Scanning the Future

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Chances are 50-50 that your last food purchase at a supermarket was scanned to determine the price. You also received a detailed item description of your purchase and possibly coupons for future repeat or complementary purchases.

At the same time, your purchase was providing valuable information to the supermarket. The manager can periodically check to see what items are selling, if a sales promotion is effective, which checker is busy, and for how long, and use other information that helps manage the store.
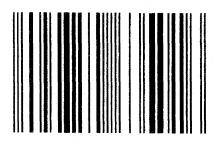
The Universal Product Codes (UPC's) are perhaps the most important innovation for the retailing industry since shopping carts or computers. Retail food stores are now shifting from conventional checkout systems to scanning checkout systems. Since the Kroger Company first installed a scanning checkout system in a retail store in July 1972, over 15,000 food stores have added scanning at the point of sale.

And scanning is gaining popularity worldwide. Just about all packaged retail merchandise has UPC markings. Apparel and footwear companies have developed programs for scanning, either using bar codes or scannable numbers that can be placed on items or on merchandise tickets. J.C. Penney pioneered the adoption among department stores. Mass retail, specialty, and department stores as well as smaller supermarkets are using scanning systems.

The Universal Product Codes (UPC's) are one of the most important innovations for the retail industry since computers. (William E. Carnahan)

Background of UPC

A system to speed up the checkout operation and eliminate the need to enter prices had long been a dream. The development of computers and scanning technology in the 1950's and 1960's brought the dream closer to reality. Retailing researchers at USDA's Transportation and Facilities Research Division had studied manual checkout systems in the early 1950's and developed standards and recommendations for improvements. In the mid-1960's they developed specifications for what an optical scanning checkout system would have to do to be successfully implemented. Industry, notably Radio Corporation of America (RCA) and Charecogn, Inc., picked up the challenge.

In 1970 a prototype developed by Charecogn, Inc., was delivered to USDA for technical evaluation. At the same time RCA and Kroger Company were testing a system. Charecogn, Inc. used a wagon-wheel-shaped code symbol and RCA used a target symbol. The RCA/Kroger work was proprietary; the USDA findings were made public in 1971. The latter showed that the system would work and would produce hard savings (improved productivity with faster checkouts, reduced errors, etc.) of 1.2 to 1.5 percent of sales, and soft savings (information for management decisionmaking) of more than twice the hard savings. These savings caught the interest of a retailing industry that was only realizing net earnings after taxes of 0.92 percent at the time.

Noting the symbol variation in the two tests and the prospects of other scanners that might require different symbols, food manufacturers became alarmed about the prospect of having to put a number of symbols on their product packages. A joint manufacturer, retailer, wholesaler committee was formed and in 1973 recommended the familiar bar code seen on most products today.

Two methods of scanning merchandise were originally developed, one using a hand-held scanning device and the other featuring a fixed mounted scanner. The latter was better adapted to the high volume food industry, while the former was adopted by many department stores and nonfood retailers. Both types of retailers could monitor sales almost instantaneously.

The retail food industry had been using mainframe computers to handle the large number of accounting functions associated with buying and selling 10,000 items per store and payrolls for the 50 or more employees common to stores in the early 1970's. Because scanners with the UPC codes could make data available in computer-ready form, there was a quantum leap in the data available for managements to assess their business operations and improve their markets and marketing skills.

In fact, data availability has become a real problem for food retailers. When you realize that today each shopper may buy from 10 to 80 or more items, each of which represents a piece of data, you can begin to understand the volume of data accumulated at a single store, let alone a large chain. Converting this mass of data to easily usable reports for different levels of management is the current challenge for the food industry.

Use of Scanning Systems

In 1983 a study of the benefits of scanning was made available to the industry by the National Grocers Association (NGA). Benefits are of two types: hard (tangible) and soft (intangible).

Hard Benefits
These are savings from improvements in speed or accuracy as a result of shifting from conventional checkout systems. Examples are:

- Improvements in checkout productivity (either items checked per labor hour expended, customers handled per hour, or labor cost per item).
- Reductions in shrinkage (product theft or loss).
- Reductions in store bookkeeping (balancing of cash registers, accumulation of total sales, sales by department, and sales tax collected).
- Reductions in labor for item marking and for item price changes.
- Improvements in produce margins from more accurate weighing.

Soft Benefits
These relate to savings from improvements in managerial decisionmaking because of the marketing and management information that scanning systems provide; they are more difficult to measure than hard benefits. Examples are:

- Improvements in shelf space allocation since sales volume and gross margin per item can be compared with the amount of shelf space allocated.
- Improvements in labor scheduling (predominantly cashier and bagger scheduling). Accurate sales data and customer counts by register, store, time of day, and day of the week over a period of time help in labor scheduling, by identifying peak shopping periods.

- Improvements in new item evaluation, which allow manufacturers and retailers to obtain a quick, accurate assessment of new item performance.
- Reduction in out-of-stock position. Improved product inventory and accurate product movement measures help reduce out-of-stocks.
- Improvements in advertising and promotion results. The impact of advertisements, coupons, and special displays is evaluated immediately and more accurately.
- Improvements in pricing decisions. The impact of a price change is readily available.

In addition, the most important benefit could well be the development of an information system designed to meet the special needs of a store. Typically a multistore retailer will initially use scanner data in support of headquarters-level merchandising decisions. At the store level, scanner data are typically used to improve the product assortment and shelf spacing to match consumer demand.

Coupons
Another major application of optical scanners is in various coupon systems. Coupons have long been used by manufacturers and retailers alike as promotional tools. A small portion of all coupons printed are redeemed, but that still means hundreds of redemptions per store each week. The retailer collects a handling charge from the manufacturer, who hopes the retailer has actually sold the right items for each coupon redeemed. With the UPC code on the coupon, it can be read by the scanner, after the consumer's order has been scanned to determine whether a corresponding item has been purchased or not. If not, the coupon amount is not deducted from the consumer's bill. This system also provides the retailer with knowledge

of whose coupons were redeemed and in what quantity.

Other approaches connect coupon-producing machines with the register. As the shopper's order is being processed, the coupon dispenser determines if there are related or competing items in the system and prints out corresponding coupons that could be redeemed on the next shopping trip. The manufacturers pay a fee to have their coupons in the system. Coupon redemption with this system is reported to be twice the normal rate, and the coupons specify they are to be redeemed at the issuing retailer's store.

In some stores customers fill out an application form to obtain a scannable ID card for special coupon benefits. The card is presented to the checker at the checkout counter, the order is scanned, and the customer is automatically credited with the coupon value for any items purchased if there is a coupon in the system. The manufacturer pays to have the coupons registered in the computer. The shoppers get the savings, without having to bring in coupons, and retailers and manufacturers get information about the types of people buying their products. This information helps them to target their marketing, especially advertising and promotion efforts.

Research Application

Translating scanning data into information for management decisions is a promising area of research. One approach is a management information system to identify key performance areas and indicators required for various managerial positions. This identification allows for a management by objectives orientation. The critical element of this system is a central data bank from which key reports are generated. The software must have the capacity for database management, analysis, graphics, flexible reporting, and modeling, all in a user friendly environment.

Management of scanner data has traditionally been considered a mainframe application regulated by highly specialized technicians. However, now retail firms may use personal computers to evaluate product performance and sales trends, and to track certain items.

Across the country thousands of households are knowingly participating in advertising tests in return for certain promotional premiums. Their TV viewing habits are monitored and they see selected commercials mixed in with regular commercials, while a demographically matched set of households do not see the same ones but see others. When they shop for

food, they both present their ID's to the checker and their orders are processed. This system is like one of the coupon systems except that this time the manufacturers get response information about their advertisements—providing quicker information about a campaign than traditional methods.

Consumer Resistance

Gone are the days when every item had its own price stamped on it, which is probably the one thing that consumers dislike about scanning systems. Retailers try to offset this issue by vigorously monitoring shelf tags and product spacing to be sure the right price is associated with the right merchandise. These shelf tags also provide unit price information which aids in comparison shopping. Some retailers still put the price on each item 1) as a promotional merchandising effort, 2) because it is required by law in their State, or 3) because they are not yet scanning. On balance, consumers benefit from faster, more accurate checkouts, and more product and price information than they used to receive.

The Future

A tremendous potential still remains for realizing the intangible benefits of scanning.

Decisonmaking

A few firms are using some scanner-derived information in decisionmaking, but a major barrier has been building software to process the data into useful forms. Most retailers still lack the resources and expertise needed to organize and analyze the scanner data. Because of some problems in obtaining accurate data as well as obtaining too much that cannot be presently used, some retailers doubt the value of scanner data in decisionmaking. Changes in item's

UPC, size, number in a case, and description require computer file maintenance procedures. Also, the data base should include information on factors which may influence item performance: out of stocks/no distribution, shelf inventory levels, type of merchandising activity, pricing errors, and allowances from manufacturers. It will be 3-5 years before most retailers can use this information.

Shopping from Home

Now that nearly every item in the food store has a unique product identification number and scannable code, the time is not far away when consumers will be able to order food at home, be assured of specific product quality, and have it delivered. This concept may take the form of scannable codes in a catalog to be scanned on a home scanner. Or, a home computer may be used with a modem and phone to dial up a catalog, and an order may be placed by using a keyboard or mouse for data entry.

Economic Research

The availability of daily sales volume and pricing information collected by scanning checkout systems has almost unlimited potential application in economic research and management decisionmaking. Because scanner data has been generated with enough reliability and consistency for economic research only since 1979, there has been limited use of scanner data as a basis for demand analyses.

Nutrition Information

As a result of diet and health concerns of consumers, nutrition information may be readily available by code in the near future and may supplement the information collected by officials from the Department of Health and Human Services and USDA.

Yes indeed, the future is scannable!