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Improving Utilization of Scanner-Derived Information In Food Retailing Managerial Decision-Making*

by

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Statement of Problem

With the introduction of electronic or scanning checkout systems tremendous possibilities exist for the generation of data and the use of such data at all levels of managerial decision-making. The hardware and software needed to generate data valuable for managerial decision-making are currently available and retail food distribution organizations have the capacity to generate such data. To date, however, it appears that relatively few resources have been devoted to generating and/or organizing scanner data to be used as tools for major managerial decision-making (General Foods Corporation; Capps; Food Mar-

keting Institute; National Grocers Association). Industry realization of scanning benefits to date has been limited primarily to operational areas such as improvements in checker productivity, improvements in price accuracy, and improvements in efficiency of labor scheduling. Consequently, it is very likely that data presently being generated are under-used in managerial decision-making. Little thought has been given to data collection and presentation in terms of which managerial staff members need the information, what needs various staff members have, and in what form they could best use the information. Different levels of management are likely to have different needs

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for information relative to type, complexity, and time span.

Objectives

This study investigates this apparent lag in the use of scanner data for managerial decision-making purposes. In this light, this research work 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 level of use of scanner-derived information in decision-making; (3) to identify additional scanner-derived 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 would provide each management level with relevant information and would coordinate total firm operations, but would not burden a particular level with large volumes of unnecessary data.

Methodology

The information used for meeting the objectives of this research was collected through in-depth interviews with various levels of management within seventeen cooperating firms in the retail grocery industry in Virginia, Maryland, Pennsylvania, Indiana, and Kentucky. This set of firms did not, however, constitute a random sample. Although the firms considered were among the most progressive in the five-state region, because of cost considerations and time constraints this sample was geographically limited. Further, there was no statistical rationale behind the number of firms to be included in the sample. The rationale for selecting firms was to include an appropriate mix to make the sample as representative as possible of the retail grocery industry. The sizes of the respective organizations ranged from a single store independent to a multidimensional 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.

Commonalities and differences revealed from the interview sessions were compiled for

each management level as to: (1) the parameters of authority in decision-making, (2) present data gathering capabilities, (3) present scanner-generated data uses for managerial decision-making by the various levels of management, (4) types of scanner-generated data needs of each level of management, and (5) possible techniques for meeting these needs. When possible, interviews were conducted singly 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 firm management.

Management Responsibilities

An understanding of each level of management responsibilities was necessary in order to develop an efficient information management system. Since the literature revealed little information on such responsibilities, the first segment of the project studied and defined the responsibilities of each level of management.

A simple generic organizational hierarchy, based on interviewed responses, was developed for the outline of management responsibilities. This hierarchy consisted of six categories: (1) chief executive officer (CEO) (includes as well all upper management levels), (2) merchandiser (includes buyers and other positions responsible for merchandising activities), (3) store manager, (4) departmental manager, (5) electronic management information director (EMID) (headquarters level personnel in charge of scanning and computer systems), and (6) scanning coordinator (store-level personnel responsible for the scanning price file). These categories of management levels cover the traditional retailing responsibilities in a grocery firm. These responsibilities, as outlined in the generic hierarchy, may be combined or rearranged to fit the organizational hierarchy of a specific firm.

A matrix of management responsibilities as defined by the managers interviewed then was developed (Matrix 1). This matrix depicts the "funneling" process in managerial decision-making from general decisions made by the CEO to more specific decisions by store and

Matrix 1. General Management Responsibilities

Key: CEO = chief executive officer
 STM = store manager
 EMD = EMID

MER = merchandiser
 DPM = department manager
 SCC = scanning coordinator

LR = Level of responsibility

LI = Level of involvement

Level of responsibility or involvement:

H = high
 M = medium
 L = low

Responsibility	Management Level											
	CEO		MER		STM		DPM		EMD		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
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

Matrix 1. Cont'd

Responsibility	Management Level											
	CEO		MER		STM		DPM		EMD		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)buildings	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	L	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	H	H	L	L
(6)price integrity	H	L	H	L	H	H	H	H	H	H	H	H
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

departmental managers. The rows of the matrix concern general responsibilities divided into four categories: (1) Facilities (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 had 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). 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 CEO 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 firm image, and the design of firm operating strategies.

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.

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 from the merchandiser. Specifically, the store manager's major responsibilities include store personnel management, general operations, in-store merchandising, and profitability.

A department manager's responsibilities are similar to those of the store manager.

The department manager is responsible for the general operations of his/her department. These responsibilities include labor scheduling and the training of departmental employees in various operations such as stocking and display of items as well as procedures for customer service. Other responsibilities include supervising the stocking and display of merchandise in the department, control of shrink through proper ordering (especially in perishables), prevention of pilferage, and general merchandising. The department manager also has profitability responsibilities since his/her performance in ordering can affect sales by preventing out-of-stocks.

Responsibilities of the electronic management information managers are classified at two management levels, those of the EMID at headquarters and those of the scanning coordinator at the store level. In general EMID managers are responsible for scanning and computer operations for the entire firm, while the store level coordinator or manager is responsible for item price accuracy and maintenance of the store price file.

The EMID 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 UPC (universal product code), and (3) all product prices in the file are accurate. Too, the EMID serves as a supervisor to the store level scanning coordinator and helps resolve problems with UPCs. The EMID also is responsible for the collection and consolidation of scanner data into useful reports for dissemination 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 price tags, individually priced items, and the computerized price file are accurate. So, the scanning coordinator is responsible both for changing shelf price tags and the reporting of price and UPC problems to his/her supervisor, the EMID.

Potential Contributions of Scanner Data To Managerial Decision-Making

Once the managerial responsibilities were defined by level of management and by degree of involvement, a second matrix classifying the potential contributions of scanner data for each managerial decision-making responsibility listed in Matrix 1 was developed (Matrix 2). Development of this matrix also was based on interviewed responses.

Consistent with findings from the literature, discussions with the various levels of management substantiated the hypothesis that there has been little use of scanner-derived data by firms to capture the benefits available through applications of these data for improved managerial decision-making. Use of scanner-derived information for management decision-making purposes has primarily been limited to occasional front-end labor scheduling, personnel evaluation, shelf sets, and evaluation of vendors' sales "pitches."

As exhibited in Matrix 2, the same hierarchy of management and management responsibilities as given in Matrix 1 is used. However, in Matrix 2 the potential usefulness of scanner-derived data to the various managers for each responsibility is denoted as high (H), medium (M), low (L), or not applicable (*). The graduations, high, medium, or low, indicate a relative level of potential usefulness of scanner data. Not applicable means that the manager basically has no responsibility in this area, as indicated in Matrix 1 by low levels of both responsibility and involvement. For example, for the store manager, the potential contribution of scanner data to aid in decision-making is high in the areas of supervision of subordinates, labor scheduling, ordering, shrink evaluation, sales objectives, and evaluation of margins as well as net profits. For the merchandiser, the potential contribution of scanner data is high in the areas of inventory evaluation (product mix, displays, processing and packaging, ordering, and shrink), merchandising evaluation (pricing and advertising), sales objectives, and profitability evaluation (margins and net profits).

A Scanner-Derived Management Information System

The discussions with managers revealed several major barriers to the effective use of scanner data. These barriers, consistent with those presented by Capps, included: (1) the inadequacy of the form and content of scanning reports received (data overload), (2) a lack of understanding within firms on the potential uses of scanner data, (3) a lack of training on the uses of scanner data, and (4) an unwillingness on the part of some managers to investigate fully the applications of scanner technology. Possible report forms based on interview responses as to managerial decision-making informational needs were developed for each level of management identified in Matrix 1. Examples developed for the merchandiser level are illustrated in this paper (Illustrations 1, 2, and 3). However, examples developed for the CEO, the store manager, the department manager, the EMID, and the scanning coordinator are also available (see Thomas). Due to space limitations, illustrations of report forms for other management levels are not included in this paper.

The Department Evaluation Report (Illustration 1) provides the merchandiser with basic data to evaluate the merchandising performance of personnel in individual stores and zones. Obviously, sales and profitability are used for personnel evaluation. 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. The percent of items scanned and the degree of price accuracy are included to give an indication of operating discipline.

In the area of capital management, the merchandiser has considerable responsibilities, primarily in the areas of shelf sets and product mix, display of merchandise, ordering, and shrink control. The Category Evaluation Report form was designed to facilitate management by exception and is the primary report to evaluate shelf sets and product mix. This report divides all the merchandise in a store into categories and yields information on the performance of a category. Additionally, the

**Matrix 2. Potential Contributions of Scanner Data
To Managerial Decision-Making**

Key: CEO = chief executive officer MER = merchandiser
 STM = store manager DPM = department manager
 EMD = EMID SCC = scanning coordinator

Level of application: High (H), Medium (M), and Low (L), and Not Applicable (*)

	Management Level					
	CEO	MER	STM	DPM	EMD	SCC
Facilities						
Real Estate Buildings	L	*	*	*	*	*
(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	*	*	*	*
Personnel						
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	*

Matrix 2. Cont'd.

	Management Level					
	CEO	MER	STM	DPM	EMD	SCC
Capital						
Allocation						
(1)real estate	L	*	*	*	*	*
(2)buildings	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
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	L
(3)net profits	H	H	H	M	L	*
Support to other managers	L	L	L	L	H	H

Illustration 1. Department Evaluation Report for the Merchandiser

Department Evaluation Report (Monthly)

Department: _____

	Total Sales	Dept Sales	Dept Sales % of Total	Dept GM	GP \$	GP % Total	Estimated Inventory Turns	% Price Integrity	% Scan
--	-------------	------------	-----------------------	---------	-------	------------	---------------------------	-------------------	--------

Firm

Zone 1

Store 1
Store 2

·
·
·

Store n

Zone 2

Store 1
Store 2

·
·
·

Store m

Zone r

Store 1
Store 2

·
·
·

Store s

GM = gross margin; GP = gross profits

Illustration 2. Category Evaluation Report for the Merchandiser

Category Evaluation Report (Monthly)

Store: _____

Dept: _____

<u>Category</u>	<u>Item Description</u>	<u># Items</u>	<u>Units Moved</u>	<u>% Dept</u>	<u>\$ Sales</u>	<u>% Dept</u>	<u>GM</u>	<u>GP\$</u>	<u>% Dept</u>	<u># Special Items</u>	<u>\$ Sales Specials % of Total</u>
-----------------	-------------------------	----------------	--------------------	---------------	-----------------	---------------	-----------	-------------	---------------	------------------------	-------------------------------------

aaa
bbb
ccc

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

**Illustration 3. Capital Management Sub-Category Reports
For the Merchandiser**

Sub-Category Reports (Evaluation of Product Mix)

(1) Reset Report (On Request)

Store: _____ Dept: _____ Category: _____

<u>Items</u>		<u>Units/</u>		<u>Unit</u>	<u>%</u>	<u>\$</u>	<u>%</u>			<u>%</u>
<u>Description</u>	<u>Size</u>	<u>Case</u>	<u>Price</u>	<u>Movement</u>	<u>Cat.</u>	<u>Sales</u>	<u>Cat.</u>	<u>GM</u>	<u>GPS</u>	<u>Cat.</u>

* This report is based on the ScanLab Store Topline Summary Report as printed in *ScanLab: Scan Data for Merchandising Decisions*, General Foods Corporation, 1984, p. 5.

** The Request Report shows weekly average figures for the previous period.

(2) Pricing Report (On Request)

Store: _____ Dept: _____ Category: _____

<u>Item</u>		<u>Movement</u>		<u>GP %</u>			
<u>UPC</u>	<u>Description</u>	<u>Size</u>	<u>% Category</u>	<u>Price</u>	<u>GM</u>	<u>GP \$</u>	<u>To Cat.</u>

Category Evaluation Report 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 category is chosen for scrutiny, various sub-category reports need to be developed for further information. To illustrate, the Reset and Pricing Sub-Category Reports contain more specific information to be used to reset shelves or to change item prices. Other reports used to evaluate product mix are the Slow Movement and the New Item Movement Reports (see Thomas). 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 Sub-Category Report was developed (see Thomas). This report compares total retail movement with movement from the warehouse to aid the merchandiser in ordering. Other reports to aid the merchandiser in ordering for specials and for holidays were developed as well. The Specialized Item Sub-Category Report lists items that have previously been specialized and gives price and movement information for the merchandiser to use as a basis for ordering (see Thomas). The Holiday Sub-Category File or Report gives similar information but is designed to show the performance of seasonal items or items of special interest at a particular holiday (see Thomas). This report is designed to collect information for several weeks prior to and after a holiday. This report should be filed and used as an aid in ordering for the holiday the next year. Finally, the Vendor Sub-Category Report was designed to compile information on all items represented by a particular vendor (see Thomas). This compiled information would be used to facilitate the dealings of the merchandisers with various vendors.

The merchandiser is also responsible for the advertising effectiveness in his/her department. Therefore, the Advertising Sub-Category Report was designed (see Thomas). This report provides information on the attractiveness of advertising efforts by giving figures

on the sales of specialized items. The report also gives profitability figures to indicate if the items on special are adversely affecting the profitability of the department.

These reports were those most often listed by merchandisers as desirable, wanted and/or needed. Few merchandisers would want all these reports; some might want reports not included. Each merchandiser should define his/her own individual needs and priorities and request only those which he/she will use.

Conclusions

This research substantiated the hypothesis that there has been little use of scanner-derived data by firms to capture the benefits available through the use of these data in managerial decision-making. Firms have tended to focus on the tangible benefits realized through the implementation of scanning systems (see Capps for a discussion of these tangible benefits).

It also substantiated the hypothesis that to design an efficient management information system, it is essential that managerial responsibilities be defined and stratified. Once done, analysis of the potential for scanner derived data in decision-making as well as the design of the form, content and timeliness for delivery of these data for each level of retail food distribution firm management may be determined.

Implications

Implications of this study may be categorized in two ways: (1) for industry applications of the results per se, and (2) for additional research needed to amplify and/or clarify the findings.

Industry Application

This research deals with the structure for defining managerial decision-making responsibilities. This research offers a firm the basic framework to use for analyzing its specific decision-making process and for

designing a management information system tailored to the structure of the firm.

Another potential application concerns the analysis and adaptation of the reports outlined in the generic management information system. Reports may be analyzed in terms of needs--content, form, timeliness--for specific management levels and/or responsibilities.

Additional Work

Many possibilities for future significant research became evident. Initially, it is worthwhile to conduct research in regard to the documentation of marginal costs from the implementation of information management systems. Additionally, there exists the need to study the decision-making structure of the retail grocery firms in much greater detail, focusing on responsibilities rather than the formal organizational chart. Third, additional work on the design of the 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 the scanner point-of-sale information system, direct store deliveries (DSD), and other information into one information system for inventory control and other purposes.

Still another area for potential research might deal with the development of an effective, efficient training program. This program might concentrate on optimizing the use of scanner derived information by managers. Overall, additional research in the area of information management should indeed be of primary concern to the retail grocery industry.

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