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**Changes in Retail Food Delivery:  
Signals for Producers, Processors and Distributors**

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## **Changes in Retail Food Delivery: Signals for Producers, Processors and Distributors**

### **ABSTRACT**

This paper contains two chapters related to changes in retail food delivery and sales. The first discusses trends in consumer demographics and lifestyles and how these continue to drive changes in the way food is prepared and delivered to consumers. Retail stores are responding with new formats: providing more ready to eat foods; more convenient store layouts; lower prices and better service in niche markets across the country. Their demands send signals up the food chain to processors and producers that alter their production and inventory decisions. Electronic information technology speeds these changes and leads to more efficient operation with, allegedly, better service for consumers.

The second chapter discusses how advances in information technology affect not only the internal business operations in food firms throughout the food supply chain but also how the product flows and how businesses link their processes together. The reengineering of the food supply chain by way of an industry-wide initiative called “efficient consumer response” (ECR) is explained and analyzed for its motivations and implementation, thus far. The many facets of ECR such as product replenishment and promotion are discussed. Lessons learned from ECR include that it is possible to accommodate the coexistence of firms of various sizes and types, and that the role of trade associations in facilitating industry-wide changes is vital and impressive.

**Changes in Retail Food Delivery:  
Signals for Producers, Processors and Distributors**

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# **CHAPTER 1:**

## **Consumer Trends and Changing Food Retailing Formats**

**By Jean Kinsey and Ben Senauer**

Dramatic changes are occurring in the way retail establishments deliver food to consumers, largely in response to dynamic and diverse trends in American lifestyles. Fundamental changes in demographics, labor force participation, and income distribution continue to dictate changes in the food system. The most successful food firms are organized to deliver the most desirable combination of food and service to consumers. Basic production, processing, logistics and marketing strategies in food and agribusiness companies are geared to producing goods and services that "bring the consumer back". New forms of integration and coordination between companies in various parts of the food system are based on information systems that start with the retail customer. Understanding how this system transmits information from the retailers to suppliers and how consumers' food demand and shopping patterns are changing can help predict the future direction of the entire food system.

This paper will analyze the consumer trends that lead to new store formats and new ways to deliver food and how food retailing companies have responded. These alternatives have increased the competition for traditional grocery stores and supermarkets and they are scrambling to maintain their traditional share of the retail food market. Changes in store design and layout, product mix, service and ambiance will be examined as will the impacts of these changes on food processors and agricultural producers upstream.

## THE CHANGING CONSUMER

There has been a sea change in the demographics and lifestyles of the American consumer. In a capsule, they include: a slower growth in population, greater ethnic diversity, an aging population, more women in the labor force, and slower growth in income and a widening disparity in its distribution.

The population growth rate which was over 1.7% per year during the post-war baby boom (1946-64) is now only about 1.0% per year. The Census Bureau projects that by 2025, Hispanics will constitute the largest minority group with 57 million, representing 17% of the population versus 10% now. Asians are the fastest growing ethnic group and their population is projected to reach 26 million by 2025. Together, African-Americans, Asians, and Hispanics will constitute over 38% of the population by 2025 versus 27% today (U.S. Dept. of Commerce, 1996).

Those age 65 and over will increase from 13% of the population today to over 18% with 62 million by 2025. Those 85 and over will double from 3.6 to 7.5 million. All these demographic changes imply that total food sales will not grow very much, a greater variety of ethnic foods will be consumed, and the elderly will increase demand for healthy, nutritious food.

The increased labor force participation of women is one of the major social and economic phenomena of our time with far reaching implications. Only 43% were in the labor force in 1970 compared to 59% in 1994. For women ages 35-44, the participation rate in 1994 was 77% compared to 93% for men of that age (U.S. Dept. of Commerce,

1996, p. 399). This trend is behind much of the rising demand for convenience. Many consumers do not have the time to prepare traditional meals and increasingly even lack the knowledge of how to cook. After work, they want a meal to eat, or at most, assemble at home; not ingredients to cook. They also want to relax in the comfort of their own home and not spend time at a full-service (sit-down) restaurant.

No wonder then, that the fastest growing segment of the restaurant business has been fast food, and drive-through sales have been a major factor. Their sales doubled between 1984 and 1994 capturing 52% of all restaurant sales (Price, 1995). More generally, consumers now spend almost one-half (47%) of their total food dollars for the 37% of their food (by volume) that is consumed away from home (Food Institute, 1996b, p. 7; Manchester & Clauson, 1995). Clearly the value of time for many consumers is higher than the extra costs of purchasing food ready to eat. In terms of the theory of household economics, wage rates exceed marginal productivity of household production (of food). This, in combination with the fact that the real cost of food to U.S. households has fallen by about one-third since 1960, leads to a great demand for value added services in the food sector.

Take-out food combines value-added services (cooking) with freshness, variety, and the comfort of eating in your own home. It is obtained from a variety of types of restaurants, delicatessen shops and grocery stores. The Food Marketing Institute (FMI) reports that shoppers buy 48% of their prepared take-out food at fast food places, 25% at other types of restaurants, and only 12% at supermarkets (Food Institute, 1996a).



Real GDP per capita rose 36% from 1973 to mid-1995 but real hourly wages of non-supervisory workers fell by 14%. During the 1980s, all the earnings gains went to the top 20% of the workforce (Thurow, 1996). The real income of the middle quintile of American households has risen only slightly over the past 25 years and there has been an actual decline in the incomes of those below the median (Schwarz, 1995). The Gini index for U.S. household income rose from 0.396 in 1970 to 0.428 in 1990 (Nelson, 1994).

These income trends follow a division in the work force as well, where about one-third report working over fifty hours a week and about one-third work only part-time, or part of a year, or rarely. Following these income and work force schisms, food shoppers can be roughly divided into two broad groups: those with lower incomes who are "economizers or price conscious" and the "convenience-oriented" who are looking for ways to save time. FMI puts the size of the two groups at about 45% and 55% of the market, respectively (Sansolo, 1996) [See Figure 1]. Although we spend only 11.4% of personal disposable income on food and the average household spent 14.2% of its income on food in 1994, the budget share was much higher for lower-income households. Food expenditures as a percent of household income after taxes were 34.8% for those with incomes of \$5,000-\$9,999; 24.2% for \$10,000-14,999; 21.0% for \$15,000-19,999; and 17.3% for \$20,000-29,999 but only 8.5% for those with incomes of \$70,000 and over in 1993 (Putnam and Allshouse, 1996) [See Figure 2].

The "convenience-oriented" group contains many families with dual-income earners, in which both the husband and wife have professional positions. Characteristics of those who report time being a tighter constraint on their decisions than money, include being age 35 to 49, married, white, earning over \$50,000 per year, having a professional or white collar job, and staying home most Saturday nights (Crossen and Graham, 1996). Some 51% of households with incomes less than \$15,000 report looking in newspapers for grocery specials "pretty much every time they shop" versus only 30% with incomes over \$50,000 per year. Likewise, 39% buy store or lower-price brands and 9% shop at discount or warehouse stores for grocery items compared to 16% and 5%, respectively, in the higher-income group (FMI, 1995, p. 29).

**FIGURE 1**  
**Two Broad Groups of Food Shoppers**

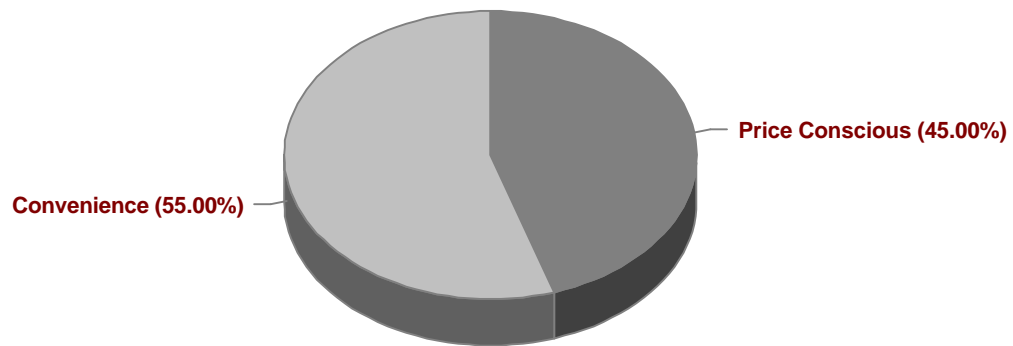
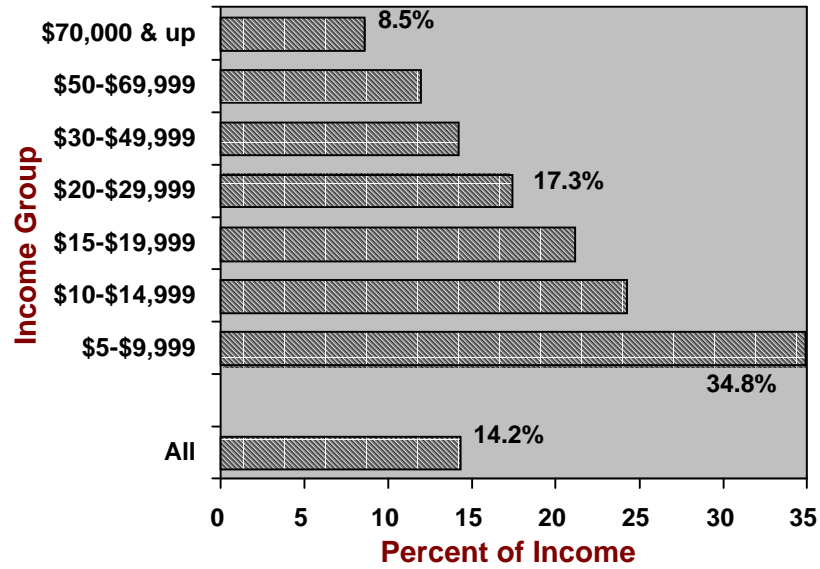


FIGURE 2

**1993 Expenditures for Food as a Percent  
of Household Net Income**

Consumer Expenditure Survey - BLS



## FOOD RETAILING CHANGES

Traditional supermarkets are facing serious new competitive challenges from supercenters at the price-conscious end of the market and from "home meal replacement" providers at the convenience-oriented end. Supercenters with an average size of about 150,000 sq. ft. devote about 40% of their space to grocery items and the rest to discount general merchandise. Supercenters accounted for only 2.0% of all groceries by commodity volume in 1994, but that is projected to grow to 7.4% by 1999. There were 380 supercenters operating in 1994 with a projection of 1,200 by 1999 (Food Institute, 1996b, p. 125).

The major supercenter operators are Wal-Mart, K-mart, Fred Meyer, and Meijer Stores. Traditional supermarkets are very concerned about the level of efficiency and, hence, price competition supercenters bring to the grocery business. A major motivation behind the "efficient consumer response" (ECR) initiative is to get ready to compete with these new competitors, especially Wal-Mart. The average grocery retailer has operating expenses equal to 21.8% of sales, whereas Wal-Mart's operating costs are only 17.5%. Even after full implementation of ECR, operating costs for the average grocery retailer are estimated to be 19.3% (Blattberg, 1996).

Traditional grocery sales are stagnant. Even though sales rose 1% in real terms in 1994, real per capita spending on food in grocery stores fell over 4% while per capita spending on food away from home rose over 3%. On the brighter side, food service sales in grocery stores are growing at 2% per year in real terms and are expected to reach \$5 billion in 1996, a 4.5% increase from 1995 (Hammonds, 1996; and Love, 1996). Although growing rapidly in response

to the demand for convenience, the market for prepared take-out food has many competitors. One of the fastest growing is "Boston Market," which is built specifically on the concept of providing consumers "a home replacement meal" at a reasonable price. As of May 1996, Boston Market had 898 stores out of the 3000 they plan to build in four years.

### **Selling Convenience**

The concept of convenience is to save consumers time. Reducing the preparation required prior to actually consuming a product is one form of convenience. In this vein, sales of pre-washed, pre-cut produce, such as carrots and celery, and ready-to-eat packaged salads have grown rapidly (about 15% per year in a typical supermarket). Most consumers are certainly aware they are paying more, but obviously they are willing to pay for the value-added in terms of increased convenience.

There are at least two other dimensions to convenience from the food shopper's perspective. One relates to the number of tasks that can be accomplished during a single shopping trip or in a single store and the other relates to the ease of shopping and time required to shop. To improve their one-stop shopping appeal, supermarkets have been adding new services, such as banks, florists, video rental, and pharmacies even though the proportion of shoppers who use these specialty departments remains small. Only 13% make a purchase from in-store pharmacies and only 4% make a floral purchase (FMI, 1991).

To make it easier and quicker to shop, supermarkets are changing their interior designs or floor layouts. A model of the traditional and new grocery store layouts are on Figure 3 and Figure 4. Newly designed or remodeled stores are expanding their prepared foods/deli into a

"food court" with perhaps even a sit-down-to-eat area. The customer is able to walk directly to the departments like dairy, deli and produce without walking through all the dry and canned goods. This will help them compete with convenience stores. Supermarkets are also trying to improve their overall ambience with amenities like fireplaces, carpeting, and entertainment for children.

The ultimate convenience is home shopping in which consumers give their order by phone, fax, or even using their home computer after looking at a catalog or visiting a web-site. Peapod Inc. is a home shopping service initially operating in Chicago and San Francisco in which the customer can browse "electronic aisles." Peapod employees then go to designated supermarkets to fill orders (Food Institute, 1995, p. 186). Twenty-four percent of stores offer home delivery and 3% of customers currently use it (Food Retailing Review, 1996).

FIGURE 3

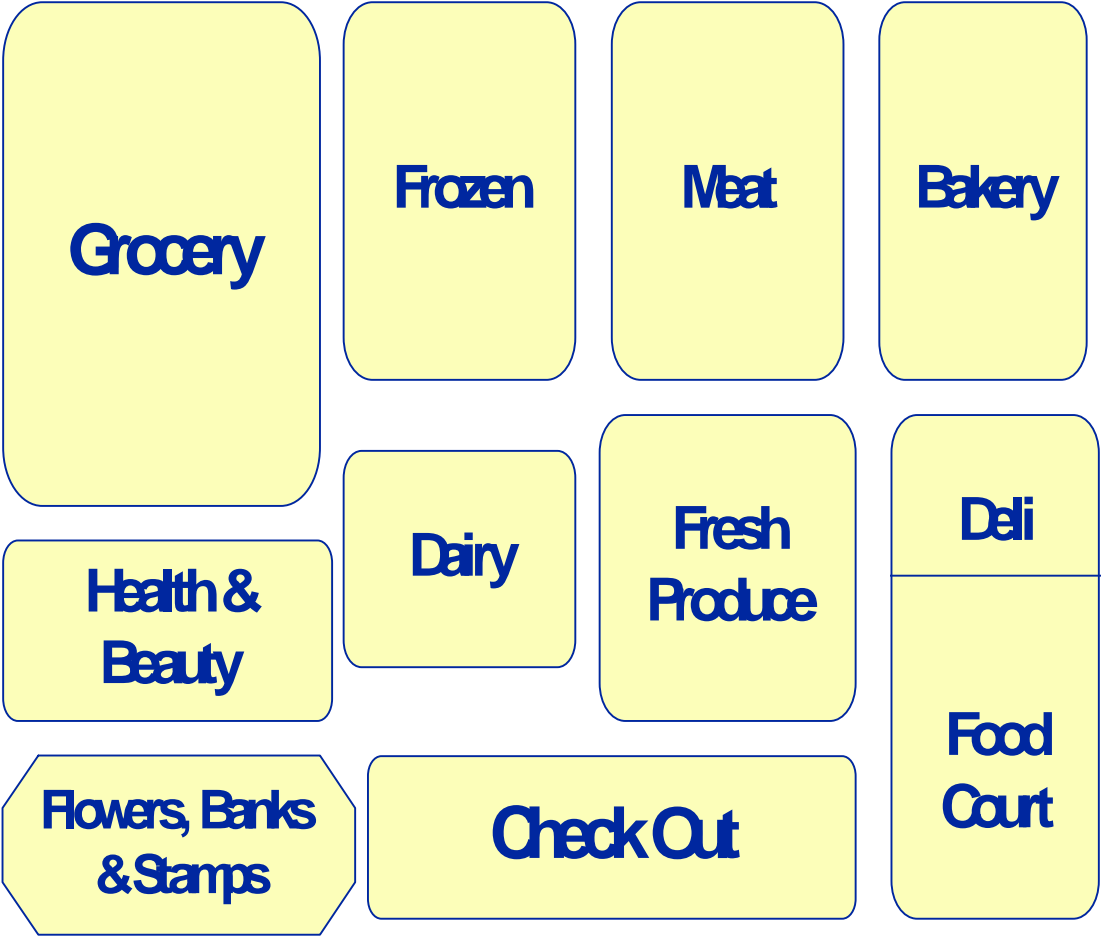
# Traditional Grocery Store





FIGURE 4

# NewGrocery Store



## **Efficiencies**

Food retailers are now moving towards realizing the full potential of point-of-sale scanner data. Even though the food industry was the first to use electronic scanning of price and product at the point of sale, they lagged other retail sectors in adopting it to streamline the entire distribution system. Now, instead of just using scanners to speedup checkout and verify prices, the goal is to automate reordering (continuous replenishment) and eliminate excess inventory and excess variety. A seamless flow of data back to vendors and food manufacturers and a paperless payment system would save billions of dollars in transaction costs that are currently incurred. For example, “pay on scanning,” would allow the retailer to pay the vendor electronically when a consumer purchases the product and it is scanned. This would eliminate the cumbersome task of invoicing shipments at the backdoor and, of course, reduces the costs of inventory to the retailer. Moreover, electronically sharing information between trading partners as part of ECR will increase efficiency and, potentially, consumer satisfaction.

Scanning, available now in over 97% of supermarkets, facilitates a variety of customer loyalty programs. An estimated 20% of supermarket chains and 13% of independents have electronic frequent shopper or loyalty programs (*Minnesota Grocer*, Spring 1996). Frequent shopper programs can thus be the basis for sophisticated database marketing which targets products to consumers based on their purchase patterns and demographic characteristics. Although there may be both privacy and equity issues

associated with this type of competitive marketing, there has been little objection from consumers.

### IMPLICATIONS FOR THE ENTIRE FOOD SYSTEM

The food system has shifted 180 degrees from being producer-driven to being consumer-driven. The power in the system is at the retail end because retailers receive the information about consumers' preferences first. This information gives them power to compete with other retailers, to negotiate with venders and to respond to consumers. This information, which is reluctantly shared, will be transmitted directly to food manufacturers and other venders in an efficient consumer response system. This induces at least two other fundamental changes in the food system. It builds stronger alliances between retailers and venders who have traditionally been adversaries. It also changes the objective function for firms up and down the food chain from that of maximizing revenue to maximizing return on assets (profits).

Traditionally, supply was pushed through the system from farmer to processor to wholesaler using volume discounts to push product to the next stop down the food chain. Some venders even paid stores to put their products on the shelf leading to a phenomenon of "making more money by buying product than by selling it." When inflation was relatively high, wholesalers and retailers could make money by holding large inventories of several products, buying low and selling high. In the end, consumers were sometimes offered coupons or price cuts to move the product out of the store.

Increasingly the system is being designed to respond to consumer demand as quickly as possible. Inventories are getting leaner, and distribution costs are declining. New products that most directly respond to the wants and needs of consumers are the most successful. Nabisco SnackWells, a line of cookies and crackers which combines reduced fat and good taste, has been one of the most successful products introduced in the last several years. Reformulating recipes and packaging to respond to consumers' preferences for specific food characteristics will be faster and more precise.

In addition, there are growing niche markets that provide unique opportunities for entrepreneurial small businesses and even agricultural producers themselves. Some examples are fresh herbs such as basil for Mediterranean cuisine, craft cheeses like goat cheese, and the phenomenal growth of micro-brewed beers. In particular, the natural/organic market niche is starting to grow. Occupying about 3-4% of produce sales over the past decade, it has becoming much more sophisticated with retailers such as "Whole Foods Market," headquartered in Austin, Texas. Sixty-five percent of traditional supermarkets now carry natural/organic foods and 24% of grocery shoppers say they buy them at least once a week (FMI, 1995b, pp. 44-45).

Consumers' demand for more convenient products with more value-added and for products with particular characteristics, is partly driving the industrialization of agri-culture. Food manufacturers require consistent uniform quality in the raw or semi-processed commodities they receive. More buying is being done with strict quality specifications and more farm production is being done under contract. The fast food industry, in particular,

has been a major factor in these trends. McDonald's buys only Russet Burbank potatoes for its french fries and they must meet strict size and moisture standards. With 9,744 U.S. outlets and U.S. sales of \$14.9 billion in 1994, McDonald's buys over 6% of the entire U.S. potato crop (Food Institute, 1996b and McDonald's, 1996). Contract farming provides secure markets and decreases the price risk faced by producers. However, some farmers may face a virtual monopsony situation in which there is a real imbalance of power. There will be new incentives for farmers to form cooperatives or networks. A striking example is the North Dakota wheat producers with their own pasta plant.

Quality control is becoming more important throughout the entire food system. With growing ready-to-eat sales, the importance of food safety and health standards increase greatly as food is held in very perishable forms and is handled by third parties just prior to eating. The Hazard Analysis Critical Control Points (HACCP) concept is being adopted by food processors and even retailers to insure quality and safety. Quality certification by third parties is growing. ISO 9000 is an international quality control process widely used in Europe.

Overall, the entire food system is in a very dynamic period. In large part, the changes are being driven by fundamental shifts in consumer wants and needs, by the availability of information technology and, by a quest for profits over volume. Macroeconomic and social forces that coincide with these changes are lower inflation, slower population growth, wider income distribution and sharper ethnic and philosophical distinctions. Signals received at the retail end of the food chain work their way back

downstream and determine the products produced and manufactured throughout the food system.



## **CHAPTER 2: Reengineering the Grocery Supply Chain**

**By Robert P. King and Paul F. Phumpiu**

The food supply chain moves food from the farm gate to the consumer, transforming raw commodities into products that can be conveniently purchased, prepared, and consumed. This chain is comprised of food procurement, and manufacturing companies, food wholesale and distribution firms, brokers, food service firms and restaurants, and retail grocery firms. It is remarkable for its efficiency, diversity of firm sizes and types, and responsiveness to consumers.

"Reengineering" is the radical redesign and restructuring of business processes (Hammer). In place of incremental adjustments to changing conditions and opportunities, it calls for a rethinking of business activities, information flows, and organizational forms from a whole systems perspective. Reengineering is evident throughout the food supply chain and the broader food system. Perhaps the most comprehensive reengineering effort, however, is the grocery industry's Efficient Consumer Response (ECR) initiative. This industry-wide, collaborative effort is bringing together food manufacturers, distributors, brokers, and retailers. The aim is to increase both intra- and interfirm efficiency through new forms of cooperation and coordination that are often based on applications of information technology.

This paper presents an overview of the ECR initiative. By focusing on ECR, we limit our attention to the segments of the food supply chain that make up the grocery



industry. We do not consider reengineering efforts by food service firms and restaurants, nor do we examine the "industrialization" of agricultural production (Urban; Barkema; Boehlje), which can be viewed as a form of reengineering. However, we believe the ECR initiative provides useful insights for understanding change throughout the food system.

In the sections that follow, we first establish the historical context for current changes in grocery industry. We then describe reengineering efforts in the four core business processes that are the focus of ECR: selection of product assortments, product replenishment, product promotion, and new product introduction. In the concluding section, we identify some of the key lessons to be learned from the ECR initiative.

### **The Historical Context for the ECR Initiative**

Far-reaching structural change is a familiar phenomenon in the U.S. food industry. Going back to the end of the nineteenth century, improvements in transportation and communications infrastructure, new manufacturing technologies that made mass production feasible, and new management practices were transforming American business (Chandler). In the food supply chain, these changes fostered the emergence of food processing companies that mass produced products for national markets and food retailing chains that could deliver these products to mass markets (Connor et al., pp. 45-51; Mayo, pp. 76-92). Another fundamental structural change began in the 1930's with the appearance of the first supermarkets and continued in the years after World War II with the emerging dominance of this retail format (Mayo, pp. 117-190). Supermarkets transformed business processes and the competition for customers at the retail level, fostered expansion and new efficiencies for

wholesale distributors, and gave food manufacturers new opportunities to expand operations, increase efficiency, and develop a wide array of new products (Mayo, pp. 189-90; Connor et al., pp. 51-52).

During the 1970's and 1980's, changes in information technology initiated a new round of structural changes in the food supply chain (Walsh, pp. 89-106). One important development was the introduction of scanning technology and the Uniform Product Code in the 1970's. At the store level, this brought noticeable changes for consumers at the checkout line. Equally important, however, these technologies transformed the ordering process, enabling electronic data interchange (EDI) of orders to wholesalers and manufacturers. At the same time, the emergence of industry supported mechanisms for sharing scanner data began to give firms in all segments of the food supply chain access to timely, accurate, highly detailed data on product movement (Cotterill). This made it possible to schedule production and manage inventories more efficiently, and provided the raw data resources for more sophisticated analyses of consumer preferences and buying patterns. Information technology-based changes in food manufacturing technology also helped foster change by lowering setup and changeover costs, making it less expensive to schedule shorter production runs of a larger number of products and product sizes. Finally, advances in information technology led to improvements in warehousing and logistics that lowered supply costs and dramatically shortened the time between receipt of an order and delivery to a retail store.

These relatively recent advances in information technology affect not only internal business operations in firms throughout the food supply chain but also the business processes that link firms. The ECR Performance Measures Operating Committee (p. 1) identifies three primary product distribution channels for the grocery industry: wholesaler supplied, self-distributing retailer, and manufacturer direct store delivery (DSD). In the wholesaler supplied channel, the three fundamental processes in the system -- manufacturing, distribution, and retailing -- are performed by separate firms. Products flow from manufacturers to distribution centers operated by a wholesaler, and then on to retail stores. In the self-distributing channel, distribution and retailing are under the control of the same firm. Products flow from manufacturers directly into distribution systems owned and operated by the retailer. Finally, in the (DSD) channel, manufacturing and distribution are under the control of the same firm. Products flow to retailers through distribution systems owned and operated by manufacturers. Information technology and new business practices can help make the products consumers want flow faster through all these channels and reduce inventories at all levels of the system, but the benefits derived from these advances can be realized best through comprehensive, integrated redesign of information systems and business processes. Such change is difficult to achieve in an industry with many participants and a complex structure.

As in the past, new technologies, business practices, and market conditions have created opportunities for new competitors in the grocery industry. Large, self-distributing general merchandisers -- notably Wal-Mart and now Target -- entered the retail grocery

business after the introduction of the new information technologies that are transforming the food supply chain and brought with them sophisticated retail information and logistics systems already designed to take full advantage of these technologies. Also, because of their size, they have been able to innovate in the design of new relationships with suppliers, such as that Wal-Mart established with Proctor & Gamble to support their Every Day Low Pricing (EDLP) strategy (Thomas, Staatz, and Pierson). More recently, “category killers” that specialize in a single line of products sold in supermarkets have become another important competitive factor. They gain competitive advantage by replicating standardized formats and business processes in a large number of stores and by exercising volume buying power with a narrowly focused set of vendors.

## **The ECR Initiative**

Recognizing new opportunities for cost savings and improved service to customers and challenged by new competitors, firms throughout the grocery industry have responded with the ECR initiative. First articulated early in 1993 in a report prepared by Kurt Salmon Associates, Inc. (KSA), the vision for ECR is a system characterized by “timely, accurate, paperless information flow” and “smooth, continual product flow matched to consumption” (KSA, p. 1). Participation by individual firms and a wide range of industry trade associations is coordinated under the Joint Industry Project on Efficient Consumer Response.

Value chain analysis (Porter, pp. 33-61) is a fundamental concept in the ECR initiative. A value chain represents the internal structure of a business. The elements of a generic value chain include primary activities -- inbound logistics, operations, outbound logistics, marketing and sales, and service -- and support activities -- procurement, technology development, human resource management, and firm infrastructure activities such as accounting and general management. The individual firms in an industry are part of a value system that is made up of separate but interlinked value chains.

One way firms can gain competitive advantage is by redesigning elements of their own value chain. They can also gain competitive advantage by redesigning linkages to the value chains of their trading partners. In both cases, costs can be reduced and/or better services can be provided through improved coordination achieved by sharing information or realigning incentives, through redesign of linked activities so they mesh more effectively, or through reconfiguration of activities to eliminate some linkages altogether.

The ECR initiative focuses on reengineering activities and linkages in four fundamental processes that run through the entire food supply chain: selection of product assortments, product replenishment, product promotions, and new product introductions. Only through system-wide changes can potential gains in these areas be fully realized. Cooperation across the system has been possible because, at least in principle, these gains should be large enough to leave all participants in the system at least as well off as they were before the changes. In the remainder of this section, we describe ECR strategies for each of these four processes. In our descriptions, we place particular emphasis on the organizational mechanisms being used to reengineer intra- and interfirm linkages.

Product Assortment: Making the right products available to consumers and merchandising them effectively is the focus of ECR efforts directed toward efficient product assortment. Retail stores make product assortment decisions to best use their limited selling space. Moving back through the food supply chain, efficient assortment at the store level can induce more effective use of distribution center space and send better signals to manufacturers, allowing them to produce a mix of products and package sizes that matches consumer demand.

Category management is the central element in the ECR strategy for efficient product assortment. The Category Management Report prepared by the Category Management Subcommittee of the ECR Best Practices Operating Committee and the Partnering Group, Inc. is an excellent overview of category management practices. Under category management, individual items are grouped into a category defined on the basis of consumer

needs and perceptions. A category will include related products from multiple suppliers. In some cases -- pizza, for example -- those products may be sold in several departments within the store. Ideally, procurement, marketing, and merchandising for a category are coordinated under a single strategy that is tailored for the store's customer base. This is a complex task that requires not only merchandising skills and an understanding of local customers, conditions, and buying patterns, but also data on broader market trends, knowledge of interrelationships among demands for complementary and competing products, and an understanding of psychological research on consumer behavior. The skills, knowledge, and data required for category management are distributed across the food supply chain but do not come together in any single segment. Therefore, category management is possible only with cooperative arrangements that cross firm boundaries. These partnerships can take several forms.

For products that move through the wholesaler supplied and self-distributing retailer channels, category management relationships are often centered at the wholesaler or retailer corporate headquarters level. Looking upstream, a category manager will establish a partnership with a counterpart working for a single key supplier. This bilateral relationship gives the distributor/retailer access to industry level expertise and information that resides with the supplier. It gives the supplier access to store level data for its own and competing products and opportunities to be participate in store level marketing and merchandising experiments. Together, the partners develop a general strategy for the entire category -- including products supplied by the supplier-partner's competitors. Looking downstream,

the distributor/retailer category manager works directly with store managers or through corporate retail consultants to fine tune the product assortment and shelf space allocation strategies at the store level.

For products that move through the DSD channel, a relationship at the corporate level may be replaced or supplemented by a partnership between an individual store and a local category manager working for a supplier. The DSD vendor category manager, who is often supported by corporate category management specialists, uses store level data to customize the product assortment and shelf set for the entire category, including products from competing suppliers. Again, parties in the partnership gain access to data, knowledge, and opportunities for direct interaction with customers that would not otherwise be available to them.

These relationships share several noteworthy features. First, the distributor or retailer establishes a partnership with a single key supplier -- not with all suppliers. Second, the partnerships allow data, expertise, and effort to flow across firm boundaries without direct monetary payments. Finally, within and across organizations, performance is measured by “scorecards” which stress profitability measures that will lead to win-win results and will penalize a party that acts only in its own self interest. As such, a category management partnership creates an intrafirm-like context for an interfirm relationship.

Product Replenishment: Efficient replenishment strategies promote faster, less costly movement of products through the supply chain, while reducing product inventories throughout the system. Efficiencies can be achieved by improving physical distribution



systems. They can also be realized through faster, more accurate transmission of orders, billing, and product information. Finally, better use of data and information that is distributed through the system can also be an important source of efficiency gains.

Improvements in the physical distribution system are being made through intrafirm reengineering of warehouse and logistics operations and through the redesign of processes that link separate firms. Supervalu's new regional distribution center in Anniston, Alabama, is an example of internal reengineering (Mathews). Slower moving, high value food and non-food items flow through this state-of-the-art facility to downstream distribution centers. Complete pallets of some products are cross-docked to downstream distribution centers. Also, new product picking technologies facilitate assembly of mixed pallets for store level orders that can be cross-docked onto store-bound trucks at the downstream distribution facilities. Interfirm reengineering efforts in logistics and distribution are exemplified by warehouse picking systems that support assembly of mixed pallets with items arranged to minimize labor required for store shelf restocking (Holistic Work Group of the ECR Best Practices Subcommittee and CSC, p. 53). Such systems requiring sharing of store layout information and are less costly to implement when store layouts are standardized.

Improvements in the flow of orders, billing, and product information are being based on increased use of Uniform Communication Standard (UCS) transactions sets for EDI. EDI allows instantaneous, paperless transmission of data within and between firms. Because transactions are standardized, data can be readily transferred into internal information systems, even when those systems differ across firms. Potential cost savings and system-

wide efficiency gains from EDI are substantial, but so are the costs of implementation. Considerable progress has been made in the shift to EDI, but benefits can only be fully realized when adoption is universal.

Better use of firm level data on item movement and inventory levels is one way to increase efficiency in the replenishment process through more effective use of information resources. Computer Assisted Ordering (CAO) has long been used in warehouse operations to generate orders based on current inventory, movement projections, and optimal reorder points and order sizes. Efforts are being made to implement CAO systems at the retail store level. This will require greater accuracy of the scanner data required to maintain perpetual inventories and changes in firm cultures that value the judgement and expertise of order writers who base decisions on visual inspection of shelf stocks.

Continuous Replenishment Practices (CRP) are a still more sophisticated approach to using data more effectively. Under CRP, the customer (a warehouse or retail store) shares data on item movement and inventory with the supplier (a manufacturer or warehouse). The supplier uses this information to write orders for the customer in a way that minimizes replenishment costs subject to maintenance of an acceptable service level for the customer. For example, under a CRP relationship between a manufacturer and a wholesale distribution center, an order may be adjusted to reflect the manufacturer's production or delivery schedule. Alternatively, the manufacturer may adjust production or shipment schedules in order to more effectively meet the needs of the distribution center. CRP systems require

accurate data, EDI capabilities, accounting systems that permit sharing of reliable performance data, and trust between trading partners.

Three institutional design strategies are being used to foster development and adoption of efficient replenishment practices. The first is standardization. This is particularly evident in the move toward EDI, where the UCS transaction sets establish standard interfaces between non-standard information systems in separate firms. Not only does this make it easier for firms to exchange data electronically, but it also provides standardized information on information system requirements that makes it easier for information system developers to serve the industry. Best management practices and performance benchmarks for efficient replenishment are another example of standards. In both cases, standardization makes it easier for firms of diverse sizes and types to coexist in the industry.

The second strategy is the use of markets for “unbundled” products and services to create strong financial incentives for firms to internalize positive and negative externalities they impose on their trading partners. Unbundling is the basis for the accounting systems that support benefit sharing under CRP systems. It is also being used to encourage the adoption of EDI and best practices for physical distribution. For example, both Supervalu and Fleming are shifting to service-based costing for their customers. They will charge more to customers that are more expensive to serve because they do not place orders electronically or do not adjust daily order levels to minimize fluctuations in the cubic feet of truck space required for each shipment.

The third strategy is the transfer of decision authority across firm lines. In effect, decisions are “outsourced” to a trading partner that is in a better position to internalize externalities. This is the motivating factor for CRP strategies. Transfer of decision authority also occurs in category management partnerships, especially for DSD products.

Product Promotions: Promotional activities include advertising, consumer promotions in the form of coupons and price reductions, and trade promotions in the form of discounts and allowances. While promotions are a valuable competitive tool, their use can also reduce operational efficiency in the food supply chain. The primary aim of efficient promotion strategies is to eliminate as many of the adverse effects of promotions as possible.

The use of trade promotions increased dramatically during the 1980's (KSA, p. 79). This had its roots in the 1970's, when buying on deal became a standard practice. The common practice is for manufacturers to set artificially high standard list prices for their products, then periodically offer large discounts or promotional allowances. As Thomas, Staatz, and Pierson explain, this makes sense in an environment with high inflation that lowers the real cost of holding inventories and manufacturing technologies that are operated most efficiently by making large runs of individual items in order to minimize setup costs. It makes little sense, however, in the current environment with low inflation and flexible manufacturing technology.

The effects of forward buying are evident throughout the food supply chain, as firms in each segment try to buy products on deal and sell them at a price as close to the standard price as possible. Inventories grow throughout the system, and added transport costs are

sometimes incurred when products are diverted from regions where they are being sold on deal to those where they are not. Also, there are considerable costs involved in simply maintaining information about deals and settling disputes between trading partners.

To date, ECR strategies for efficient promotion are less developed than those for efficient assortment and efficient replenishment. In part, this stems from concerns about compliance with antitrust laws. As Thomas, Staatz, and Pierson (pp. 542-545) note, individual firms also have strong incentives to defect from cooperative solutions to the problems caused by promotions. KSA (p. 84) identify three basic principles for trade promotion strategies. First, suppliers should offer their customers alternatives to buying on deal. Second, suppliers should simplify the terms of their promotions, making them easier to evaluate and compare. Finally suppliers should use UCS transactions to transmit information on deals to their customers. Relationships established under category management partnerships and incentive created by the unbundling of costs and pass-throughs on promotions that will be part of efficient replenishment strategies will also lessen the advantages gained through reliance on trade promotions, and the EDLP strategies of mass merchandisers and category killers will dampen incentives for using trade promotions.

New Product Introductions: Each year, thousands of new food items are introduced by manufacturers. A high percentage of these fail. As KSA observe in their overview of efficient product introduction (pp. 87-94), inefficiencies stem not only from wasted development costs incurred by the manufacturer, but also from costs associated with entering

and removing product from information systems and inventory build-ups prior to promotions for new products.

ECR strategies for efficient product introductions draw on Quick Response strategies in the apparel industry. Computer based design tools and more flexible manufacturing systems shorten development times and make it possible to produce test market quantities of a new product earlier in the development cycle. In addition, frequent shopper programs and credit card purchases facilitate matching demographic information on consumers with data on buying patterns in test market settings. As a result, these studies yield information not just on whether a product is likely to succeed but also on which consumers are likely to buy it.

As in the case of product promotions, ECR strategies for efficient product introductions are not fully developed. It appears that they will be linked closely to category management activities, however, since new products are part of an efficient assortment. Therefore, they will be governed primarily under loosely structured partnership arrangements.

### **Lessons from the ECR Initiative**

At least three general lessons can be drawn from experience to date in the ECR initiative. First, reengineering can be accomplished in a setting with great diversity of firm sizes and types, and it can accommodate their continued coexistence. Firms of all sizes and types that are able to adopt ECR practices will benefit from them. Despite justified concerns about shifts in the balance of power and difficulties small firms face in adopting ECR

practices (Weinstein), this initiative may actually slow down trends toward increased concentration and vertical integration.

Second, there is an extensive tool kit of institutional mechanisms that can be used to reengineer interfirm linkages. These include industry standards, market transactions for unbundled products and services, loosely structured partnerships for exchanging information and expertise, and partnerships that shift decision responsibility across firm boundaries. Matching the institutional mechanism to the problem or opportunity being addressed -- choosing the right tool for the job -- has important impacts on the success of reengineering efforts.

Finally, collective action, coordinated by trade associations or by other industry organizations, can be an effective medium for working toward industry-wide benefits, even before the distribution of those benefits is known. The trade associations involved in the ECR initiative have been remarkably effective in bringing together competing firms from throughout the food supply chain to develop solutions to common problems and to find ways to exploit shared opportunities. They have also helped educate their members and lower barriers to adopting new technologies and practices. The Land Grant System, which has traditionally played a similar role, has much to learn from what the trade associations have accomplished.

## REFERENCES

- Barkema, A. "Reaching Consumers in the Twenty-First Century: The Short Way Around the Barn." American Journal of Agricultural Economics 75(1993):1126-1131.
- Blattberg, Robert C. "Changing Store Image Through Category Revitalization," paper given at the Food Marketing Institute Annual Supermarket Convention, Chicago, May 7, 1996.
- Boehlje, M. "Industrialization of Agriculture: What Are the Implications?" Choices, First Quarter 1996, pp. 30-33.
- Category Management Subcommittee of the ECR Best Practices Operating Committee and the Partnering Group, Inc. Category Management Report. Joint Industry Project on Efficient Consumer Response, 1995.
- Chandler, A.D., Jr. The Visible Hand: The Managerial Revolution in American Business. Cambridge, Massachusetts: The Belknap Press, 1977.
- Connor, J.M., R.T. Rogers, B.W. Marion, and W.F. Mueller. The Food Manufacturing Industries: Structure, Strategies, Performance, and Policies. Lexington, Massachusetts: Lexington Books, 1985.
- Cotterill, R. Effects of Information Technology on Employment and Economic Performance in the Food Manufacturing and Food Distribution Industries. Report to the Office of Technology Assessment, Washington, D.C., 1985.
- Crossen, Cynthia and Ellen Graham. "Pressed for Time or Pressed for Money?" *The Wall Street Journal*, March 9, 1996, p. R4.



ECR Performance Measures Operating Committee. Performance Measurement: Applying Value Chain Analysis to the Grocery Industry. Joint Industry Project on Efficient Consumer Response, 1994.

Food Institute. *Food Retailing Review*, 1995 edition, Fair Lawn, N.J., 1995.

Food Institute. "The Battle for Share of Stomach," *The Food Institute Report*, May 13, 1996a, p. 3.

Food Institute. *Food Retailing Review*, 1996 edition, Fair Lawn, N.J., 1996b.

Food Marketing Institute. *How Consumers Are Shopping the Supermarket*, Washington, D.C., 1991.

Food Marketing Institute. *It's Mealtime: Are Supermarkets on the Menu?* Washington, D.C. 1995a.

Food Marketing Institute. *Trends in the United States: Consumer Attitudes and the Supermarket, 1995*, Washington, D.C., 1995b.

Hammer, M. "Reengineering Work: Don't Automate, Obliterate." Harvard Business Review 68(1990):104-112.

Hammonds, Tim. "Retailing in the Future," lecture presented at the University of Minnesota, St. Paul, MN, March 28, 1996.

Holistic Work Group of the ECR Best Practices Subcommittee and CSC. The ECR Roadmap: Organizing Your Effort. Joint Industry Project on Efficient Consumer Response, 1995.

- Kurt Salmon Associates, Inc. Efficient Consumer Response: Enhancing Consumer value in the Grocery Industry. Washington, D.C.: Food Marketing Institute, 1993.
- Love, Kimberly. "Hot Trends in the Supermarket," *Grocery Marketing*, May 1996, pp. 28-32.
- Manchester, Alden and Annette Clausen. "1994 Spending for Food Away From Home Outpaces Food at Home," *Food Review*, May- August, 1995, pp. 12-15.
- Mathews, R. "Wanted: Low-Cost Distribution." Progressive Grocer, January 1996, pp. 39-40.
- Mayo, J.M. The American Grocery Store: The Business Evolution of an Architectural Space. Westport, Connecticut: Greenwood Press, 1993.
- McDonald's, Corporate Headquarters, Oak Brook, IL, Consumer Satisfaction Office. Telephone Conversation. May 28, 1996.
- Minnesota Grocer*. "Frequent Shopper Cards -- Wave of the Future?" Spring, 1996, pp. 27 and 30.
- Nelson, Charles T. "Levels of and Changes in the Distribution of U.S. Income," in J. H. Bergstrand, et al., eds., *The Changing Distribution of Income in an Open U.S. Economy*, Amsterdam: North-Holland, 1994.
- Porter, M.E. Competitive Advantage: Creating and Sustaining Superior Performance. New York: The Free Press, 1985.
- Price, Charlene C. "Sales of Food Away From Home Expanding," *Food Review*, May-August, 1995, pp. 30-32.

- Putnam, Judith and Jane Allshouse. *Food Consumption, Prices, and Expenditures, 1996: Annual Data 1970-94*. USDA, ERS, Stat. Bul. 928, April 1996.
- Sansolo, Michael. "The State of the Food Marketing Industry: Speaks '96," presented at the Food Marketing Institute Annual Supermarket Convention, Chicago, May 6, 1996.
- Schwarz, Benjamin. "American Inequality: Its History and Scary Future," *The New York Times*, December 19, 1995, p. A19.
- Thomas, J.M., J.M. Staatz, and T.R. Pierson. "Analysis of Grocery Buying and Selling Practices among Manufacturers and Distributors: Implications for Industry Structure and Performance." *Agribusiness: An International Journal* 11(1995):537-551.
- Thurow, Lester. *The Future of Capitalism: How Today's Economic Forces Shape Tomorrow's World*, New York: William Morrow, 1996 (book review, *The Economist*, March 9, 1996, p. 88).
- U.S. Department of Commerce, Bureau of the Census, 1995. Washington, D.C., 1996.
- Urban, T. "Agricultural Industrialization: It's Inevitable." *Choices*, Fourth Quarter 1991, pp. 4-6.
- Walsh, J.P. *Supermarkets Transformed: Understanding Organizational and Technological Innovations*. New Brunswick, New Jersey: Rutgers University Press, 199#.
- Wegman, Daniel. "The State of the Food Marketing Industry: Speaks '96," presented at the Food Marketing Institute Annual Supermarket Convention, Chicago, May 6, 1996.
- Weinstein, S. "Small Firms Need Help." *Progressive Grocer*, February 1994, pp. 40-46.