Sixth Joint Conference on

Food, Agriculture and the Environment

(in honor of Professor Emeritus Philip M. Raup)

Minneapolis, Minnesota

August 31 - September 2, 1998

Hosted by the

Center for International Food and Agricultural Policy
University of Minnesota
Department of Applied Economics
1994 Buford Avenue\332 ClaOff Building
St. Paul, Minnesota 55108-6040 U.S.A.

STORE-LEVEL INNOVATION IN THE RETAIL FOOD INDUSTRY: THE
ECR INITIATIVE AND BEYOND

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Store-Level Innovation in the Retail Food Industry: The ECR Initiative and Beyond

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Over the past five years, the Efficient Consumer Response (ECR) initiative has been a significant force for change in the retail food industry. This industry-wide, collaborative effort has fostered the establishment of new business relationships, the implementation of new business practices, and the adoption of new technologies by food manufacturers, distributors, brokers, and retailers. The basic outline of the ECR initiative was first presented in a 1993 report prepared by Kurt Salmon Associates, Inc. That report asserted that up to $30 billion in costs could be eliminated from the grocery supply chain by reengineering internal and interorganizational business processes. It identified four key areas of business activity that would be the focus for those reengineering efforts: (1) selection of product assortments, (2) product replenishment, (3) product pricing and promotion, and (4) new product introductions. An overview of efforts in each of these areas is presented in King and Phumpiu (1996).

Much of the emphasis in the ECR initiative has been on technologies and practices that are most applicable at the distributor or manufacturer level. However, important changes are also happening in retail food stores — the point where the food supply chain meets the consumer. The Retail Food Industry Center (TRFIC) at the University of Minnesota has conducted exploratory studies on store-level implementation of ECR practices in Minnesota grocery stores (Phumpiu and King) and Minnesota convenience stores (Ashman). These studies have provided useful insights on impacts the ECR initiative is having on store operations and performance, yet each only collected data at a single point in time for a small number of stores in one geographic area. This

summer, TRFIC is launching the Supermarket Panel — a nation-wide, longitudinal study of retail food stores. The Supermarket Panel will track the adoption of new technologies and business practices for a large cross section of stores. It will also provide detailed information on store characteristics, products and services offered, human resource practices, and a variety of financial performance measures. As such, the Supermarket Panel will be a unique resource for studying the rapid evolution of the retail segment of the food supply chain.

In this paper, we first describe the two exploratory studies on ECR implementation in Minnesota grocery stores and convenience stores and summarize the major findings from each. We then look to future research based on the TRFIC Supermarket Panel and identify key issues we believe this effort will allow us to explore with respect to the ECR initiative and other significant changes in retail store operations. More specifically, we discuss research questions related to: (1) store level technology and business practices, (2) human resource management, (3) frequent shopper programs, and (4) home shopping.

Exploratory Studies on ECR Implementation in Minnesota Retail Food Stores

In the summer of 1995, soon after the establishment of The Retail Food Industry Center, Robert King and Paul Phumpiu initiated a study of ECR adoption in Minnesota grocery stores. The primary objectives for this study were to (1) to describe operational and organizational changes associated with implementation of ECR and (2) to identify factors that may explain significant differences in ECR implementation across firms. An unstated (but perhaps equally important) objective was simply to learn as much as possible about store-level operating practices. One year later, in the summer of 1996, Robert King and Sara Ashman initiated a similar study of

Minnesota convenience stores. In this section, we describe the research design and key findings for each study.

Grocery Stores[1] Data for this study were collected through personal interviews with forty store managers during the spring and summer of 1996. Questions focused on: store and manager characteristics; inventory management and ordering processes; store layout, shelf-space allocation, and product assortment, and product pricing and promotion decisions. The forty stores in the study were not a representative, random sample of Minnesota grocery stores. Rather, they were chosen to ensure a broad distribution of store sizes, locations, and types.

Three distinct criteria were used to group stores for comparisons: location, organizational form, and level of ECR adoption. With regard to location, twenty-six of the stores were in the Minneapolis-St. Paul metropolitan area; fourteen were in out-state locations that include small towns and cities such as Duluth and Rochester. With regard to organizational form, seventeen of the stores in this study were part of a corporate chain consisting of eleven or more stores; eight were part of an independent chain with from two to ten stores; and fifteen stores were independently owned and not part of a chain. Finally, an "ECR readiness" score was the basis for the third grouping. This index was simply an unweighted adoption rate for seventeen technological, organizational, and management practices considered necessary for implementing the ECR initiative. The eleven stores in the high ECR readiness group had scores of 75% or more. The fifteen stores in the moderate group had scores ranging from 40% to 74%. Finally, the fourteen stores in the low ECR readiness group had scores below 40%.

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[1]This description of the grocery store study draws on text from King and Phumpiu (1997) and Phumpiu and King.

Detailed findings from the store interviews are summarized in Phumpiu and King. In the concluding section of that report, findings are summarized in three general conclusions:

1. Location in a major metropolitan area made an important difference in implementing some components of the ECR initiative. On average, metro and out-state stores differed little with respect to store size or the adoption of technologies that support the ECR initiative. They differed significantly, however, in the degree to which they coordinated their activities with outside trading partners.

2. Stores that were part of a chain, especially a large corporate chain, were making faster progress toward implementation of ECR initiatives than were single stores. This was expected, since large chains are able to spread the fixed costs of ECR adoption over a larger number of stores. It was also noteworthy, however, that three independently owned single stores were among the most innovative of those visited. In these stores, it appeared a visionary, energetic owner/manager was able to quickly respond to new opportunities.

3. ECR adoption and superior performance were closely associated, but it was not clear whether there was a causal relationship in either direction between these two factors.

Convenience Stores[2] Data for this study were collected through a mail survey administered during the spring and summer of 1997. The survey instrument design was based on the interview protocol for the grocery store study. Questions focused on: store characteristics; inventory management, ordering and receiving process; store layout, shelf space allocation, and product assortment; and product pricing and promotion decisions. The unit of analysis for this

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[2]This description of the convenience store study draws on text from Ashman.

study was the convenience store chain, rather than the individual store. Of 250 convenience store chains contacted, fifty-eight returned a completed survey. In total, the chains included in the final sample operate 824 convenience stores, representing approximately 40 percent of the convenience stores in Minnesota.

Once again, three criteria were used to group chains for comparison. In this study, they were: location, chain size, and level of ECR adoption. With regard to location, twenty-one chains operated stores in urban areas; sixteen operated store in suburban areas; and twenty-nine operated stores in rural areas. With regard to chain size, forty-four chains operated one or two stores, and fourteen operated three or more stores. The "ECR readiness" score that was the basis for the third grouping was an unweighted adoption rate for nine technological, organizational, and management practices that were relevant for convenience stores and related to the ECR initiative. The eight chains in the high ECR readiness group had scores of 77% or more. The twenty-three chains in the moderate group had scores ranging from 33% to 76%, and the eleven chains in the low ECR readiness group had scores below 33%.

Detailed results from the convenience store survey are summarized in Ashman. Key findings can be summarized with regard to each of the three convenience store chain groupings:

1. With regard to location, rural convenience stores, which often meet customer needs that were once met by small grocery stores, carried a wider range of products and offered more services than convenience stores in urban and suburban locations. However, rural stores had the lowest adoption rate for practices related to the ECR initiative. Urban chains coordinated business practices with suppliers to greater degree than suburban and rural chains.

2. With regard to chain size, larger chains were more likely to have implemented costly technological practices than were small chains. As in the grocery store study, this was expected since large chains can spread the fixed costs of ECR adoption over a larger number of stores. Larger chains also cooperated and communicated more with their suppliers than small chains. Again, this was expected, since larger chains can economize on transaction costs involved in maintaining these business relationships.

3. ECR adoption and superior performance were positively related. Having adopted six to nine practices was positively correlated with higher inside and outside sales per square foot of selling area and higher annual inventory turns. As in the grocery store study, however, it was not clear whether there was a casual relationship in either direction between ECR practices and store performance.

The TRFIC Supermarket Panel

The Supermarket Panel is being established in 1998 by The Retail Food Industry Center, with funding from the Alfred P. Sloan Foundation. The Panel will collect data annually on competition, facilities, operations, human resources, sales, and financial performance for a nation-wide panel of stores. In addition, special sections can be added to the Panel data sheets to collect information on emerging issues, such as food safety and frequent shopper programs. Collecting consistent information each year from the same stores will make it possible to track important trends in supermarket operating practices and determine the timing and magnitude of effects new technologies and business practices are having on store performance. Including stores for all regions of the U.S. with a wide range of formats and competitive strategies will make it possible

to investigate how contextual factors such as location, customer demographics, and organizational form are related to store performance and operating practices.

Data are being collected on survey forms designed to be completed by the store manager, with assistance from corporate headquarters when applicable. The target participation level for 1998 is 500 stores. Data sheets are being received and coded by the University of Minnesota Survey Research Center, with strict procedures in place to ensure the confidentiality of store data. Each participating store will receive a benchmark report that compares its own responses to averages for peer stores in the Panel. A Supermarket Panel report will be prepared and published annually, using the entire data set. In addition, the data set will be used by TRFIC researchers for more in-depth studies of specific issues — e.g. dissertation research projects on frequent shopper programs and human resource practices in supermarkets.

Research Questions on Technology and Business Practices

The Supermarket Panel will collect detailed information on adoption and use of technologies and business practices at the store level. The section on store operations will be a source of information on the locus of authority — i.e., delegated by the manager, made by the manager, or made for the manager by someone outside the store — for a wide range of management decisions that can have a profound influence on store performance. Because many of the innovations associated with the ECR initiative involve changes in decision authority, this will provide new insights on the impacts these innovations are having at the store-level. The store operations section of the Panel survey form will also provide information on the adoption of key technologies and business practices, ranging from the use of customer self-scanning to product

movement analysis and the use of formal planograms for shelf-space allocation.

Simply summarizing responses from this section for alternative store groupings will be of considerable value. For example, two likely groupings will be by format — e.g. conventional supermarket, upscale supermarket, warehouse store, etc. — and by organizational form — e.g., independent single store, independent chain, corporate chain, etc. As in the exploratory studies, stores also may be grouped by levels of adoption for key technologies and business practices. Summaries based on each grouping scheme are likely to reveal patterns in technology and business process adoption and in store performance. The usefulness of such tabular summaries is limited, though, by the fact that each grouping scheme only controls for differences along a single dimension. The large sample size for the Supermarket Panel will allow more extensive use of multivariate tools for statistical analysis than was possible in the exploratory studies.

One important set of questions related to technology and business practices centers around the identification of factors associated with the adoption of new technologies and practices. Improved understanding of how store characteristics and environmental conditions may influence key decisions about a store's operating strategy will help store managers and chain executives plan changes in operating practices and will help manufacturers, distributors, brokers, and technology suppliers serve their store trading partners more effectively. Data from the Supermarket Panel can be used to test several specific hypotheses regarding technology and business practice adoption that emerged from the exploratory studies. These include:

- While location near trading partners does not affect the adoption of new in-store information technologies, proximity is positively associated with more rapid adoption

of increased collaboration and decision sharing with trading partners.[3]

- As chain size increases, adoption of new technologies and new business practices will increase.

- Adoption of technologies and business practices associated with ECR will be more rapid in stores that are wholesaler supplied or part of a self-distributing chain.

Data from the Panel can also be used to analyze the extent to which new technologies and practices are adopted in clusters — e.g., adoption of the use of scanner data for computer-assisted ordering and electronic-assisted receiving may be closely associated.

A second set of research questions related to technology and business practices centers around relationships between store performance and the adoption of innovations. Analysis of these relationships will be a source of quantitative estimates of the difficult to measure benefits associated with the adoption of new technologies and practices. It will also provide insights on factors that may condition the magnitude of benefits. One specific hypothesis from the exploratory studies that can be tested with the panel data is that adoption of ECR practices is associated with improved sales per unit of selling area and inventory turns but not improved labor efficiency, as measured by sales per labor hour. Also, as performance histories grow for stores in the Panel, it will be possible to determine the direction of causality in the relationship between ECR adoption and store performance. The historical data can also be used to model learning curve effects for realizing the benefits of new technologies and business practices.

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[3]It will be interesting to assess the extent to which use of technologies such as email make proximity less relevant.

Research Questions on Human Resource Management

The supermarket industry has long faced problems of high employee turnover and difficult

recruitment.   The difficulty of recruiting good new employees has been among the top three

concerns of both chain and independent executives in recent years (Food Institute). According to

a 1996 survey of U.S. supermarkets, the average number of interviews required to fill a

store-level position has been rising and turnover rates remain high for both full and part-time

employees (Canadian Council of Grocery Distributors and Food Marketing Institute). Turnover

costs go far beyond the cost of retraining to include additional expenditures such as advertising,

hiring, and personnel processing and lost revenue due to reduced productivity and lower customer

satisfaction. These problems have been compounded in recent years by record low unemployment

levels and increased worker mobility. Recent initiatives such as ECR create even greater

challenges for staffing today's supermarkets. The introduction of new technologies has altered

the skill requirements of many store-level jobs, and this is forcing stores to recruit, train, manage,

and compensate employees accordingly. The education and skill level of store-level employees

has been cited as a major constraint to the implementation of ECR practices (Kurt Salmon

Associates, Inc., 1996).

Beyond ECR initiatives, supermarkets are attempting to increase their value to the

consumer by focusing on value-added products and services such as prepared foods and home

shopping. But these efforts are often more labor intensive than traditional store services, and this

provides added pressure to recruit and retain good employees. Many of these issues are not

specific to the grocery industry and have driven changes in many other increasingly

service-oriented industries. In the past two decades there has been increased adoption of

so-called "high performance" work practices. These work practices generally involve increased

levels of employee participation in decision-making and financial returns.

The impacts of changes in work practices on firm performance and the terms of

employment are uncertain. The impacts are even harder to examine in a time period when

technological changes have also drastically altered the performance and work environment of

firms. The Supermarket Panel will capture information on human resource practices and terms of

employment. Basic departmental information such as starting wage, number of full and part-time

employees, union association, and number of new hires will be gathered. The Panel will also

collect information on employee involvement associated with human resource management

activities such as hiring, firing, scheduling, and grievance resolution, and with operational

activities such as pricing, advertising, and promotions. It will also gather data on the types of

compensation employed by each store (e.g., hourly wage, salary, bonus, incentive pay, stock

option plan). Together, this data will provide information on the degree of employee

participation. Additional information regarding training, shrink, and store manager characteristics

will also be captured.

Together with data on financial performance, technology adoption, and store

characteristics, this information will be used to test a number of hypotheses. These include:

- The increased use of employee participation practices lowers turnover and improves
  store performance.
- Together, employee participation practices and the adoption of new technologies
  improve labor productivity.
- Greater adoption of new technology and the increased use of employee participation

practices are associated with increased wage rates (evaluating employee participation

and technology adoption separately and as a combined effect).

Data from the Panel can also be used to explore the determinants of turnover and relationships

between store characteristics and adoption of participation practices.

Research Questions on Frequent Shopper Programs

Given the central place of the consumer in its name, it is surprising that the ECR initiative

has placed so little emphasis on reengineering the relationship between consumers and the retail

food supply chain. Frequent shopper programs, also known as customer loyalty programs, are an

increasingly popular tool for addressing the role of "consumer" in the ECR initiative.

Understanding consumer shopping patterns and preferences is of primary importance to retail

food operators and suppliers in today's ever changing marketplace. Mass marketing to the

general consumer is rapidly being abandoned for database marketing and loyalty marketing

approaches. These approaches begin with the adoption of a frequent shopper program and aim to

reclaim the one-to-one relationships that existed years ago between the grocer and the consumer.

The Food Marketing Institute (FMI) defines frequent shopper programs as "essentially

database marketing programs that include promotion and advertising directed at consumers with

specific purchase patterns, demographic profiles, and lifestyle characteristics. Frequent shopper

programs can also facilitate the creation and maintenance of customer information databases for

marketing programs and for strategic planning" (FMI, p. 20). Most frequent shopper programs

are centered around scanning a customer's shopper card at the checkout. For using the card, the

customer is rewarded, for example, by receiving price discounts on selected items, while the

retailer is able to collect information on each shopper's buying preferences and habits. The level of information collected may be very minimal — at the department level — or very detailed — at the stock keeping unit (SKU) level.

A "frequent shopper program model" is defined by choices regarding the primary use of the program and how customers are rewarded. A retailer can choose, for example, to use a frequent shopper program to provide discounts to card users, differentiate its stores from the competitors, or collect consumer data. If a store chooses to collect data, the potential value of the program increases dramatically. By collecting data the retailer can target consumer groups for tailored promotions, facilitate merchandising decisions and category management practices, or segment the customer base into deciles by amount spent. Rewards are a way for retailers to thank customers for shopping in their store and, more importantly, a way to keep customers interested and involved in the store's shopper program. Retailers can choose to reward consumers through various methods, including special promotions, continuity programs (i.e. the more you spend the more you save), sweepstakes, or newsletters. The joint Food Marketing Institute and Willard Bishop Consulting, Ltd. publication, *Loyalty Marketing: After the Card is Issued* illustrates the potential capabilities of frequent shopper programs.

The Supermarket Panel contains a special set of questions to be answered only by stores offering a frequent shopper program. These questions will collect information on the primary use of the frequent shopper program, what consumer data are being collected and how they are being used, types of rewards offered to consumers, and level of consumer participation. These data will be used to compare and contrast frequent shopper programs in use today. Summarizing program characteristics will be valuable in beginning to understand what role frequent shopper programs

are playing in the retail food industry. In addition to the questions specific to frequent shopper

programs, the Supermarket Panel will collect data on services and benefits offered at the store

level. For example, whether the store offers a carryout service or home delivery or has a franchise

food department or child care center. This information will be used, in conjunction with frequent

shopper program characteristics, to provide a more complete picture of a consumer's shopping

experience.

Further data from the Supermarket Panel will be used to examine relationships between a

grocery store's frequent shopper program, store characteristics, and store performance. Several

hypotheses regarding specific relationships can be tested. Examples include:

- A deep discounting grocery store will use a frequent shopper program only for price

  discounts and not for data collection.

- An upscale grocery store will use a frequent shopper program to collect data to assist

  in merchandising decisions and offering more services and benefits to its customers.

- An independently owned grocery store is more likely to use a frequent shopper

  program than a store in a large chain.

- *Ceteris paribus*, average weekly sales for a store using a frequent shopper program

  will be greater than average weekly sales for a store not using a frequent shopper

  program.

Beginning to understand what types of frequent shopper programs work best, given a store's

format, services offered and organizational form will be valuable. The adoption of frequent

shopper programs is occurring at a rapid rate (Blair). "But a misguided attempt to gain customer

information could cause supermarket companies to spend millions of dollars in irrelevant software

and hardware" (Raphel, p. 42).

Research Questions on Home Shopping

The relationship between consumers and the retail food supply chain is also receiving increased attention as the potential of the Internet as a tool for electronic commerce grows and as retailers struggle to retain their share of sales to a rapidly changing consumer population. Many industry participants believe home shopping will play an important role in the emerging new relationship between retailers and their customers, and the Supermarket Panel will provide an opportunity to follow the impact this new channel will have on supermarkets.

We define *home shopping* as a service with the following attributes: (1) customers place orders from their homes, offices, or any other convenient place; (2) orders are filled for the customer by the service; and (3) orders may be delivered to the customer or picked up at a designated site. Under this broad definition, home shopping may supplant the traditional retail store or may be an integral part of a store's strategy.

A "home shopping model" is defined by choices regarding the order entry system, the order fulfillment system, and the delivery/pickup system. Excellent overviews of the range of models currently being tried in U.S. markets are provided by Linneman and Kirschling and by Park et al. Typical alternatives for order entry include telephone, fax, and Internet. Order fulfillment can be done in an existing retail store or in a specialized fulfillment facility. Some delivery systems require the customer to be present, while others use a temperature-controlled delivery appliance that makes the delivery schedule more flexible; and pickup systems may require the customer to enter a building or may use a drive-through lane than eliminates the need for customers to leave their cars. While no model appears to be succeeding financially at present, there is broad consensus that home shopping will be important and commercially viable within five to ten years.

Data from the Supermarket Panel can be used to identify the characteristics of stores that are offering home shopping services. Over time, it may also be possible to assess the impacts of a store's own home shopping program or of the introduction of a competing home shopping service on store performance. Finally, as is being done with frequent shopper programs, a special set of questions on home shopping services could be added to the Panel survey form in a future year. These questions, to be answered by stores who offer a home shopping service and/or compete with such a service, should focus on the characteristics of the home shopping model being used, the number of customers served, and the operating performance of the service.

Concluding Remarks

As the pace of change increases in the retail food industry, the Supermarket Panel will be a valuable resource for monitoring and assessing the impacts of new developments at the store level. As the number of stores in the Panel grows, it will be possible to summarize findings for increasingly refined store groupings and to investigate complex relationships among store characteristics, business practices, and performance. Once the Panel is well established for supermarkets in the U.S., it may also be possible to extend it to include supermarkets in other countries or to expand the focus to include other forms of food retailing, such as food service and forms of home shopping that bypass traditional retail outlets.

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