Computerized Checkout - An Update

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Presents a progress report on the development of the computerized checkout systems in retail food stores. Suggests areas for related research before the full potential of the new system can be realized.

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At the 11th annual meeting of the Food Distribution Research Society in St. Louis, a conference session was devoted to advanced checkout systems. Two computerized checkout systems, the IMS Marketron Retailer System and the Charecogn System, were presented and discussed. I will briefly discuss the progress since that time and highlight other developments related to establishing computerized checkout systems in retail food stores.

The total computerized checkout system is assumed to encompass the activities of ordering, inventory control, pricing, checkstand operations, sales analysis, management control, labor scheduling, advertising, promotion, and customer relations. All employees and management at the store, warehouse, and headquarters level will find their work methods influenced by a computerized system. It encompasses much more than the process of checking out the customer's order. The key to the system's effectiveness is the ability to scan code marked or tagged merchandise.

There are two developments of some significance that have a bearing on the rate with which computerized checkout systems will be adopted and installed in retail food stores. They are (1) industry agreement on the structure of a universal product identification code and (2) adoption of a standard machine readable symbol for that code. Until manufacturers, processors, and retailers agree on the code structure and symbol, the maximum potential benefits of computerized systems will not be achieved.

Almost all of the devices that are proposed for improving throughput at the checkstand and all of the devices for capturing specific transaction data at the checkstand rely on the use of a code number to identify each item. The way in which this identification process takes place varies with the type of system used. One approach might have a checker visually read the code and manually key it into the register which is connected to the computer. Other approaches use mechanical devices such as a scanner to read the code and pass it on to the computer.

The Ad Hoc Industry Committee has concluded that a 10-digit all numeric mixed code would be the most pragmatic solution to the code structure issue. This means that each manufacturer would be assigned a 5-digit identification code and he in turn would assign a code to each of his products. The 10-digit code represents a compromise between manufacturers and retailers and is compatible with the drug and national health items code.

The Ad Hoc Industry Committee has not selected a standard symbol to represent the code on individual products. Instead it chose to adopt tentative guidelines for symbol standardization. The symbol must be fully defined, which means it is necessary to determine specifications, including dimensional tolerances, color requirements, types of materials acceptable, etc. for every kind of package or container in use by the industry. Other factors such as the ease with which the symbol can be reproduced at the store, ease of readability without orienting the package to the machine, and effect on throughput must also be considered. At this time the guidelines for the symbol have not been developed completely and accepted by the grocery industry. Once the guidelines have been verified, the committee recommends operational tests of prototype scan systems in typical store environments prior to the final selection of a standard symbol.

A time table for the code that has been proposed by the committee indicates that a plan for administering the code will be developed, and in early 1972 a code management agency will be established. Following this action will come the many specific steps of conversion by manufacturer and retailer which will stretch into 1974. Guidelines for the symbol development will be finished this fall leading to in-store tests during 1972 with a target for selecting a symbol by early 1973. Following symbol selection it will probably be 1 to 2 years before scanning is being used extensively. Of course, this time table could be delayed slightly by current economic conditions and publicity given to the Marketron System financial problems.

The Charecogn System will be discussed first since we have the most detailed information on it. Last year Charecogn loaned a working trial model of their system

to the USDA for an evaluation to determine how well it satisfied performance specifications that had been previously proposed by the Department. This model was delivered to Hyattsville, Maryland, where it was set up in a laboratory for three months for an engineering and economic evaluation by the Wholesaling and Retailing Group of the Transportation and Facilities Research Division.

The system has as its key component, a hand-held electronic scanner that will "read" a code placed on the package. The code is identified in a computer with the specific size, brand, and price of the item. When the food item is checked out, the scanner reads the code and the item's price is immediately displayed at the cash register. After all of the customer's order is checked, the customer receives an itemized listing of all of her purchasers identifying each item by name, size, cost per item, and price per ounce.[1]

Results of the laboratory evaluation indicate that computerized checkout systems will reduce operating costs of retail food stores by 5½ to 7 percent, excluding the cost of implementing the system, with slight variations depending upon the procedures used to checkout the customers order. The estimated savings were approximately 1.2 to 1.5 percent of sales which is substantially more than the net earnings after taxes of .92 percent as reported by food chains for 1969. The savings estimates were based on the laboratory evaluation and an assumed representative supermarket with annual sales of $4 million. The potential savings figures do not include estimates for the presumed additional economic benefits that will result from having current, accurate product and management information.

In a simulated test in which a split checkstand was used, optical scanning improved checkstand throughput 18 percent. A 19 percent improvement in productivity was realized when the shopper unloaded the cart. For a store with a $4 million annual sales volume, the 18 percent increase in productivity represents a cost saving of $16,200 or a 1.9 percent reduction in operating costs. The 19 percent increase in productivity would result in a saving of $17,424 annually or 2.1 percent reduction in operating costs. An individual grocery item can be scanned and recorded in 1.14 seconds versus 1.74 seconds with a conventional register.

Checkout errors were reduced by an estimated $14,200 or 57 percent using optical scanning. This represents a reduction in operating costs of 1.7 percent annually. In addition, it is estimated that the length of time necessary to train checkers could be reduced by 33 percent.

Once universal product codes are placed on the grocery items by manufacturers, the need for price marking and repricing can be eliminated. A reduction in time spent taking inventory and ordering could result in potential savings of $10,200 or 1.2 percent of operating costs.

For the first time, the retailer can have instantaneous current product movement data which can be used for such specific studies as (1) shelf space allocation, (2) department profitability, (3) labor scheduling, (4) consigned goods identification, (5) shrinkage, (6) advertising and promotion, (7) pricing decisions, (8) new item evaluation, (9) out of stocks, (10) selecting product mix, and (11) other statistical data. Management will have a wealth of product movement information by individual product, department, store, and chain for each day, week, month, and year. Effective use of this information will result in substantial savings and reduced operating costs.

There is less public information available on other computerized checkout systems. The Marketron system that was undergoing store tests in Connecticut and California was removed from the stores and the company filed for bankruptcy under Chapter XI in March of this year. The Marketron Retailer System was based on having the checker manually input product identification codes through a keyboard. The code consisted of four numbers in most instances, with low number codes being reserved for the fastest moving items. IMS had plans for introducing an optical scanner with its system in a retail store this past summer but were unable to do so because of the financial problems. It is difficult to assess the impact of this company failure on the industry. It may very likely delay the start of in-store tests of other systems while both retailers and manufacturers alike seek to determine the probable causes of the IMS failure.

The Jewel Company has been testing a manual entry electronic indexing device in one of its stores for the past 18 months. Involving a 10 key indexing device, cash drawer, receipt printer, and logic system, Jewel's in-store computer terminal uses prices rather than codes and has successfully convinced management of the feasibility of an electronic checkout system. In fact, they have announced a tentative plan to have electronic checkouts installed in approximately one-fourth of their stores by July 1, 1973.

Zellweger, Ltd. had announced plans to have their APOSS Checkout System installed in a supermarket in Europe a couple of months ago. The APOSS symbol consists of a series of concentric circles of varying widths radiating out from a central point. It is read by passing the coded merchandise over a laser scanner that is fixed in the checkout counter. The checker places the items in the bag after passing them over the scanner. Special procedures are needed for handling difficult shaped items, such as those too small to be labeled or too large to be placed on the belt. At this time there has been no published report on whether the store test is actually underway or not.

RCA demonstrated their proposed symbol and an electronic scanning device at SMI in May 1971. It is similar in design and operation to the Zellweger system. While there has been no public announcement of intention to have a store test, it has been reported that one is planned early next year. Some of the other firms that have publicly announced electronic checkout systems include NCR, Sweda, Olivetti, Friden Division of Singer, American Regitel Corp., Sharp Corp. and Shinko Electric Co. of Japan. Of the models introduced by these companies, the NCR, Sweda, American Regitel, and Friden are designed primarily for department stores. The Olivetti uses auto-adhesive magnetic tape tabs which are removed from the item at the checkout and inserted into a slot in the machine. The Sharp and Shinko model is a manual input electronic cash register.

As indicated earlier, the computerized checkout system will affect most areas of operation at the retail store. In order to effectively obtain the maximum potential for the system, there are many related operations that still need to be studied and evaluated. Not the least of these is a successful test store installation under normal operating condition to verify projected potential savings. Some of the other types of research that should be undertaken include:

(1) Research to determine the best means for printing and applying product identification code labels on merchandise. Until these codes are printed on the containers at the point of manufacture or processing, it will be necessary to apply them at the retail store or at the warehouse.

(2) Research to develop cost benefit estimates for the many types of management information reports that could be generated from data provided by the system.
(3) Customer, checker, and management acceptance of all aspects of the system.
(4) Research to determine the best methods for handling perishable items to effectively utilize optical scanning.
(5) Work needs to be done to determine the optimum design for a checkstand that will appropriately incorporate the bagging function.
(6) Studies should be undertaken for the benefit of the small independent retailer to determine how he may effectively achieve some of the efficiencies made possible by the system.
(7) Research should be undertaken to determine the impact on warehouse costs.
(8) Finally, all operating procedures at the retail store, warehouse, and headquarters levels having a direct bearing on the system, should be evaluated to determine the most effective procedures to be followed to achieve an economical operation without sacrificing customer satisfaction.

In summary, in-store testing of computerized checkout systems will be a reality in the near future with probable wide-spread adoption of the systems beginning in about five years.

LITERATURE CITED

[1] A detailed description of the Charecogn System is contained in the **Journal of Food Distribution Research Vol. II, No. 1, The Proceedings Issue — 11th Annual Meeting, 1970.** A detailed description and report on the laboratory evaluation is included in "Computerized Checkout Systems For Retail Food Stores" by Ricker, H. S., and Krueckeberg, H. F. Copies may be obtained by writing to Dr. H. S. Ricker, Transportation and Facilities Research Division, Federal Center Building, Hyattsville, Maryland 20782.