you using from the host?

Report Name(s):

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

G. Do you use reports to assist your decision-making and in what areas?

Yes No Where?

1. Merchandising
2. New Item Orders
3. Theft Prevention
4. Vendor Profitability
5. Scheduling
6. Price Discrepancy
7. Shelf Price Audits
8. Checker Productivity
9. Other (list)

H. Are you using any data from your scanning system directly in an application program? If so, what types of data? Data Tape(s) i.e.: Item Sales, please list.

- 1.
- 2.
- 3.

I. Do you plan to attach your small business computer directly into your scanning system(s)?

Yes No

J. Are you currently sell your movement information to SAMI, A.C. Nielsen, etc.?

Yes No

Appendix B

- (1) Austin's Warehouse of Groceries; Jeffersonville, Indiana: A four-store retail operation. Store sizes ranged from 25,000 to 33,700 square feet.
- (2) Bon Foods; Dumfries, Virginia: A five-store operation with two stores scanning and plans to implement scanning in a third. Host services were provided by Richfood, the supplier of this firm. The store visited was approximately 25,000 square feet and was currently using a DTS-545 scanning system.
- (3) Farm Fresh; Norfolk, Virginia: A 40-store, multiple zone operation with all stores scanning. All stores were free standing (no host). Several stores were equipped with direct store delivery (DSD) systems. The scanning system used was the NCR-1255 series.
- (4) Food City; Abingdon, Virginia: A 30-store, one-warehouse operation with 20 stores scanning. Three scanning systems were used: (1) DTS, (2) SWEDA, and (3) Datachecker. Also, plans for the installation of DSD systems in several locations were in the offing.
- (5) George's Thriftway; Sykesville, Maryland: A one-store operation with an area of 25,000 square feet. Their supplier offered host services but the firm had in-house service. The scanning system used was the NCR 8258-1255 series.
- (6) Giant Foods; Carlisle, Pennsylvania: A 39-store operation with 26 stores operating National Semiconductor scanning systems. The company provided the host system. The store visited was 34,000 square feet with 17,000 square feet in selling space.

- (7) Giant Open Air; Norfolk, Virginia: A 23-store operation with 6 stores scanning. The firm also owned 50 Tiny Giant convenience stores. In addition, the firm had 16 DSD sites. Richfood was providing scanning host services. The scanning system in operation was a DTS unit.
- (8) IGA Foodliner; Stuarts Draft, Virginia: A one-store operation with 12,000 square feet. The scanning system was the DTS-500D series.
- (9) Ken Lewis - Liquor Discount, Louisville, Kentucky: A one-store (5,000-item) operation with plans to add an additional store. The firm had scanner and DSD capabilities. The CEO planned to tie all systems to a central computer.
- (10) Kroger; Roanoke, Virginia: A 108-store division with 61 stores scanning and plans to install scanning systems in 20 additional sites. The scanning vendors were NCR and IBM. The division also had operational DSD sites; supplying independent stores. The company provided host services to members.
- (11) Malone and Hyde; Nicholasville, Kentucky: A cooperative wholesaler supplying independent stores. The company provided host services to members.
- (12) Richfood, Inc.; Richmond, Virginia: A cooperative wholesaler providing host services to 50 member stores. The basic services included price changes and product movement reports.
- (13) Santoni's Markets; Baltimore, Maryland: This operation included six supermarkets (two with scanning systems) and two convenience stores. The supermarket visited encompassed an area of 17,000 square feet. The scanning system used was the NCR-1255 series.
- (14) Ukrops; Richmond, Virginia: A 17-store operation with 15 stores scanning. The host services of the firm provided by Richfood, Inc., their supplier. The store visited encompassed an area of 33,000 square feet. The firm used the IBM-3663 and IBM-3683 scanning systems.
- (15) Value Foods; Baltimore, Maryland: The operation included 10 stores and a warehouse. The firm had no host computer at the time of the interview but had plans to obtain one. The store visited encompassed an area of 31,000 square feet. TEC-TS80 scanning systems were used.
- (16) Wades; Christiansburg, Virginia: A six-store independent operation with four stores scanning. The firm was supplied by Richfood but did not use the host services. The scanning systems in operation included the NCR-2126 and DTS-540 systems.
- (17) Wetterau Food Services; Bloomington, Indiana: A wholesaler providing scanning host services.

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