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**Electronic
Commerce in
Grocery
Production and
Distribution**

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ELECTRONIC COMMERCE IN GROCERY PRODUCTION AND DISTRIBUTION

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Electronic Data Interchange Program (EDIP)

***Electronic Commerce in Grocery
Production and Distribution***

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Abstract

In this report, INPUT examines how electronic network systems (that interconnect companies) support the commerce in grocery production and distribution. It examines the kinds of systems users are implementing, what these systems allow the users to accomplish, how much users are spending on these systems, who the vendors of the systems are, what economic influences are impacting the implementation of systems, what influences the systems have on enterprise and industry organization, and the future prospects for providing the population with a good diet at minimal cost.

The report contains 88 pages and 33 exhibits. An index to the companies mentioned is included in the appendix.

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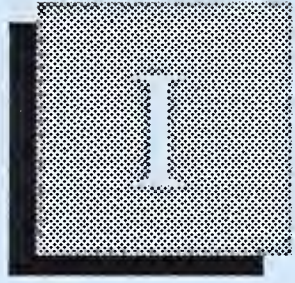
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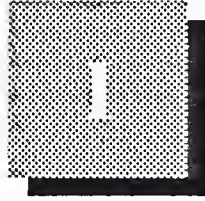
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Introduction





Introduction

Despite the 19 million citizens who are undernourished due to poverty,* the capability of the U.S. to feed itself is remarkably efficient.

- Six percent of the population grows, processes, and distributes food for more than a hundred percent of the population (counting exports). That is, 1.5 million farmers and about 13.5 million non-farm food industry persons (including food processors, transportation and distribution personnel, eating establishment personnel, and others) participate in the feeding of the 250 million U.S. residents.
- Normal margins in the food distribution sector are one percent or less, the sign of economic efficiency.
- The average supermarket stocks 30,000 food items and the number is growing. The number of items grew from less than 20,000 in the late seventies.
- Real food prices are falling relative to the general price index, making food expenditures a smaller and smaller portion of household expenditures.

Nevertheless, efficiency inexorably improves as participants in the food chain work smarter. Working smarter is a matter of coordination: coordinating manufacturing processes; coordinating distribution processes; coordinating the satisfaction of consumer concerns; coordinating the available tools, persons, supplier sources, and marketing channels to meet customer needs.

* The number of participants in food stamp programs.
U.S. Department of Agriculture

A

Communication Technology As an Efficiency Driver

Historically, the greatest gains in agricultural productivity were made with tools and machinery that enhanced the physical productivity of a person. For example, the oxen harness and iron plow made human brawn more productive.

Technological improvements in food processing, packaging, and distribution have further enhanced the efficiency of the food chain. For example, refrigeration technology brought great efficiency and economies of scale to meat packing, allowing Midwest packers to greatly expand their markets to the Eastern seaboard.

Technology and better practices are lowering the cost of food in other theatres.

- Bioengineering, for example, is reducing the time it takes to raise chickens (from 13 weeks to 8 weeks), and making more efficiently packagable tomatoes.
- New food manufacturing processes and synthetics are lowering the cost of ingredients—for example, cutting the cost of pure vanilla from \$1,200 per pound to \$8 per pound!

Today, communication and information technologies are bringing this already efficient production and distribution apparatus a new degree of efficiency. These technologies, rather than impacting material transformation processes *per se*, make human communication and management more productive.

Specifically, technologies bring greater effectiveness in human-to-human transactions within and among organizations.

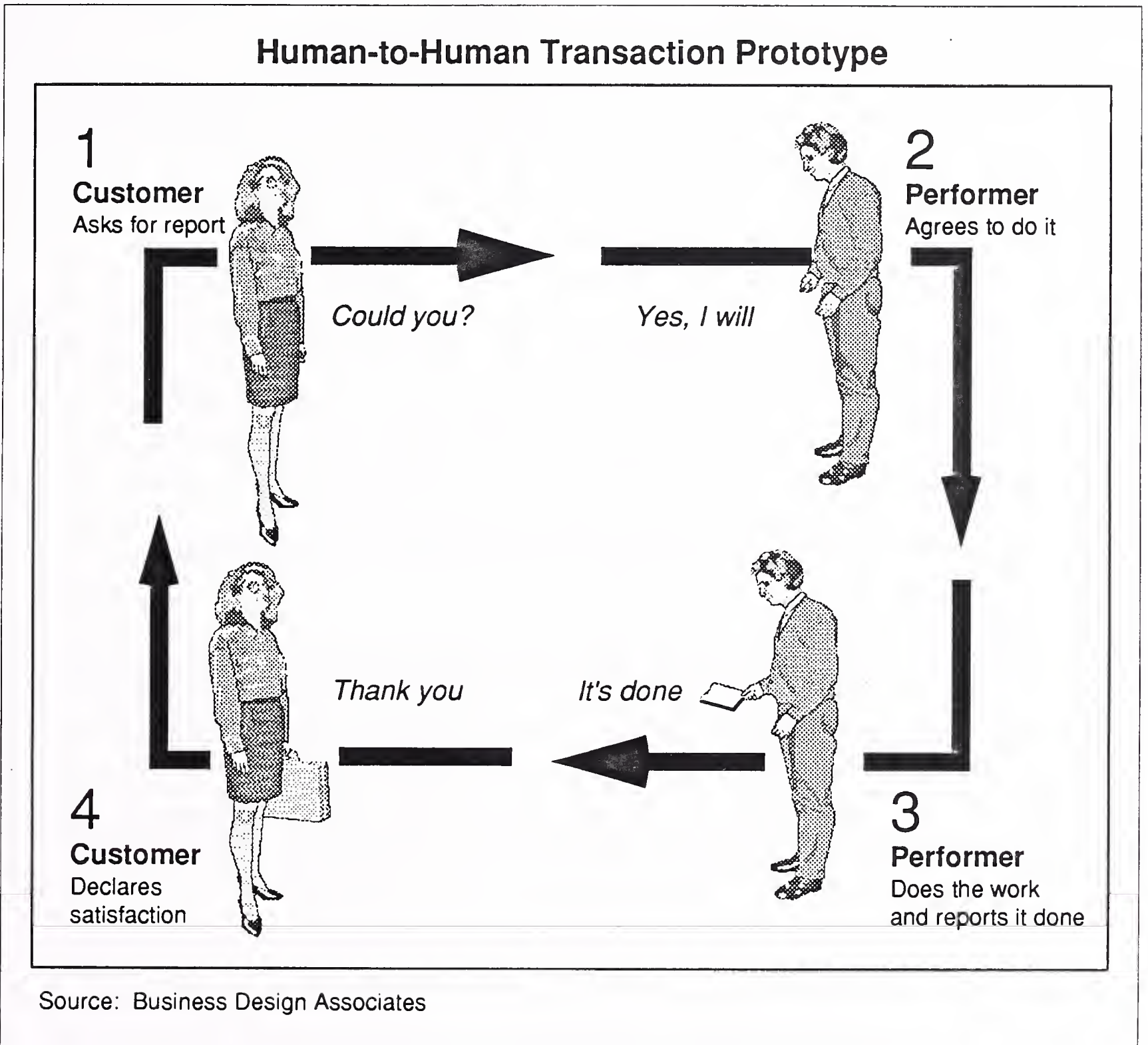
More effective transactions mean customer satisfaction because of the nature of all human-to-human transactions.

All work- or market-related transactions are composed of:

- A buyer (a requestor/customer) and a seller (a fulfiller/supplier)
- Basic conversational moves: request, offer, promise to fulfill, report that the promise has been fulfilled, report that the fulfillment of the promise was satisfactory or not, etc.

Exhibit I-1 illustrates the basic conversational parties and moves that constitute a human transaction.

EXHIBIT I-1



Electronic communication systems are bringing great efficiencies to human transactions. The result is better resource management and customer satisfaction.

Whether data bases on consumer purchases, EDI between food manufacturers and distributors, commodity market transactions, EFT settlements between buyers and sellers, or advertising and government regulation made more effective through electronics—all these kinds of systems are allowing the providers of food and the consumers of food to coordinate their actions and satisfy each other through commercial exchange.

B

Electronic Commerce: Definition and Background

While applications software and systems allow for better coordination of human transactions within organizations, electronic commerce consists of systems that interconnect organizations and facilitate the transactions among organizations.

Exhibit I-2 states the definition of electronic commerce.

EXHIBIT I-2**Electronic Commerce Definition**

Electronic commerce is the facilitation and recording of commercial transactions among organizations by interorganizational computer-based systems.

Although computer applications that operate solely inside the boundaries of a single organization interface with electronic commerce systems, INPUT considers them outside of the definition of electronic commerce systems.

Also, electronic commerce applications require, to some degree, the ability for transactions or portions of transactions to be symbolically coded so that they can be processed to some extent by machines.

In other words, a telephone (although an interorganizational, electronic system that facilitates commercial transactions) is not an electronic commerce application. Yet, an interactive voice response system (which allows customers to use their phone key pads to place an order at a supplier, get an update on product availability or inquire about shipment status) is.

Facsimile transmissions are electronic commerce systems in that they can be processed by machines over and above basic transmission processing. For example, bar codes can be embedded in a fax transmission to allow for machine identification of the transmission. Character recognition, fax-server, and imaging technologies allow for the processing of the content—not just the image—of the facsimile document.

The requirement for machine processability of coded transactions is important because it obviates anyone from manually re-recording the transaction. The ability to have the transaction or component thereof recorded once and only once, so that subsequent business references to it can be done automatically, is paramount.

Implicit in electronic commerce is the concept of a trading community. A trading community is more than a vertical market. It is all the organizations involved in delivering a certain consumer product or service.

Exhibit I-3 states the definition of trading community.

EXHIBIT I-3

Trading Community Definition

A company, its trading partners, and the trading partners of its trading partners. An expanded vertical market.

Whole groups of companies—trading communities—are integrating in transcorporate, technically complex, electronic infrastructures.

These agglomerations are not only presenting technical challenges (with an accompanying confusing array of vendors offering a variety of solutions), but they are also generating unprecedented commercial phenomena that users and vendors frequently have little understanding of.

Examples include: alliances/partnerships between vendors and customers and—sometimes—among competitors; the elimination of intermediaries; users becoming vendors; economies of scale; proprietary versus open systems; the implementation of standards and open systems across an industry.

The scope of what can be considered electronic commerce systems and who the users and vendors are is necessarily wide. The scope is wide because the nature of the efficiency engendered by electronics is causing a collapsing or implosion of industries and organizations. This collapsing is “pulling in” many disparate groups.

In the food industry, vendors of electronic commerce services and products are publishers, banks and financial institutions, telecommunications companies, network and processing services companies, and computer software and hardware manufacturers. They are converging to build the electronic infrastructure by which groceries are delivered from the farmer to the consumer.

Users of electronic commerce systems are agribusiness companies (including farms), food manufacturers, distribution intermediaries, and store and institutional retailers. These groups are reaping economies of scale and scope by consolidating operations.

Electronic, software-based systems allow the reduction of tasks within and among organizations. The elimination of redundant work is the essence of information systems

Because of this workflow collapse, many technologies and many categories of vendors and users must be analyzed to comprehend the full scope and potential impact of electronic commerce.

C

Report Methodology

INPUT drew on several sources for the data in this report.

- Interviews (by phone or in person) of 20 managers in the grocery industry representing 4 supermarket chains, 7 food manufacturers, 5 food brokers and distributors, and 4 vendors of software and network services
- Results from two EDI surveys INPUT conducted during 1991
- Multiple interviews with industry experts at the Food Marketing Institute, the U.S. Departments of Commerce and Agriculture, and the Uniform Code Council
- Ongoing interviews with vendors of electronic commerce services and products
- Extensive trade press and independent research sources
- In-house data bases on companies and product literature
- Other INPUT studies

D

Related INPUT Reports

This report is part of a series of reports on specific communities that use networked-based systems. The well-received series was established because INPUT recognized an important trend taking place in the economy: the integration of trading communities in transcorporate, technically complex, electronic infrastructures.

The rationale for these studies is to analyze the larger commercial phenomena in light of the information systems that play such a crucial role in integrating trading communities.

Titles of related research reports are:

Electronic Commerce: The New Foundation for Trade
Electronic Commerce in Health Care
Electronic Commerce in Trade and Transportation
U.S. Electronic Commerce/EDI Federal Markets, 1991-1996
Electronic Commerce in Apparel and Retail
The Electronic Data Interchange Market, 1991-1996
The Electronic Data Interchange Market, Europe
The Electronic Data Interchange Market, Japan
Trends in Electronic Corporate Trade Payments

E

Overview of Report Findings

Use of electronic commerce systems is more advanced in the grocery chain than in other trading communities.

Expenditures on electronic systems as a percentage of total trading community output is highest in grocery relative to health care and transportation. Exhibit I-4 shows this relation.

EXHIBIT I-4

Grocery Electronic Commerce versus Other Industries

Trade Community	Electronic Commerce Expenditures vs. Output	Ratio (Percent)
Grocery	\$1.8 billion/\$540 billion	0.3
Transportation	\$260 million/\$122 billion	0.2
Health Care	\$800 million/\$676 billion	0.1

See related INPUT reports.

The grocery industry is the most tightly integrated single trading community in the economy. The large number of electronic interorganizational data transfers attests to this.

The largest markets for electronic commerce services and systems are at the retail level (stores and institutions), particularly supermarkets.

Debit and credit card processing, check authorization, electronic marketing, and product movement software and services account for 70% of all electronic commerce services in the grocery trading community. Exhibit I-5 shows the key electronic commerce service categories and estimated dollar amounts that users are spending on these services.

EXHIBIT I-5

User Expenditures on Key Electronic Commerce Software and Services

Software/ Service	1990 Expenditure (\$ Millions)
EDI	20
Card Processing	510
Check Authorization	200
Electronic Marketing	100
Product Movement	450
Commodity Markets	300
Other	200
Total	1,780

The point-of-sale environment at supermarkets is a focal point for electronic commerce systems and represents the largest single application area of electronic commerce in the grocery industry. Integrating systems and building software that allows consumer data to drive purchasing, production and marketing functions is needed.

The possibilities for grocery industry players to re-engineer their businesses through the use of electronic commerce capabilities are numerous and will play out rapidly in the 1990s. Some of the more immediate impacts and opportunities are listed in Exhibit I-6.

EXHIBIT I-6

Impact/Opportunities for Users

- Improved marketing
- Automatic re-order (computer-assisted ordering)
- Industry consolidation/restructuring
 - Manufacturer consolidation
 - Food broker bypass
 - Partnering
 - Decentralized commodity exchanges
- New distribution channels
- New payment vehicles
- Product ownership changes
- Yield management pricing
- New profit centers—consumer information
- Health care/grocery linkage

Many of the impacts on business practices are driving and reinforcing opportunities for providers of electronic commerce systems. Exhibit I-7 lists some of the key opportunities.

One specific information service that manufacturers are requesting is product-movement data in the institutional side of the business (such as IRI's and Nielsen's services in grocery stores). Such service could potentially be generated using EDI and other electronic commerce transaction traffic.

EDI is underutilized in the grocery industry. The most popular use is purchase orders to manufacturers from food brokers and large distributors. The second most popular use is invoices from manufacturers to these same groups.

Direct store delivery EDI is still in a pilot/implementation stage, with even large chains still preparing for it.

EXHIBIT I-7

Electronic Commerce Vendor Opportunities in Grocery

- Market data on institutional buying patterns
- Greater EDI penetration
- Software and services for consumer information data
- Integrating POS systems
- Integrating EDI, IVR, and facsimile with applications
- Community-wide solutions

According to supermarket chains, 1992 should be a year of aggressive EDI implementation by stores (notwithstanding negative impacts from the recession).

Growers and grower cooperatives are adopting EDI and other computer-assisted ordering systems.

Large food retailers are seeking direct links to manufacturers with EDI and bypassing food brokers. Manufacturers and retailers maintain that the brokers' business is still desired for service representation, but direct linkage speeds product delivery turnaround by a day or more. Food brokers are concerned about this trend.

The predominant areas where facsimile, interactive voice response, and hand-held ordering are being used are:

- Institutional food brokers
- Independent grocer cooperatives and grocers
- Regional manufacturers and distributors of perishable or direct-store deliverable items (such as dairy products and bread).

The consolidation that exists and is continuing in food manufacturing and distribution will justify investments in electronic commerce systems. Large companies that have large-volume businesses are the best candidates for electronic commerce systems.

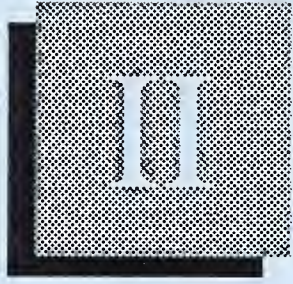
With its focus on building electronic commerce systems, the grocery community is becoming an information-intensive industry. Changing business practices and a recognition of the importance of information is a very observable trend and one that promises to accelerate.

Several specific developments and needs illustrate future qualitative changes in the grocery community:

- In the food brokerage niche, information processing is offloaded to systems and the brokers' added value is increasingly in building human relationships.
- Manufacturers need better processing of scanned supermarket data so that they can see more clearly and in better detail what is happening in their markets and how to respond.
- Manufacturers need better marketing information on the institutional (restaurants, hospitals, schools, etc.) grocery markets.

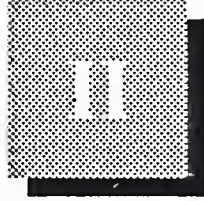
The grocery community is deliberately enhancing and streamlining its communication capacities and adopting business practices that leverage these capacities.

The predominant value generated in the grocery industry will remain food. The electronic commerce infrastructure—which allows for the communication of requests and promises—is not even one percent of the total cost of food. Yet electronic commerce expenditures will increase as a portion of the overall food bill. The value of the infrastructure is hard to determine, but the trend is clear: the food industry is increasingly becoming an information industry. Discovery of many commercial opportunities awaits those that supply and/or use information systems.



The Grocery Production and Distribution Trading Community





The Grocery Production and Distribution Trading Community

Electronic commerce is the facilitation and recording of commercial transactions among companies by interorganizational computer-based systems.

To see how and where electronic commerce can be applied to the grocery production and distribution community, INPUT first identifies the major players in the community and the degree to which they interact (as measured by trade volumes).

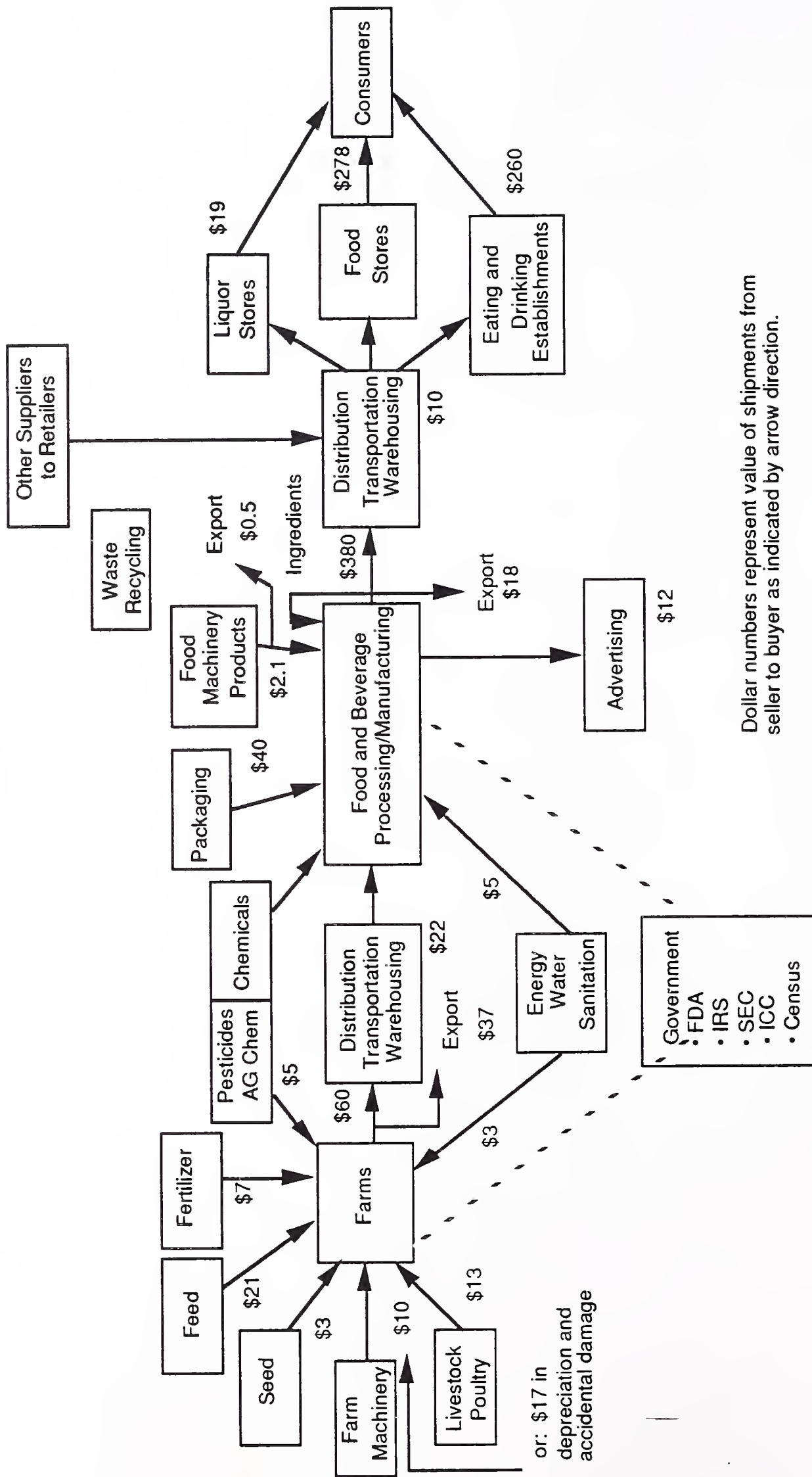
Such a “conversational mapping” of the community helps:

- Vendors of electronic commerce systems identify market segments and opportunities
- Users see where certain efficiencies can be gained through implementing electronic commerce and/or through re-engineering industry and/or enterprise workflows.

Exhibit II-1 depicts the major trading partners and trade flows for the production and distribution of food. The data was primarily gathered from three sources: Bureau of Census (*Statistical Abstract*), International Trade Administration (*U.S. Industrial Outlook, 1991*), and the Bureau of Economic Analysis (Input-Output Program).

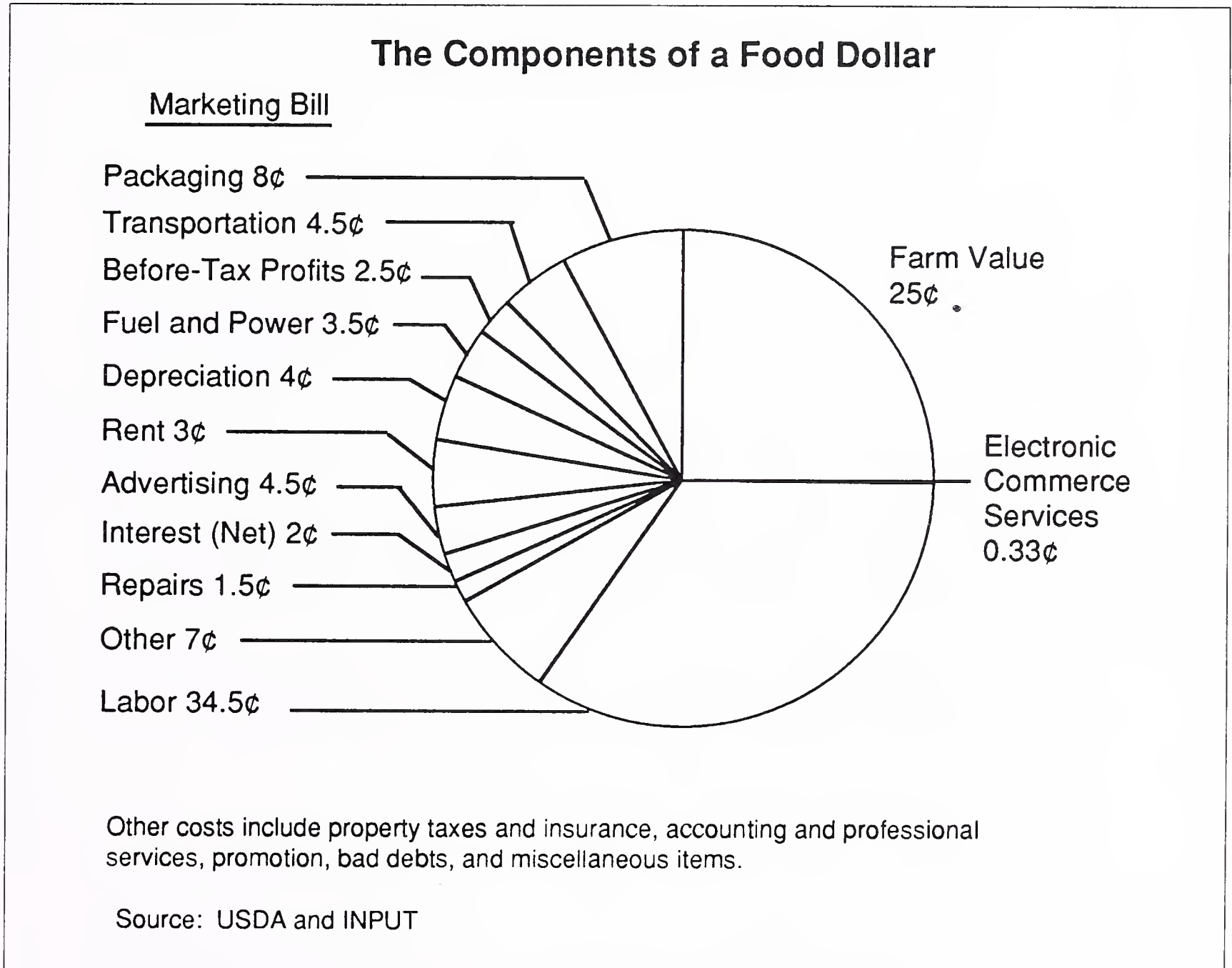
EXHIBIT II-1

Grocery Trading Community: Players and Trade Flows (\$ Billions)



Of the total national grocery budget, expenditures on electronic commerce systems are less than one percent. Exhibit II-2 shows what a dollar spent on food pays for.

EXHIBIT II-2



The food community can be divided into three main subcommunities: agriculture/farming, food and beverage manufacturing/processing, and retail distribution (through stores and restaurants).

This chapter reviews the players, trade flows, and other demographics of the grocery trading community.

A

Players**1. Agriculture/Farms**

U.S. farms are numerous and small (not concentrated—as is often thought—and unlike other sectors of the food chain). Almost 90% of farms are individually or family-owned. About 75% make \$50,000 or less per year in income. Corporate farms with more than \$250,000 per year incomes represent about 7% of all farms.

Farms spend approximately \$10 billion per year on equipment purchases, but write off (in depreciation or accidental damages) approximately \$17 billion in capital equipment.

Other main expenditures by farms (excluding those for real estate and wages) are shown in Exhibit II-1 and include feed, pesticides, agricultural chemicals, fertilizers, seed, livestock and poultry, and electricity.

Farms procure these supplies through a network of distributors and dealers (not shown explicitly in the exhibit).

Farms sell their output to large food-buying groups through non-profit cooperatives (through commodity market and direct transactions) and directly to various distribution intermediaries.

For example, in the fluid milk industry, bottlers collect raw milk from farmers and haul the finished product to retailers. Sixteen percent of the fluid milk sector's employees are engaged in transportation.

2. Food and Beverage Manufacturers

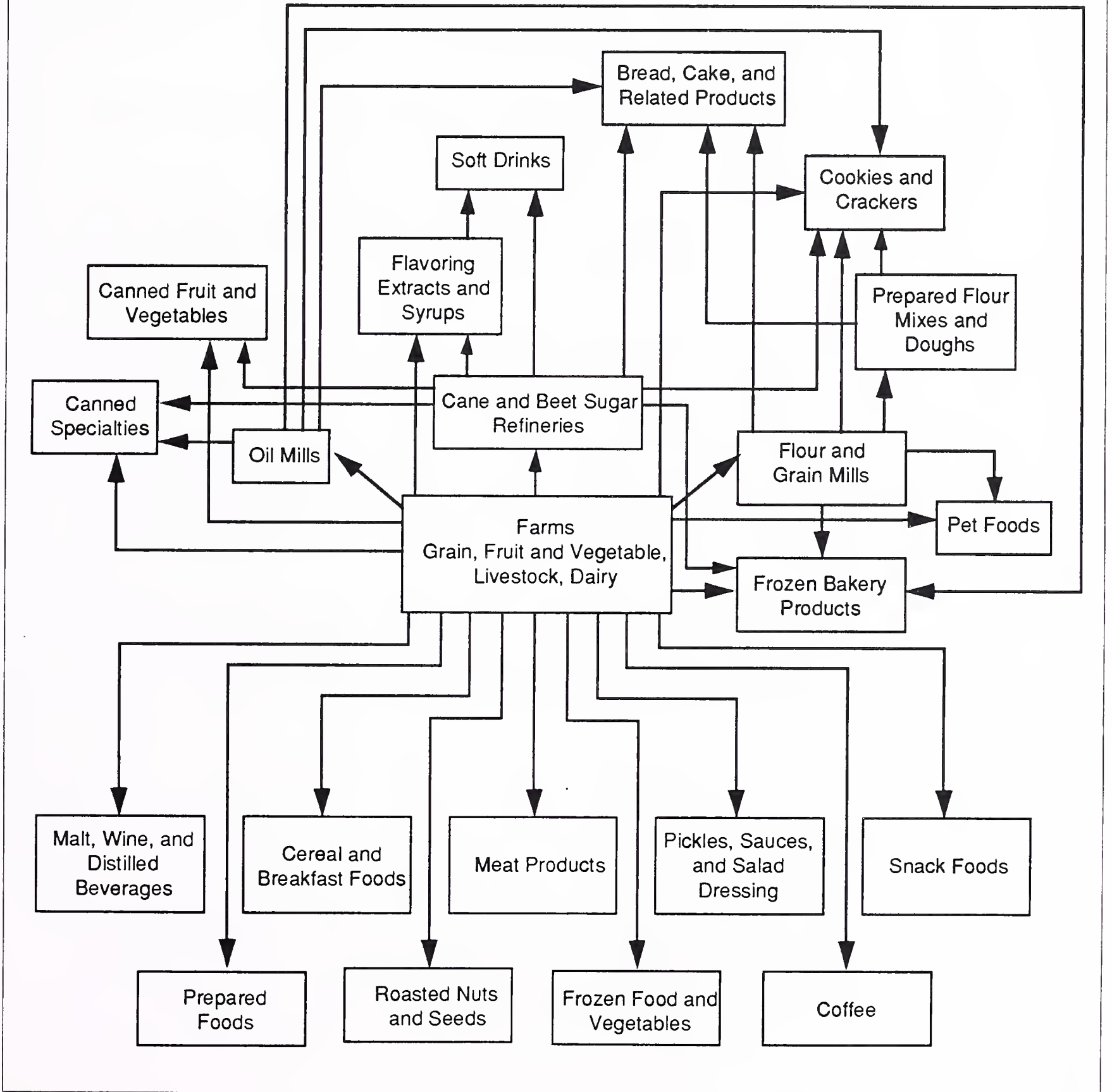
There are approximately 20,624 food and beverage manufacturers in the U.S.

Food manufacturing is “incestuous,” with manufacturers—even competing manufacturers—purchasing supplies and ingredients from each other. Approximately one-third of total output by U.S. food manufacturers is consumed by food manufacturers.

Exhibit II-3 shows the basic food manufacturing groups and the trade flows amongst them.

EXHIBIT II-3

The Food Manufacturing Trade Community



Note that large food conglomerates own operations in many and even all sectors of the manufacturing groups shown in the exhibit. Vertical integration can be found throughout the industry.

- Many manufacturers bypass spot commodity markets and contract with growers and/or grow themselves commodities needed for their production. ConAgra is an example of this.
- Some commodity merchants are finding that selling brand foodstuffs brings higher margins. They are entering the manufacturing business. Cargill is an example of this.
- Some food manufacturers have their own distribution operations and compete with distribution companies as well as other food manufacturers. Kraft is an example of this.
- Transfer pricing is an issue within large conglomerates. If Ore-Ida makes a frozen dinner that requires ketchup, it most likely will source the ketchup from one of its sister companies in the A.J. Heinz family and not source it outside.

In addition to the incestuousness, consolidation/centralization within certain segments of the industry will continue. Exhibit II-4 lists some of the most concentrated industries within the food manufacturing community.

Concentration is an important parameter to consider from the standpoint of electronic commerce, as high volumes (economies of scale) determine affordability of IS investments. Companies with large market share are good candidates for electronic commerce systems.

- They have high volumes of purchasing and selling.
- They are trying to streamline throughput.
- They can exploit economies of scale.

It is worth it to these companies to invest in systems that shave costs off of commercial transactions. Systems become easier to market for vendors. Other implications are addressed in the next chapter.

EXHIBIT II-4

Concentrated Industries Within the Food Manufacturing Community

Industry	Total Number of Companies	1982 Value of Shipments (Billions)	Percent Accounted for by the Four Largest Companies	Percent Accounted for by the Eight Largest Companies
Cereal Breakfast Foods	32	4.0	86	-
Blended and Prepared Flour	91	1.5	58	74
Pet Foods	222	4.5	52	71
Wet Corn Milling	25	3.2	74	94
Cookies and Crackers	296	4.6	59	71
Cane Sugar and Refining	19	3.0	65	91
Beet Sugar	14	1.5	67	95
Chocolate and Cocoa Products	77	2.2	75	89
Chewing Gum	9	1.0	95	-
Soybean Oil Mills	52	8.6	61	83
Vegetable Oil Mills	26	0.5	52	83
Malt Beverages	67	11.0	77	94
Flavoring Extracts and Syrups	297	4.2	65	71
Roasted Coffee	118	5.8	65	76
Cigarettes	8	12.0	-	-
Cigars	54	0.25	60	82

Portions of the food and beverage industry are highly consolidated and the overall trend is toward more consolidation:

- The meat and poultry products sector (\$88 billion in 1990—23% of all food and beverage output) is controlled by a handful of firms. The top three meat-packing firms control over 70% of total cattle slaughter. The top four poultry industry firms accounted for over 50% of total production.
- The dairy industry consists of 1,745 firms.

3. Packaging

Packaging includes firms that make cans and containers; paperboard boxes; corrugated and solid fiber boxes; flexible packaging material; and paper coating and laminating.

Plastic containers are replacing glass (to package such food products as ketchup, salad dressings, etc.). This is leading to a switch from wet-glue labels and water-activated labels to pressure-sensitive labels.

Use of pressure-sensitive labels is also being driven by increased application of Universal Product Code (UPC) labeling and bar-code labeling systems.

4. Food Stores

Food stores sell items other than food. Approximately 80%-90% of retail grocery store sales are from food. Exhibit II-5 shows the categories of merchandise sold by food stores.

The industry includes independently owned stores and corporations that own and operate chains of supermarkets, convenience stores, candy and nut shops, meat-poultry-seafood stores, produce stores, retail bakeries, and miscellaneous food retailers, including health food stores.

Chains account for approximately 56% of the industry's total sales and about 58% of total grocery store sales.

The large chain stores usually receive the majority of their inventory from a wholesale distribution facility owned and operated by the same corporate entity. Independently owned and operated establishments usually buy their inventory from independent wholesaling operations. Such retailers are often associated with voluntary or cooperative wholesaling groups or franchise groups.

EXHIBIT II-5

Categories of Merchandise at Food Stores

Merchandise Sales	Percentage of Total
Grocery, Dairy, Frozen	54.9
Meat (includes service, meat and seafood)	17.0
Produce	9.5
Non-foods (not including pharmacy)	8.2
Deli	2.7
Bakery	5.0
Wine and Beer	2.8
Floral	0.3

Source: Food Marketing Institute

Brand versus private-label foods. Many large chains offer their own label of foods—e.g., Safeway frozen peas. This causes the chain to be a competitor to its other suppliers of brand foods—e.g., Birdseye. The retailer will often favor its own label in promotions and store displays over the brand provider.

A further complication comes into play when the brand provider also contracts out to provide the store with the private-label products. For example, Ore-Ida—a subsidiary of A.J. Heinz—makes private-label frozen potatoes for many store chains as well as its own brand.

Chains are not loyal to their suppliers of private-label goods and will often source the product from as many as 50 different manufacturers. As long as the product meets its minimum specifications, the chain seeks the lowest-priced provider.

5. Eating and Drinking Places

This group includes restaurants, chain restaurants (including fast food chains), hotels, hospitals, schools and other institutional buyers. Food manufacturers usually sell to these groups through distributors. Manufacturers will sell directly to large chain restaurants and hotels.

Approximately 40% of the sales in this group comes from fast food establishments.

6. Distribution, Transportation, and Warehousing

Distribution, transportation, and warehousing services are employed throughout the food community. Trade figures in Exhibit II-1 primarily refer to the amounts of a given commodity that is sold to a given user. Values for distribution and transportation services were obtained from the Bureau of Economic Analysis input-output program. The values refer to how much a given entity buys annually for these services.

The input volumes for farms in Exhibit II-1 show how much of the various inputs farms purchased. This is different from how much the producers of these inputs actually sold. The difference between farm purchases and suppliers' sales represents the value added (and therefore revenue) by the transport, distribution, and warehousing intermediaries.

The distribution intermediaries between farms and producers and then between producers and retail outlets are shown in Exhibit II-1. The dollar volumes shown indicate how much was spent by either the producer or the retailer to move the product from supplier to buyer locations.

a. Cooperatives

Independent farmers/growers work together and form non-profit cooperatives. The cooperatives provide processing services as well as selling/distribution of product services. Cooperatives represent farm output and sell to brokers and distributors.

b. Distributors

Distributors buy from manufacturers, brokers, and cooperatives and sell to store and restaurant outlets. There are two main channels available to the food manufacturer: institutional (to restaurants, hospitals, schools, etc.) and grocery chain channels. Half the sales of large wholesalers go to supermarkets.

c. Brokers

Brokers buy from manufacturers and grower cooperatives and sell to distributors and retail chains. One broker will handle hundreds of manufacturers. There are 1,600 brokers in the U.S.

d. Buying Groups

These are collections of distributors that collectively bargain for price commitments from food manufacturers. Distributors that belong to a buying group are entitled to the prices set in the agreement between the group and the manufacturer.

7. Commodity Exchanges

Futures contracts—binding, standardized, transferable agreements to buy or sell a specific amount and grade of commodity at a future date for the price established at the time of the trade agreement—are traded in more than 30 commodities.

The officially designated commodity exchanges are: Amex Commodities Exchange, Inc.; the Chicago Board of Trade; the Chicago Mercantile Exchange; the Coffee, Sugar & Cocoa Exchange; the Commodity Exchange, Inc.; the MidAmerica Commodity Exchange; the Minneapolis Grain Exchange; the New York Exchange; the Kansas City Board of Trade; the New York Mercantile Exchange; and the New York Futures Exchange.

8. International Trade

Mexico and Canada figure prominently in many U.S. import and export markets for food. Proximity and the coming free trade agreement make for a unified agricultural, food production region. This phenomenon generates greater need for electronic commerce systems.

9. Consumers

The 80 million households (245 million people) of the U.S. comprise the final users of groceries.

Consumers are pursuing timeliness and convenience in relation to food. Consumers are opting for a just-in-time approach to getting food in their mouths, instead of spending a lot of time preparing.

- While the majority of food purchases are made through food stores, consumers are increasingly opting for the convenience of eating out. More and more of food output is distributed via restaurants and fast food outlets.
- Seventy percent of all U.S. households in the 1990 census had a microwave oven. The figure is expected to increase to 75% by 1995.

10. Banks and Finance

Behind the transactions among the various players in the community are banks. They make available, for example, consumer POS debit networks for supermarket purchases. Banks also provide payments between food manufacturer and broker.

But the financing of transactions is also facilitated by other non-bank institutions. Commodity exchanges, cooperative buying, distributor-group buying, special rebate agreements between manufacturer and retailer, and a myriad of other instruments help the players distribute and allay costs.

These financial arrangements facilitate trade just as much as do payment and credit services offered by traditional banks. Consequently, they need to be paid equal consideration in building electronic commerce systems, where relationships among trading partners are embodied/encoded in information systems.

Furthermore, constructing and, in particular, financing an electronic infrastructure for transactions is inextricably intertwined with the kind and nature of the relationship trading partners maintain with each other.

For example, Kraft's relationship with hospital customers and Baxter is unique. Or Procter & Gamble's relationship with Wal-Mart, now that Procter & Gamble actually has personnel stationed in Wal-Mart buying offices.

B

Issues in the Food Business

Given the above list of players in the food value chain, Exhibit II-6 lists the issues that are of concern to these players.

In 1980, supermarkets attracted nearly 60% of food spending; restaurants attracted 40%. Now the portions are approximately 50-50.

1. Communication Technology in the Food Chain

There are three main areas where communication technology is improving the coordination of food production and distribution:

- *Agriculture*: Agriculture-manufacturer coordination. This is on the left side of Exhibit II-1.
- *Manufacturing*: Among food manufacturers and processors. The middle of the exhibit.

EXHIBIT II-6

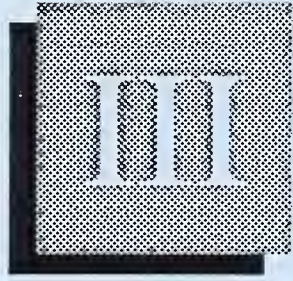
Issues of the Food Business

- Centralized purchasing of multidivision chains
- Wholesalers getting into retail
- Retailers selling their own private-brand labels (competing with manufacturers)
- Consolidation of brokers
- Consolidation of manufacturers
- Green movement (recycling)
- Greater "stomach share" going to restaurants
- Intensifying retail competition
- Changing consumer demographics
- Product labeling
- Consumer health consciousness
- Information technology

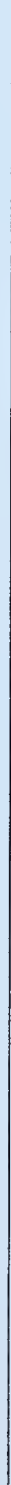
- *Distribution:* Between manufacturers and consumers. The right side of the exhibit.

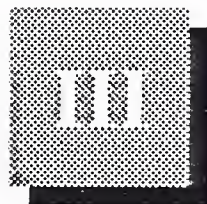
The objective is to move and transform physical goods from left to right based on demand signals that move right to left (see Exhibit II-1).

This report focuses on moving the demand signals (as opposed to moving and transforming physical goods). It also focuses on grocery stores more than institutional (restaurants, etc.) establishments. The grocery store outlet is more advanced in electronic commerce than are institutions. Nonetheless, the institutional sector represents a tremendous opportunity for implementing electronic commerce.



Actual and Potential Electronic Commerce





Actual and Potential Electronic Commerce

Electronic commerce is commercial transactions supported by information systems. Therefore, electronic commerce systems and services are interorganizational in nature. A commercial transaction must have two parties.

Either electronic commerce systems connect a buying organization with a selling organization or they involve a third party acting between the buyer and seller (as in the case of credit-card authorization service providers).

Exhibit III-1 lists selected electronic commerce services in the food community.

EXHIBIT III-1

**Electronic Commerce Services
in the Food Community**

- Food Stores
 - Direct debit at POS
 - Credit card authorization/payment
 - Check authorization
 - Check guarantee
 - Electronic benefits transfer (food stamps)
 - Electronic marketing
 - Product movement data services
 - Lottery
 - Recycling charge-backs
 - In-store ATMs
 - EDI (DEX/UCS, DSD authorized lists)
 - EDI/EFT tax payments
 - Third-party prescription eligibility
 - Home shopping networks
 - Electronic mail
 - Network/processing services for independent grocers
 - In-store radio advertising

EXHIBIT III-1 Cont.

Electronic Commerce Services in the Food Community

- Restaurants
 - Credit card authorization
 - Network/processing services for institutions/restaurants
 - IVR and facsimile ordering systems for institutions and restaurants
 - EDI
- Food Manufacturers
 - EDI (with distributors, brokers, other manufacturers, growers, facilities construction)
 - EDI/EFT tax payments
 - Product movement data services
 - Commodity market quotations
 - EDI/EFT payments between food manufacturers and buyers
 - IVR and facsimile systems for food distributors
 - Hand-held, paging, dispatch systems for in-field personnel
- Agriculture
 - Commodity market quotations (cooperative networks, grower to grower)
 - Network/processing services for growers/agribusiness
 - EDI (growers, farm supply vendors, distributors)
- Other data base services not elsewhere classified

A

Point of Sale: The Largest Electronic Market

The largest market for electronic commerce services and systems is at the retail level (stores and institutions), particularly supermarkets.

Debit and credit card processing, check authorization, electronic marketing, and product movement software and services account for 70% of all electronic commerce services in the grocery trading community. Exhibit III-2 shows the key electronic commerce service categories and estimated dollar amounts that users are spending on these services.

EXHIBIT III-2

**User Expenditures on Key
Electronic Commerce Software and Services**

Software/ Service	1990 Expenditure (\$ Millions)
EDI	20
Card Processing	510
Check Authorization	200
Electronic Marketing	100
Product Movement	450
Commodity Markets	300
Other	200
Total	1,780

Consumer transactions, although they have smaller dollar amounts, are much more numerous than corporate (corporation-to-corporation) transactions. High transaction volumes at the point of sale necessitates more systems to facilitate trade than at other points in the grocery trading community.

The modern supermarket checkout station is a confluence of systems, many of which are interorganizational or generate data that is sent to other organizations.

- Scanned data drives price-lookup data bases, store inventory systems, and EDI replenishment systems.

- Scanned data is sold to market-data, third-party resellers or directly to food manufacturers.
- Scanned data drives electronic and paper couponing/loyalty systems, which in some cases alter the prices of products (scanned items may include a personal consumer identification card in addition to UPC coded merchandise).
- Debit card payment systems hook into real-time bank networks.
- Credit card and check authorization/guarantee terminals hook into real-time authorization data base services.
- Frequent-shopper programs are accessing/updating data bases on consumer purchases.

The multitude of electronic commerce systems at the point of sale in supermarkets represents a highly dynamic, rich-with-potential system environment to be exploited by retailers and providers of electronic commerce systems.

B

Electronic Data Interchange (EDI)

Although it has existed since the late 1970s, EDI is still underused in the food industry.

Exhibit III-3 lists the major vendors of EDI services in the grocery industry.

1. General Trends

Trends in EDI use by food manufacturers, distributors, brokers, and retailers are:

- The practical universe of EDI users in the agricultural, processing, and distribution sectors is around 5,000 to 8,000, and this universe will shrink during the 1990s as consolidation continues at all levels of the food chain.
- Approximately 1,500 grocery industry companies have EDI mailboxes on third-party networks. The Uniform Code Council, the principal grocery trade group responsible for standards definition and maintenance, has almost 600 members. Further detail is shown below.

EXHIBIT III-3

Grocery EDI Network Services Providers

Company	1991 Software, Network, and Professional Services Revenues (\$ Millions)	Market Share (Percent)
Sterling Software ORDERNET	7.0	34
BT North America	5.0	24
GE Information Services	3.0	14
EDI Able, Inc./FOODCOM	2.0	10
ARI Network Services, Inc.	1.5	7
Other	2.0	10
Total	20.5	≈100 *

*Addenda may not total 100 due to rounding

- EDI relationships among retailers and manufacturers are asymmetrical due to the nature of the grocery business. Retailers place many of their orders with food brokers, not directly with manufacturers. But the manufacturers invoice the retailers directly. So a retailer purchase involves two purchase order transmissions (from store to broker, then from broker to manufacturer), but one invoice transmission (from manufacturer to retailer) with a copy sent to the broker. A single food broker may represent hundreds of manufacturers, making that EDI PO conduit to the broker highly leveraged.
- EDI use in the grocery industry is strongest for broker/wholesaler-sent POs to manufacturers and wholesaler/retailer-sent POs to brokers. Invoicing from manufacturer to wholesaler/retailer, although strongly used by the largest wholesaler/retailers, is not as advanced as PO transmissions. Spurred by large retailers, POs from retailers to manufacturers are just now beginning.
- Food brokers are being bypassed as large retail accounts seek direct EDI links with food processors. The broker, although relieved of the day-to-day purchase order processing, is nonetheless kept in the service of the food processor to represent the product to the retailer. The brokers' role

is not threatened, according to industry sources, because they provide the sales support and customer service that many—especially small—manufacturers cannot afford by themselves. In cases where EDI purchase orders go directly to manufacturers, brokers are copied on the purchase order. The need to copy the broker makes EDI the superior solution to facsimile and voice response systems, as discussed below.

- Even a midsized to large supermarket chain of 200 to 400 outlets has less than 100 EDI trading partner relationships—often less than 50. A large portion of these relationships, however, are with food brokers that individually can represent hundreds of food manufacturers.
- Only large food conglomerates with tens of billions of dollars in sales have more than 1,000 EDI trading partnerships. Yet even this high number reflects the counting of each purchasing point or shipping point as an individual partnership, when in fact many points represent only a single company—i.e., Nabisco has multiple EDI addresses.
- The Uniform Communication Council—the grocery trade body that facilitates EDI implementation—launched an EDI expansion program in 1991. The program encourages retailers and manufacturers to use new EDI data formats. In particular, the formats for promotion announcements, price changes, and item maintenance are being promoted. Large supermarkets are experimenting with these new message sets.
- Computer-assisted ordering—automatic replenishment of some items using EDI—was a low priority among the interviewees and according to trade press sources.
- Some food manufacturers are downsizing from mainframes to midsized and often UNIX-based hardware platforms to support EDI applications.
- EDI is part of a larger partnering (close relationship) process that occurs among food manufacturers and large retail accounts—e.g., Wal-Mart, K mart, SuperValu, and Safeway.
- Every food distributor INPUT surveyed for this study that used EDI also used facsimile machines to transmit purchase orders. Facsimile-transmitted purchase orders from wholesalers and brokers to food makers is common and transaction volumes are possibly a hundred times greater than EDI purchase orders.
- Many food makers conduct EDI directly with large accounts through dial-up telecom sessions and bypass third-party value-added networks.
- Many food makers use several third-party networks to communicate with trading partners.

- Integrating EDI with internal systems is the greatest bottleneck for adopting EDI by manufacturers.
- Most food brokers are running PC-based EDI systems, if at all, and even these systems are in their infancy of use.

2. Direct Store Delivery EDI

Direct store delivery (DSD) EDI is used by only a handful of manufacturers with a handful of retailers (namely, Vons, Ralph's, Price Chopper, Shaw's, Frito-Lay, and Nabisco).

The experimental/pilot programs of 1989 brought to light deficiencies in retailer information systems (typically at the individual market outlet) that in many cases have yet to be addressed.

Consequently, DSD activity is still in the experimental stage, but manufacturers have been buying systems in the last year to prepare for it, according to interviews with retailers and manufacturers.

One reason for DSD's slow adoption has been the high capital investment necessary by the manufacturer or delivery company. Each delivery driver needs a hand-held computer. In many cases, DSD suppliers may already have hand-held computers to support route accounting functions.

Stores are experimenting with variations on the DSD theme that would obviate the need for the supplier to make a heavy investment.

Ralph's is experimenting with a program in which the supplier sends the invoice for delivered items in advance to Ralph's central corporate mainframe EDI CPU. The mainframe then downloads the information to the store site. Receiving personnel at the store check the delivery against the invoice and sign off. This method is very similar to the use of EDI advance ship notices used in manufacturing.

Ralph's is using this method for general merchandise goods and acknowledges that it won't work with spot-sell products where the deliverer must look at the remaining shelf supply of the product to determine the reorder quantity.

3. Case Studies

Ralph's Grocery (Compton, CA) sends 52% of its purchase order dollar volume via EDI. If perishable products were taken out of this, the proportion would be 80%, according to a company spokesperson. The number of EDI trading partners is about 80. Ralph's receives about 15% of the dollar value of its invoices via EDI. It is integrating its EDI translation software with its accounts payable system for automatic reconciliation. It expects

80% of the invoices will be automatically reconciled without human assistance. Ralph's has pilot programs for DSD in 12 stores with Coca-Cola, Nabisco, Leggs, Keebler and Frito-Lay.

A large canned-tomato-products manufacturer based in Orange County, CA—a division of ConAgra—is receiving EDI purchase orders from 100 trading partners (mostly food brokers but also large retailers). It also receives facsimile purchase orders (but no IVR or E-mail purchase orders). It uses Sterling Software's Gentrans EDI mainframe software and the network services of IBM Information Network, Sterling Software ORDERNET, and BT North America. It does direct EDI with a number of large customers.

A Sacramento, CA-based grower cooperative represents and markets the output of growers of dried fruit and nuts. Sixty percent of the dollar value of all its POs (primarily from food brokers) come via EDI. Larger retailers—including Safeway, Raley's, Lucky, and Wal-Mart—want to conduct EDI directly with the co-op and bypass the broker (but keep the broker in the loop by sending a copy of the documents). These larger customers want faster turnaround. The company uses Sterling software and network services. It is not doing EDI with transportation companies. The cooperative has an internal network that links it to 40 warehouses, four producing plants, and all member cooperatives that represent growers of specific crops—e.g., prunes, raisins, Brazil nuts, etc. According to officials, the co-op is rolling out EDI more aggressively than a few years ago, primarily at the request of large retail customers. Direct store delivery will be implemented in 1992.

Vons Grocery (Glendale, CA), the second largest chain in Southern California with 320 stores, is conducting EDI with 50 trading partners. It has just started a DSD pilot program. Vons does not send IVR or facsimile POs, only EDI or paper.

A major sugar producer receives EDI purchase orders from 20 customers—half represent grocery store business, half represent other food manufacturers. The company has been doing EDI for seven years. The program has always been on the back burner, but a spokesperson said that in 1992 EDI will be a higher priority. The company wants to have 100 EDI trading partners by the end of 1992. Also, the company wants to implement EDI invoicing in 1992. Sixty percent of the dollar volume of purchase orders comes in via EDI, and 40% comes in via facsimile or phone. The company uses TSI's Translate mainframe EDI software and BT North America's EDI network services.

A large food distributor in the Northwest sends EDI purchase orders to approximately 100 trading partners. Its parent company (based in the Midwest) does EDI with around 700. The distributor uses the parent's EDI translation software running at the parent site. The distributor also sends facsimile purchase orders.

A Memphis, TN-based food broker is not doing EDI yet, but will next year. It has signed up with ORDERNET. It has installed a \$15,000 Novell network with nine workstations attached. It uses facsimile.

A Rocquette, IA manufacturer of corn syrup and corn starch has two trading partners with whom it conducts EDI. It sends X12 shipment notices to one customer and bills of lading to one railroad. Otherwise, it uses facsimile for transmissions of these documents and purchase orders with other trading partners. EDI, according to a company spokesperson, is a "back-burner project."

C

Facsimile, Interactive Voice Response, and In-field Sales Support Systems

Use of facsimile, interactive voice response (automatic telephone ordering), and in-field support systems (typically using a hand-held device) are being used to order products from manufacturers.

The predominant areas where fax, IVR, and hand-held ordering devices are being used are:

- By institutional food brokers. For example, institutional food brokers are collecting orders from restaurants via fax, phone-in orders, and sales representatives who carry a hand-held computer.
- By independent grocer cooperatives and grocers
- By regional manufacturers and distributors of perishable or direct store-deliverable items, such as dairy products, snack foods, and bread

1. Facsimile

Every company surveyed that used EDI used facsimile machines. Many companies used or planned to use facsimile network servers so that multiple buyers could send fax POs to suppliers through a single gateway.

2. In-field Support

The use of hand-held devices by delivery and sales representatives is a rapidly growing market. Interfacing the devices with corporate data bases is revolutionizing management control over operations. Frito-Lay and Coca-Cola are two prominent pioneers.

3. Interactive Voice Response

Interactive voice response technology enables callers to use the telephone to enter and/or retrieve information from a wide variety of information sources and data bases. The telephone key pad is used in the same way as

the keyboard of a computer terminal; the caller interacts with a data base of information and services and can be brought into the company's information stream.

Order entry is an excellent application for IVR technology because this technology gives customers the ability to place orders 24 hours a day, seven days a week, according to their own work schedules.

IVR ordering may require some manual re-entry of data, however, and some people say it is inferior to EDI. Although the order may seamlessly interface with the supplier's order-entry application, today's IVR systems do not interface with the buyer's purchasing/accounts payable application. Thus the buyer must re-enter the order so that its accounts payable application will be ready to reconcile the seller's invoice. Rekeying data opens the possibility of making errors and is labor intensive.

IVR ordering systems are finding a niche in the grocery distribution chain.

4. Case Studies

Tuscan Dairy Farms, Inc., a \$200 million-per-year New Jersey-based dairy farm (and a subsidiary of Labatt), installed an IVR system to take orders from restaurants, supermarkets, and institutional buyers.

Prior to installing the system, customer order processing was labor intensive. Customer service representatives telephoned Tuscan's customers two or three times a week to get orders. This time-consuming order entry function contributed to the dairy's high cost of sales.

Tuscan faced tight delivery deadlines as well. Trucks were loaded at the last minute while customer service representatives struggled to reach decision makers at customer locations.

IVR was used to create the Tuscan Order Processing System (TOPS), an order entry system that allows Tuscan customers to call an automated system to place orders, using their telephone touch-tone key pads to enter codes for items and quantities.

Tuscan uses TOPS as a promotion tool as well. TOPS promotes specials, such as items on sale and seasonal products. To encourage customers to use TOPS, Tuscan instituted a frequent buyers incentive program. Each item ordered carries points that are accumulated for discounts.

An Atlanta, GA-based institutional food broker is not interested in EDI at this time. Seventy-five percent of all sales come from representatives in the field (paying calls on customers) and 25% comes from telemarketing. In 1992, the company will issue laptop computers to its in-field representatives and—in some cases—its customers. The computers will dial

directly into the company's IBM System 36 to place orders and check product availability. The company sells canned goods, meats, coffee, fresh produce, and frozen foods to restaurants, hospitals, nursing homes, schools, and country clubs. It private labels some of its products.

D

Electronic Marketing and Product Movement Data Services

Electronic marketing is a general term that includes electronic signs in the store, video kiosks, in-store radio broadcasts, electronic coupons, frequent shopper, electronic rebates, and even home shopping.

INPUT is interested in couponing and frequent-shopper programs because these systems involve interorganizational exchanges of electronic data as part of a commercial transaction. Couponing and frequent-shopper systems are thus related to the relatively older product movement data services.

1. Product Movement Data Services

Consumer transactions tell retailers and manufacturers what is happening in their markets. INPUT estimates that recording, processing, and reporting on these transactions is a \$500 million business.

In the 1970s, product movement data services began. Here, shipments from warehouses to markets were first tracked. As more supermarkets used scanning devices, tapes of scanned data were used to compile information.

Exhibit III-4 lists the key vendors in this market.

Control Data Corporation was the pioneer in this market, but just this year it closed its operation.

Product movement reports only on aggregate sales of a given brand of product at a given store site.

2. Electronic Marketing

In contrast, electronic marketing systems track the purchases of individual consumers. A lot more data is involved.

EXHIBIT III-4

Product Movement Data Services Vendors in Food Production Distribution

Company	1990 U.S. Revenues (\$ Millions)	Market Share (Percent)
The Dun & Bradstreet Corporation (Nielsen Marketing Research)	270	60
Information Resources, Inc.	136	30
Citicorp POS Information Services, Inc.*	20	5
Other	24	5
Total	450	100

*Citicorp's POS ISI estimated total revenues of \$20 million in 1990 were arbitrarily split between product movement and elective marketing

There are many aspects of electronic marketing. Systems for electronic couponing print coupons at the POS depending on what the consumer purchased. If the consumer bought Pepsi, perhaps the couponing system would print a coupon for Coke. If a chicken was purchased, a chicken recipe could be printed out. Manufacturers pay retailers for this marketing technique.

Exhibit III-5 shows the penetration of electronic marketing applications.

EXHIBIT III-5

Stores with Electronic Marketing Applications

Application Planned	Percent of Stores Active	Percent of Stores
Electronic Coupons	12	31
Electronic Rebates	6	5
Frequent Shopper	3	8

Source: Food Marketing Institute

Frequent-shopper/reward/loyalty programs encourage the shopper to continuously buy a certain product by giving points every time the product is purchased. Points can be redeemed for prizes, other products, or the same product. (In this sense, frequent-shopper electronic marketing programs are similar to trading stamp programs.) The consumer is issued an ID card that is scanned at check out.

Exhibit III-6 depicts one possible scenario of the data flow for a frequent-shopper program.

The system links the supermarket, a third-party data processing vendor, and product manufacturers. Shoppers purchase products that are discounted at the point of sale; the product and shopper data is transferred to a computer tape and mailed to the processor.

The processor provides discount information on tape that is fed to the store's computer and finally to the POS cash register. Manufacturers can buy the data for their own marketing purposes.

Manufacturers and retailers have different, sometimes conflicting objectives with frequent-shopper programs. The manufacturer wants to encourage the shopper to continuously buy its product. It doesn't care in what store the shopper buys it.

Retailers, however, want to encourage shoppers to continuously shop at its store. It doesn't necessarily care what products they buy.

Frequent-shopper programs can be designed to suit these differing objectives.

Direct mail is used with frequent shopper. Real-time frequent-shopper data base look-ups are not available and probably won't be until the late 1990s.

EXHIBIT III-6

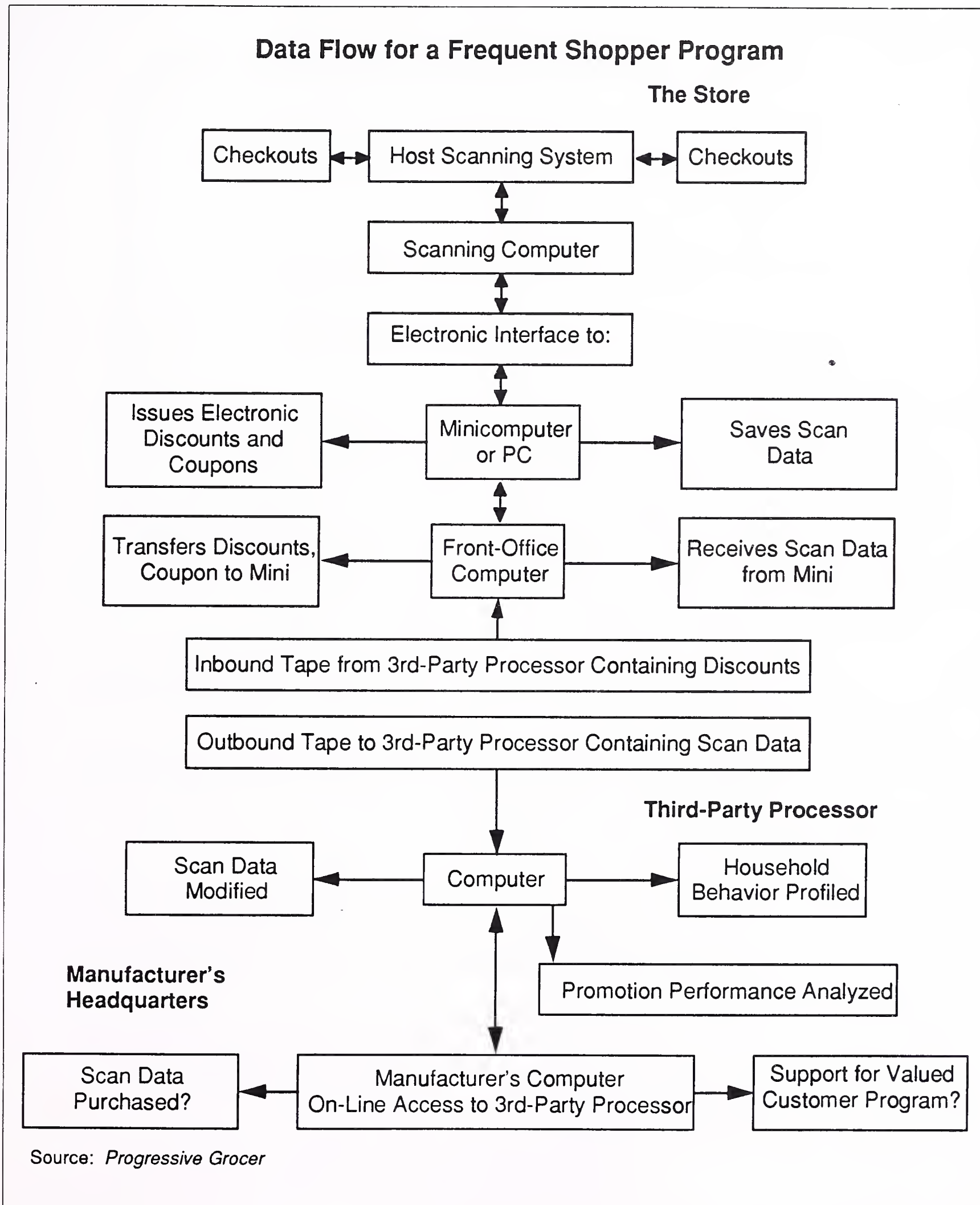


Exhibit III-7 lists major vendors of electronic marketing programs.

EXHIBIT III-7

Electronic Marketing Service Providers

- Catalina Marketing Corporation
- Advanced Promotion Technologies
- VideOcart
- Gift Link
- Citicorp Information Services
- Counter Intelligence (S&H)
- Act Media
- Dynamic Controls, Inc.
- Epsilon Data Management, Inc.
- Comdata Holdings Corporation

Market Acceptance

Although they sound like a good idea, frequent-shopper programs have been slow to catch on.

Supermarket representatives interviewed for this report said that implementing price look-up/scanning, inventory control, and electronic payment systems are the overriding IS priorities over electronic marketing programs.

Also, the representatives said that electronic marketing requires a whole new way of doing business. The slowness to change business culture will keep electronic marketing from being a standard business practice for some time. The technology is not the problem. It is still early in the education period of the technology.

Some vendors have had to scale back their programs. At the end of 1990, Citicorp Information Services dropped its Reward America program. Catalina Marketing dropped its program.

Some of the problems of frequent-shopper programs include:

- They are still very complicated and costly, with customer sign-up and mailing costs continuing to rise.
- Customers resist showing their cards.
- Data management is difficult.
- Programs don't offer enough value and excitement.
- Retailers want the programs integrated with existing POS systems and strategies.
- Retailers want to give real value to a broad base of shoppers.

Maintaining the data base of consumer purchases and/or product movement is tricky for the retailer to handle alone. A third-party market-data services company is best to handle it. Many of these companies have entered the market in the last eighteen months. They often offer professional services consulting, systems integration, and—sometimes—processing.

These companies are often too small and go bankrupt. Also, manufacturers want vendors that can support national marketing campaigns. Small, regional consulting companies aren't large enough.

3. Case Studies

Some 12% of supermarket chain stores and 3% of independent grocery stores offer some type of electronic marketing program, according to the Food Marketing Institute. Here are some of the leaders.

- Vons has frequent-shopper programs in 36 supermarkets and all 26 Pavilions stores. It uses target marketing with various incentives.
- A&P is working with Counter Intelligence in a loyalty program. It is using Catalina's Checkout Coupon and ActMedia's Act Now instant coupon machine, in addition to other marketing techniques.
- Schnuck Markets started its own frequent-shopper/couponsing program in five stores near St. Louis. The program uses a card that can be used for paperless coupon deductions at the checkout on tagged items, for rebate offers credited toward quarterly certificates redeemable at participating stores, for movie rentals and for paperless checking at any store in the chain. Data from the program is used for direct mail. Schnuck also uses VideOcart.

- Dahl's Food Markets uses Advanced Promotion Technology's VisionValue Club frequent-shopper program in two stores. VisionValue uses a smart card that stores customer purchase data.
- Holiday Corporation set up an electronic couponing program with Citicorp. The chain sells participation to vendors and the data to Citicorp. The data is used for direct mail target marketing. The program works through a card.
- Wegmans launched a frequent-shopper program of its own called Wegmans Shoppers Club, which offers electronic discounts at the checkout on about 100 items a week.
- Scotts Corner Market. A one-store independent grocer, Scotts (\$12 million in annual sales) started an electronic discounting system that automatically deducts a discount—up to \$1—from the price of a product as it passes through the scanner at checkout. There are no limits on purchases of discounted items. The total discount for the shopping trip is printed on the receipt.

Discounted products are listed in a monthly flier posted at each checkout and available to shoppers as they enter the store. Signs announcing individual discounts are posted on shelves throughout the store. Shoppers can save up to \$40 per month on products that they commonly purchase.

Customers use a Valued Customer Card, the application for which requests various demographic and psychographic data.

- Sessel's (Memphis, TN) issues a proprietary credit card (similar to department stores). It bills customers at monthly intervals.

E

Electronic Consumer Payment Services

The typical grocery store makes 10,700 consumer transactions per week (median figure from the Food Marketing Institute).

Consumers predominantly use checks or cash to pay for groceries. Exhibit III-8 shows the proportions of the various payment methods.

EXHIBIT III-8

Consumer Payment Methods

	Percent
Cash	47
Check	46
Food Stamps	5
Other	2

Source: Food Marketing Institute

1. Credit and Debit Cards

Supermarket acceptance of debit cards began in the early 1980s.

Traditionally, supermarkets spurned credit card purchases except in the peripheral departments of pharmacy and floral. But with credit cards the norm throughout almost all retail sectors, supermarkets see that they must also provide this convenience to their customers.

Supermarkets that have adopted credit card purchasing have found that checkout transactions are fast (credit card approvals take less than 10 seconds) and the sales per customer are higher than other forms of payment.

Forty-three percent of supermarkets accept third-party credit cards, according to a survey by *Chain Store Age* magazine.

Visa has been the prime mover of supermarket acceptance of credit cards. In 1991, it introduced a program that lowers the interchange rate that Visa sets for all banks that process supermarket-industry credit transactions.

Normally the interchange rate is 1.25%, but Visa is offering it for 1%. The lowered rate stays in effect only until 1994, when the normal rate will resume. Visa hopes to capture many grocery retailers in this time, during which the use of credit payment will become an entrenched buyer practice.

By lowering the rate, Visa gives supermarket-serving banks an incentive to lower the discount rate they charge grocers every time a shopper pays with a Visa card. It's this discount rate—a percentage of the take—that has prevented many supermarkets from accepting credit cards in the past.

With margins so thin for supermarkets, paying the traditional rates would have made supermarkets lose money on the transactions.

Other banks have followed Visa's lead by lowering their discount rates. MasterCard intends to match Visa's 1% interchange rate. Discover card is unlike MasterCard and Visa in that it charges a flat fee—not a percentage fee—per transaction. It is being accepted by many supermarkets.

More than 2,000 stores, including 16 of the top 50 chains, have signed up for Visa's program.

Leading supermarkets that have begun accepting credit cards include:

- Safeway (Oakland, CA): 220 stores in northern California and western Nevada
- Kroger: all major cards accepted in 13 San Antonio, TX stores and 78 Michigan-division stores
- King Soopers (Denver)
- Ralph's (Compton, CA): all 153 stores accept debit and credit cards (Visa, MasterCard, and Discover)
- Foodland Super Markets Ltd. (Honolulu, HI): 27 stores accept Visa, MasterCard, American Express and Discover. Credit cards are an important customer service for Foodland because of the high proportion of tourists who are its customers. Currently, 5% of sales are on credit cards.
- Fiesta Mart (Houston, TX): 23 stores accept credit cards
- Associated Grocers (Seattle, WA—a cooperative and subsidiary of SuperValu): 41 of its 360 member stores accept credit cards

Many independent grocers are also offering credit card purchasing to their customers.

Although transaction charges for a credit card are higher than for checks, the purchase amount is higher. Exhibit III-9 compares transaction costs and average purchase amounts among different payment vehicles.

The delivery of credit and debit card services to supermarkets and institutions as well as all retail outlets is through a combination of many IS vendors' offerings.

EXHIBIT III-9

Payment Vehicle Comparisons

Average Transaction Amount (\$)	
Credit Card	46.00
Check	42.25
Cash	9.09
Average Transaction Costs to the Grocer (¢)	
Credit Card	55 *
Check	53
Food Stamp	32
Debit Card	31
Cash	19

*Based on a transaction amount of \$46.00 and a discount rate of 1.2%, the approximate rate banks are charging under the Visa program that expires in 1994.

Source: *Progressive Grocer* estimates and Food Marketing Institute

Credit card purchases can be made on the same POS equipment on which debit card purchases are made. Leading vendors of this equipment are Casio, Verifone, Hobart, and ICL Datachecker.

The equipment for both debit and credit services is either purchased by the grocer or by the bank and leased to the grocer.

Banks and credit card companies offer credit and debit services to the grocer. Exhibit III-10 lists the leading credit and debit card program providers.

EXHIBIT III-10

**Credit and Debit Card Program
Providers to Stores**

- Chase Manhattan
- Bank of America
- Citibank
- Michigan National Bank
- Bank of California
- AT&T
- Visa
- MasterCard
- Discover

Networks to carry the credit card authorization or to directly connect to POS debit networks are offered by other groups, many of which are bank-owned consortia, but some of which are independent of the banks.

Exhibit III-11 lists some of the biggest POS networks.

EXHIBIT III-11

Leading POS Networks

- MOST/Internet, Inc.
- PLUS System, Inc.
- CIRRUS System, Inc.

These networks switch transaction traffic between credit authorization data bases (usually maintained by an independent non-bank processing company) and debit POS networks (usually operated by bank consortia or a combination of bank consortia and an independent processor).

Debit and credit card networks are beginning to be used for the transfer of government benefits—namely, food stamps—and benefits information at the point of sale.

Exhibit III-12 lists the leading vendors that provide banks with credit and debit card processing services.

EXHIBIT III-12

Credit and Debit Card Processing Service Companies

Vendor	1990 Revenues (\$ Millions)
Electronic Data Systems	290
National Data Corporation	73
Deluxe Data Systems	35 *
Mid West Commerce Corp. (subsidiary of NBD Bancorp, Inc.)	N/A
NCR Data Services	150 **
First Data Resources Inc. (wholly owned subsidiary of American Express)	275 ***
Concord Computing Corporation	17
Affiliated Computer Systems, Inc.	N/A
First Financial Management Corp.	450
National Processing Co.	N/A
Telecredit Inc. (subsidiary of Equifax)	58
Total System Services, Inc.	74
Other	700
Total Card Processing	2,122
Card processing just for food stores and eating/drinking establishments	510

* 1988 Revenues

** 1987 Total division revenues

*** 1989 Revenues

Credit authorization data bases are not used directly by grocery or restaurant outlets. But food transactions using credit cards affect these data bases in that the history of cardholder payments of monthly bills is recorded in these data bases. The use of credit cards by stores and restaurants therefore triggers a data flow that is interorganizational.

Exhibit III-13 lists the leading credit card authorization service providers.

EXHIBIT III-13

	1990 Revenue (\$ Millions)
Equifax (Atlanta, GA)	840
TRW Information Systems	500
Other	200
Total	1,540

2. Check Authorization and Guarantee

Electronic networks connect the checkout station with check authorization and guarantee services. Authorization simply facilitates acceptance of the check—indicating the check writer has a good credit record or belongs to a club. Guarantee services guarantee grocers that they will be reimbursed for the amount of the check even if the check bounces.

Typically, a service provider will offer both services, as the services require common components.

The provider maintains a data base of information concerning dishonored checks, checks written with insufficient funds, and stolen or counterfeit checks. Subscribers to the service and other sources (including law enforcement agencies and business and retail associations) voluntarily provide this information to the provider on a continuing basis.

Access to the provider's data center is available via customer computers, point-of-sale terminals, or telephone.

If a guaranteed check is subsequently dishonored, the provider must reimburse the subscriber for the face amount of the dishonored check.

Charges for the service are based on a percentage of the total face amount of checks guaranteed.

Exhibit III-14 lists the leading check authorization and guarantee service providers.

EXHIBIT III-14

Check Authorization and Guarantee Service Providers

	Authorization Services	Guarantee Services	1990 Sales from Service Revenue (\$ Millions)
Telecredit, Inc. (owned by Equifax)	✓	✓	99
Comdata Holdings Corporation	✓	✓	20 *
Concord Computing Corporation	✓		8
Comp-U-Check, Inc.	✓		7
Other			65
Total			200

* 1989

A new kind of service is a combination of check authorization and debit card. Safeway is implementing an automated check system (in its Denver stores) where customers at checkout use a personal identification card.

The purchase amount and customer identification is transmitted to a third-party check guarantee/card processing provider (in this case, Concord Computer Corporation). The provider approves/disapproves the purchase based on the customer's credit records. Later, the provider passes the debit on to the bank processor (in this case, Chase Manhattan Bank) for funds transfer.

The checkout transaction takes about five seconds (much less than the normal check approval process). The funds transfer takes about the same amount of time to clear as normal checks do.

In addition to the advantage of faster checkout, the system also allows Safeway (via Concord Computing) to build a customer information data base.

F

Electronic Home Shopping

Electronic home shopping is an emerging market. Most home shopping networks for groceries are offered by E-mail networks such as Prodigy. These networks act as gateways to specific manufacturers' and retailers' products, including grocery products.

Some supermarkets, such as King Soopers (Denver, CO), allow customers to call in their orders, and the store either has it waiting for them to pick up or delivers it, at an extra charge.

A new kind of electronic home shopping is emerging in which the customer uses a special kind of telephone and scanning equipment.

The Bank of America, Safeway and U.S. Order (Herndon, VA) system has customers use a modified telephone equipped with a card-reading device to pay bills electronically and order groceries for home delivery from Safeway supermarkets.

Safeway also markets the device, which includes a small display screen and a pen-like bar-code scanner that reads codes of grocery items published in a special catalog. Customers also get a list of bar codes for paying their monthly bills.

The system will be launched in the first quarter of 1992.

PC Flowers is a fast growing member of the Florists Transworld Delivery Association (FTD) that relies entirely on orders generated via the Prodigy videotex service. Prodigy subscribers browse through two dozen floral arrangements. The orders from Prodigy are transferred to PC Flowers' computer system where a credit check is performed. PC Flowers' computer then searches for the FTD member closest to the destination of the flowers and the order is sent. PC Flowers receives a commission of 20% for generating the order, which accounted for \$170,000 in revenue for 1990.

A list of electronic grocery shopping service providers is given in Exhibit III-15.

EXHIBIT III-15

Home Shopping Networks

- CompuServe
- General Videotex
- CUC
- Dow-Jones
- GEIS
- America Online
- Prodigy
- Telecue Systems
- W.E.L.L.
- Bank of America/Safeway/U.S. Order

G**Commodity Market Electronic Information Services**

Networked computer systems are rapidly transforming commodity trading. Not only are the large, traditional commodity exchanges changing—e.g., to 24-hour trading and where the network itself is the exchange, not some geographical location—but smaller regional and crop-specific exchanges are emerging based on bulletin board systems of grower cooperatives.

For example:

- Purdue University Cooperative Extension Service

The university runs a buy-sell electronic bulletin board service for farmers. At this time, the system links prospective hay buyers and sellers. Using a dial-up modem link, users enter their name, address, and phone number. Information included in the data base includes type of hay or straw, cutting, year of harvest, bale or package type, average weight per bale or package, amount in tons available or wanted, tie type, method of storage, and weed content.

- Plains Cotton Cooperative Association (PCCA)

The PCCA built TELCOT, a computer-based system, to provide cotton traders with functions much like those available to New York Stock Exchange or American Stock Exchange traders. TELCOT transformed PCCA from a small cotton merchant to a major cotton broker. Handling 115,000 to 240,000 computer transactions per day, TELCOT provides over 20,000 cotton producers, 40 buyers, and 200 gin operators with an electronic marketing service that has helped PCCA grow from a \$50 million to a \$500 million enterprise in just 15 years.

H

Distributor Processing Services

Distributors to independent markets often offer processing and network services to the independents. The distributor maintains computer systems and time-share processing services on it with the independents.

Stores might subscribe to a menu type of service offering such as "customer composite," which tracks all the items in a given store, their profit margins, their back inventory, how often they sell, and whether sales are seasonal. Other services might include computer-aided design for designing new or remodeled stores and bar-code scanner information, compilation, and financial services.

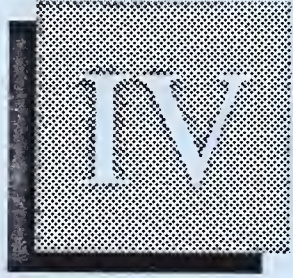
PCs in the individual stores act as terminals to the mainframes at the distributor site and download information for individual analysis.

Exhibit III-16 lists miscellaneous electronic information services in the agricultural sector.

EXHIBIT III-16

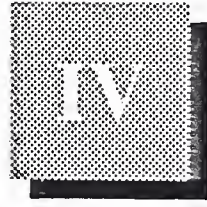
Agriculture Data Bases and Electronic Bulletin Boards

- Vance Publishing Corporation/ProNet
- Purdue University
- Martin Marietta Data Systems (USDA Computerized Information Delivery Service EDI Service)
- USDA ONLINE
- NCYC ON-LINE
- Plains Cotton Cooperative Association/TELCOT



Grocery
Electronic Commerce
Service Providers





Grocery Electronic Commerce Service Providers

Only 17 companies record, process, and report on the majority of the commercial transactions that take place along the food value chain—from farmer to consumer. Continuing developments in software and service arrangements promise to further consolidate this number.

Exhibit IV-1 lists the leading vendors of electronic commerce services and systems in the grocery trading community.

Electronic commerce vendors offer services and products that support commercial transactions.

Many of these electronic commerce vendors have offerings at many transaction points along the chain. For example, AT&T offers credit card services, electronic cash registers, EDI services, and basic telecommunication circuits; Citicorp offers credit and debit card services, product movement services, electronic marketing, and commodity market quotations.

For one vendor to offer electronic commerce services at many points throughout the chain seems a good way to take advantage of synergies and scale economies. Although such strategies have yet to be proven (and there are failures to report—e.g., Citicorp's Information Services), consolidation of vendors is moving forward.

Note: The top 17 vendors are comprised of telephone companies, banking and financial institutions, network and processing service companies, information publishers (electronic and paper), and computer software and hardware manufacturers.

This remarkable collage of vendor types underscores the converging corporate competencies that constitute electronic commerce.

EXHIBIT IV-1

Leading Electronic Commerce Vendors in the Grocery Trading Community

	Direct Debit at POS	Debit Processing	Credit Card Issuing	Credit Card Authorization	Credit Card Processing	POS Software	Check Auth./Guar.	EDI	Prod. Movement Data Svcs.	Electronic Marketing	Commodity Market Quotations	POS, ATM, other Hardware	Telecom Network Svcs.	EFT Software	Home Shopping	Packet Switched Network Svcs.	IVR Software Turnkey Products	Genl. EFT Payment Svcs.	
Citicorp	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EDS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NDC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Dun & Bradstreet	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
American Express	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sterling Software	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GEIS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
BT North America	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Information Resources	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
TRW	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
AT&T	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
First Financial Mgt. Corp.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Deluxe Data Systems	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EquiFax	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IBM	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Visa	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sears	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

A

Advanced Promotion Technologies

Advanced Promotion Technologies is a joint venture of Donnelley Marketing, CheckRobot, and Procter & Gamble.

B

American Express Information Services Corporation (New York, NY)

Revenue: \$827 million (1990)

American Express Information Services Corporation (ISC) was formed in 1989 from business previously organized as the Data-Based Services Group of American Express Travel Related Services Company, Inc.

ISC is currently organized into the following business units:

- First Data Resources (FDR), based in Omaha (NE) with 7,600 employees, provides third-party processing of credit and debit card transactions. FDR also operates a U.K.-based subsidiary, First Data Resources, Ltd.
- American Express Integrated Payment Systems (IPS), based in Denver (CO) with 700 employees, is a worldwide issuer of American Express MoneyOrder, American Express Official Check, and American Express MoneyGram products. This unit also provides cash concentration reporting and disbursement services to corporations and financial services institutions.
- Health Systems Groups (HSG), based in Charlotte (NC) with 1,400 employees, provides processing services and turnkey systems to health care institutions and physicians. This unit was formed in 1989 with the merging of Systems Associates (acquired in 1986) and McDonnell Douglas Health Systems Company (acquired in 1989).
- Integrated Marketing Services (IMS), based in Omaha with 4,300 employees, provides inbound and outbound telemarketing services.
- WATS Marketing (WATS), based in Omaha with 2,400 employees, offers information management, teleservices, and teleconferencing services.
- Cable Services Group (CSG), based in Omaha with 700 employees, provides processing services and turnkey systems to cable television operators.

- The Shareholder Services Group, based in Boston (MA) with 1,300 employees, provides shareholder recordkeeping and transfer agency services.
- The Securities Information Group, formed in January 1991 with 1,100 employees, manages the brokerage data processing operations of Shearson and offers similar services to other companies in the brokerage industry.
- Integrated Systems Technologies, formed during mid-1991, is based in Medford (MA) with 150 employees.
- Call Interactive, based in Omaha with 150 employees, is a joint venture between ISC and AT&T that provides 800- and 900-number telephone facilities for high-volume interactive voice services in the marketing and entertainment industries.

C

AT&T (Basking Ridge, NJ)

Revenue: \$37 billion (1990)

AT&T's primary business is moving and managing information. Its Worldwide Intelligent Network carries voice, data, image, and facsimile messages around the world. AT&T makes telecommunications and computer products, which can be networked into integrated systems. AT&T is in the general-purpose consumer credit card business and provides value-added financial and leasing services for AT&T and other equipment.

AT&T's electronic commerce services and products are found in the following business groups:

- AT&T Computer Systems is expected to have merged with NCR Corporation by the end of 1991, upon completion of AT&T's acquisition of the company. NCR will be responsible for AT&T's development, manufacturing, marketing, and servicing of enterprisewide information systems throughout the world.

A merged product line, based on an open cooperative computing architecture and the NCR System 3000 line of computers, will provide systems that meet the information processing needs of customers in commercial, industrial, government, financial, retail, medical, and education markets.

Customer needs will be addressed in nine categories: processing platforms, telecommunications platforms, networking hardware, network and systems management, network services and protocols, transaction processing, workgroup computing, cooperative computing solutions, and coupon-management systems.

NCR is one of the market leaders in POS and electronic cash register manufacturing. Its recent purchase of Teradata, a data base machine manufacturer, gives AT&T/NCR's foray into transaction processing platforms added strength.

NCR Data Services, included in the acquisition, provides processing services to thrift institutions, commercial banks, credit unions, and retail establishments.

- AT&T EasyLink Services develops and markets global electronic messaging services for business customers worldwide. Services include AT&T Mail, AT&T Enhanced FAX, Telex, and AT&T EasyLink electronic data interchange. The unit has offices in about 20 countries and provides service to 160 countries.
- AT&T Universal Card Services Corporation markets a consumer credit card for general purchases and long-distance calling. The card, from the AT&T Universal Bank of Columbus, GA, is accepted by more than 8 million MasterCard and Visa merchants worldwide. It offers access to cash at selected bank branches and automated teller machines and the ability to make AT&T calling card calls from telephones around the world. There are more than 11 million card members.

D

ARI Network Services, Inc. (Milwaukee, WI)

Revenues: \$3 million (FY 1991—ends July)

ARI Network Services, Inc. provides EDI and other network and information services to targeted sectors of the U.S. agribusiness industry. The company has developed and operates a proprietary EDI network that links manufacturers, distributors, and dealers in three sectors of the agribusiness industry: agricultural chemicals, farm and outdoor power equipment, and animal health products.

The agribusiness value-added network ARI Network Services (Milwaukee, WI), formerly known as AgriData Resources, made an initial public stock offering. Offering 3 million shares at \$8 per share, it grossed \$24 million. The price is holding steady.

The company's fiscal 1991 revenues (for FY ending in July) were \$3 million, making the IPO a healthy eight times its revenues.

The successful IPO comes at a critical juncture in the company's history. Since its organization in 1981, the company has experienced net losses in each fiscal year resulting in an accumulated deficit of \$34,748,000. The company does not anticipate reporting net income for the fiscal year ending July 31, 1992 and there is no assurance that profitability will be achieved thereafter.

The company's prospectus says, "If substantial increases in revenues are not achieved on a timely basis and if additional sources of financing are not available, the company's business will be materially and adversely affected."

Until fiscal 1989, substantially all of the company's revenue was derived from its magazine publishing business and information services, and no significant revenues were generated by the network. In fiscal 1991, recurring revenues from network usage began to increase as a percentage of total revenue. Management expects this trend to continue at an accelerated rate as the manufacturers, distributors, and dealers that joined the network in 1990 and 1991 begin to use it for more of their business transactions.

The company's substantial historical network development costs have been funded principally from long-term indebtedness and the sale of equity securities and convertible debt securities in private placements.

For the period August, 1985, through July, 1991, the total cost of the company's network development was \$22,768,000. In 1985, the company entered a joint development agreement with IBM that provided for cooperation between it and IBM in the funding, technical development, operation, and marketing of network services for electronic commerce in the agribusiness industry.

ARI Network Services is listed on the NASDAQ National Market System under the symbol ARIS.

E

Catalina Marketing Corporation (Anaheim, CA)

Catalina Marketing Corporation offers electronic couponing programs to manufacturers. The programs are used by manufacturers to implement and monitor the performance of product promotions. Catalina maintains a retailer network from which it obtains scanner data.

Catalina's Checkout Coupon program is a nationally distributed, scanner-activated coupon system. Program results are reported weekly.

A variety of report formats analyze competitive and own-product purchase behavior. The information may be based on such criteria as purchase quantity, product mix, etc.

Catalina's store network—from which it buys scanner data—includes all the major chains for a total of over 4,100 individual stores. The number of stores accounts for 34 million households.

F

Citicorp POS Information Services, Inc. (Stamford, CT)

Revenues: \$20 million (INPUT estimate for 1990)

Citicorp POS Information Services was established as a subsidiary of Citicorp in 1985. The company provides product-movement marketing information to grocery retailers and manufacturers. It sells software and processing services in addition to market data reports.

Grocery shoppers use an ID card that—combined with the electronic scanners at the checkout line—tells marketers exactly who bought what.

The company has had trouble making a viable business of electronic marketing. In its six years of existence, it is estimated to have spent nearly \$200 million and only captured \$20 million in sales (made in 1990).

The company's first product was called Coupon Bank. Instead of clipping coupons in the newspaper, shoppers could receive cash after the scanner electronically tabulated any purchases eligible for coupons. The program gave manufacturers a more efficient way to spend the billions that go into paper coupons. Also, the program could save hundreds of millions of dollars in mistakes by store clerks who redeem coupons that are out of date or don't accompany a purchase.

The next product was Reward America. By awarding cash rebates monthly to customers buying a certain number of specific products, it had the advantage of combining the concept of electronic coupons with a frequent-shopper program. The cost of running Reward America was borne by the participating manufacturers.

In November 1990, Citicorp closed its Reward America program and laid off 174 people. It has scaled down its operation but continues to offer electronic marketing services.

G

Comdata Holdings Corporation (Brentwood, TN)

Revenue: \$160 million (1989)

Comdata provides a range of processing services to the transportation, leisure and gaming, and retail industries.

In the grocery industry, Comdata Retail Services provides check verification, check guarantee, and collection services for supermarket and grocery store chains, as well as certain mass merchandise retail stores in several regional markets. These services are currently marketed under the trademarks Cashex and Honest Face.

During 1989, Comdata processed approximately 100 million checks, representing a face value of about \$6.5 million.

Operations centers in Atlanta, St. Louis, and Los Angeles serve merchants with store operations in 22 states.

In 1990, Comdata introduced the Integrated Payment System (IPS), an automated in-lane payment system for supermarkets that accepts credit and debit cards as well as authorizes checks through a single device. IPS also provides a platform for future services, such as frequent-shopper incentives, electronic couponing, and other special promotions.

H

Comp-U-Check, Inc. (Southfield, MI)

Revenue: \$7.2 million (1990)

Comp-U-Check, Inc. provides various processing services to retailers and financial institutions, including check guarantee, verification, and collection services.

Approximately 91% of Comp-U-Check's fiscal 1990 revenue was derived from its various check guarantee, check verification, and credit card processing services. Eight percent of revenue was derived from collection agency services and 1% from other sources.

Comp-U-Check's check guarantee service is provided to retail merchants throughout the U.S. under the name Sure-Check.

As of February 1991, Comp-U-Check had approximately 3,500 check guarantee service subscriber locations.

During fiscal 1990, Highland Superstores, Inc. accounted for approximately 42% of Comp-U-Check's gross revenues and approximately \$237 million in checks guaranteed.

Comp-U-Check's check verification service for retailers is marketed under the name Take-A-Check. FORBANK is a similar service available to financial institutions in the Detroit area.

I

Concord Computing Corporation (Memphis, TN)

Revenue: \$37 million (1990)

Concord Computing Corporation provides a range of processing services for the authorization, control, and settlement of transactions of consumers using checks, credit cards, debit cards, and cash cards at supermarkets, truck stops, convenience stores, drug stores, and other retail locations.

In the grocery industry—66% of revenues come from retail, including grocery—Concord has two major service offerings.

- EFS, Inc., a wholly owned subsidiary of Concord Computing, provides bank credit card authorization, sales data capture, and settlement processing services for Visa, MasterCard, Discover, and American Express transactions at retail points of sale.
- The Retail (Check) Services Division authorizes the cashing of checks by consumers in supermarkets and drug store chains, primarily in the Midwest and West.

J

Deluxe Data Systems, Inc. (Brown Deer, WI)

Revenue: \$75 million (INPUT estimate)

Deluxe Data Systems provides electronic funds transfer processing and network services, software products, and associated support services to financial institutions, shared EFT network providers, and retailers. It has customers in the U.S., U.K., Canada, Germany, New Zealand, Sweden, and Israel.

Its Connex Software is EFT software for financial institutions, networks, and retailers. It performs functions in electronic banking, POS systems (including debit, credit, and check authorization), and card processing.

Banks use Connex Software to provide card services to supermarkets. A few supermarket chains use the software to run their own card and POS programs.

Deluxe Data Systems' processing services include network processing services (transaction and authorization processing for branded ATM networks); gateway processing services (links to multiple credit and debit authorizers for financial institutions, retailers, and regional and national

networks); financial institution processing (ATM network processing); retail processing services (electronic marketing and POS payment services for supermarkets and other retailers); and government benefits transfer processing.

Deluxe Data Systems' Edge debit terminal not only initiates consumer debits, but also has the ability to accumulate consumer marketing data.

Edge works especially well at smaller chains that do not hire technical people to set up and run their own systems.

Deluxe is working with food wholesalers in an effort to interest more supermarket chains in taking on ACH/POS. The wholesaler would offer the service and share in the transaction income. The wholesaler would be more of a full-service provider to the supermarkets it serves and be able to offer enhanced information on customer habits.

K

The Dun & Bradstreet Corporation (New York, NY)

Revenue: \$4.8 billion (1990)

The Dun & Bradstreet Corporation is a collection of over 20 operating divisions sharing the common objective of providing business customers with information to make better and faster decisions.

The company has six main service groups: Risk Management Information Services (20% of revenue); Directory Information Services (10%); Marketing Information Services (40%); Financial Information Services (7%); Software Services (11%); and Business Services (12%).

The company's principal grocery industry product offering is through its Nielsen Marketing Research group. The group measures consumer response worldwide for manufacturers and retailers of groceries, health and beauty aids, and other packaged and durable goods. It also measures and evaluates promotions that influence consumer sales.

Its Logistics Data Systems (a group within Nielsen) markets software systems that help retailers and manufacturers worldwide manage retail shelf space and display areas more profitably.

Nielsen's total worldwide revenues for 1990 were \$900 million; \$270 million of this was generated in the U.S.

L

Equifax Inc. (Atlanta, GA)

Revenues: \$840 million (1989)

Equifax was founded in 1899 as a credit reporting agency under the name Retail Credit Company. The company was renamed Equifax in 1976 and now operates as the parent company for its affiliates, which provide a range of services related to credit reporting, insurance underwriting, and product marketing.

In June 1990, Equifax announced an agreement in principle to acquire Telecredit, Inc. of Los Angeles, CA.

Telecredit—with revenue of \$159 million for the fiscal year ending April 30, 1990—provides check authorization, credit card processing, and other payment services to retail merchants and financial institutions in the U.S. and Canada.

One of the divisions of Equifax is Credit Information Services, a national credit bureau network providing information for consumer and commercial credit reports, services for the management and collection of accounts receivable, and the detection and prevention of fraud.

M

First Financial Management Corporation (Atlanta, GA)

Revenues: \$786 million (1990)

First Financial Management Corporation (FFMC), founded in 1971, provides a range of processing services—including financial institution processing, data imaging, micrographics, medical claims servicing, and merchant credit card authorization, processing, and settlement.

INPUT estimates that approximately 57% (\$450 million) of FFMC's revenue was derived from retailers/merchants.

NaBANCO, a wholly owned subsidiary of FFMC, provides third-party credit card authorization, processing and settlement services to approximately 98,000 merchant customers at over 200,000 locations throughout the U.S. and the Caribbean.

Merchants served range from large, multilocation retailers to one-location specialty stores, restaurant and hotel chains, mail order companies, governments/utilities, car rental agencies, and financial institutions. Clients also include fast food chains, theaters, and supermarkets.

N**Electronic Data Systems Corporation (Dallas, TX)**

Revenues: \$2.8 billion (1990)

Electronic Data Systems Corporation (EDS), founded in 1962, is a leading information and communication services company providing information processing, consulting, systems management, systems integration, and communications services to the financial, insurance, commercial, and communications industries domestically and internationally and to state and federal government.

Financial transaction processing applications—available worldwide—include the following:

- The Card Processing Service is a transaction processing service for the financial and retail industries. The service supports credit, debit, and private-label card programs.
- The Merchant Accounting Service provides merchant transaction processing to the financial and retail industries. Merchant base profitability assessments are also provided.
- The 1stAdvantage Program offers an integrated service for credit card issuance, customer service, and merchant account servicing.
- EFT services are provided to financial institutions and retailers through the Exchange and MPACT networks.

The MPACT Network, established in 1979, includes approximately 1,300 MPACT ATMs and approximately 2.5 million MPACT debit cards issued to customers of member financial institutions located primarily in Texas, Louisiana, Arkansas, New Mexico, Oklahoma, West Virginia, Mississippi, and Massachusetts.

O**Information Resources, Inc. (Chicago, IL)**

Revenues: \$136 million (1990)

Information Resources, Inc. (IRI) was organized in 1977 to apply new technology to the collection and analysis of market data on consumer purchasing. IRI develops and maintains data bases for batch and on-line processing services, and markets decision support software and other applications software products primarily to the consumer packaged-goods industry. IRI also provides marketing strategy testing services using its software and data bases.

IRI's products and services are composed of data base processing and software license fees (termed *software support services* by IRI), and marketing strategies testing and hard copy sales of IRI data base information.

BehaviorScan is one of IRI's principal systems for gathering marketing data. BehaviorScan tracks the purchasing habits of members of a consumer panel.

The panel members shop at participating stores just as any other consumers, except they identify themselves with a panel membership card at the checkout counter. Panel members' purchases are recorded using UPC product-code scanning systems.

Customers have access to the BehaviorScan data base in the form of a hard copy (*The Marketing Factbook*) through an IRI representative, or using IRI's query software (Prompt) for on-line access.

INFOSCAN tracks sales of all brands on a national level, taking into account variances in price, advertising and promotional activities.

DATASERVER is a relational data base management system designed specifically for scanner-based marketing information applications. DATASERVER is a mainframe-based product using pop-up windows and mouse-control technology.

CoverStory is an expert system designed to sift through extremely large data bases in order to extract meaningful pieces of information.

APOLLO PLUS is a software package designed to aid consumer packaged-goods vendors in shelf layout design.

CORE is a software product designed to control communications to, from, and within a store among like and disparate systems.

Retail File Support System is a software product that supports file maintenance for UPC scanning-based systems.

TIME MANAGEMENT is a software product designed to aid in the optimization of labor scheduling.

IRI derives approximately 95% of its revenue from consumer packaged-goods manufacturers, such as Nabisco, Johnson & Johnson, Procter & Gamble, General Foods, Kellogg, G.D. Searle, Kraft, General Mills, Quaker Oats, Ralston Purina, and Coca-Cola. The remaining 5% of revenue is derived from grocery stores and grocery store chains.

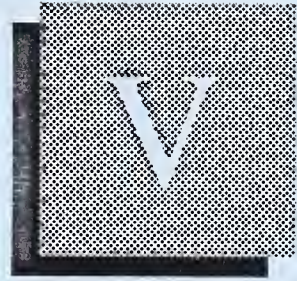
Citicorp owns 4.2% of IRI's stock.

P

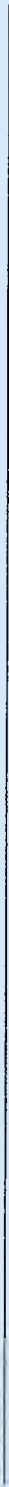
National Data Corporation (Atlanta, GA)

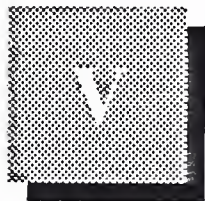
Revenue: \$227 million (FY ending May 1991)

National Data Corporation was incorporated in 1967 in Delaware to provide specialized data processing and facilities management services. The company currently provides various processing services, professional services, turnkey systems, and systems operations services primarily in the areas of credit and debit card authorization and processing; cash management and information reporting; and health care systems and claims processing.



Impact and Opportunities of Electronic Commerce in the Grocery Community





Impact and Opportunities of Electronic Commerce in the Grocery Community

Use of electronic commerce systems in the grocery chain is more advanced than in other trading communities.

Expenditures on electronic systems as a percentage of total trading community output is highest in grocery relative to health care and transportation. Exhibit V-1 shows this relation.

EXHIBIT V-1

Grocery Electronic Commerce versus Other Industries

Trade Community	Electronic Commerce Expenditures vs. Output	Ratio (Percent)
Grocery	\$1.8 billion/\$540 billion	0.3
Transportation	\$260 million/\$122 billion	0.2
Health Care	\$800 million/\$676 billion	0.1

See related INPUT reports.

The grocery industry is the most tightly integrated single trading community in the economy. The preponderance of electronic interorganizational data transfers attests to this.

It is consequently the most efficient. See data in Chapter I concerning overall grocery industry efficiency.

A

Impacts on/Opportunities for EC Users

The possibilities for grocery industry players to re-engineer their businesses through the use of electronic commerce capabilities are numerous and will play out rapidly in the 1990s. Some of the more immediate impacts/opportunities are listed in Exhibit V-2.

EXHIBIT V-2**Impact/Opportunities for Users**

- Improved marketing
- Automatic re-order (computer-assisted ordering)
- Industry consolidation/restructuring
 - Manufacturer consolidation
 - Food broker bypass
 - Partnering
 - Decentralized commodity exchanges
- New distribution channels
- New payment vehicles
- Product ownership changes
- Yield management pricing
- New profit centers—consumer information
- Health care/grocery linkage

1. Improved Marketing

Electronic commerce technology is allowing retailers and manufacturers to capture data on consumer purchases to the finest, most complete possible detail, including: the name and address of the person, what the person is buying, for what price, in what quantities, when and where.

This data allows the food manufacturer to compete more effectively, monitor promotions, and respond with product improvements and new products.

The only limitations at this time are: (1) systems and software to process consumer purchase data; and (2) consumer/legal acceptance of the micro marketing practice.

2. Automatic Re-Order (Computer-Assisted Ordering)

Slowly coming and not for all goods, this methodology requires more integration of store systems and a realignment of retailer/manufacturer relationships (see product ownership changes below).

3. Industry Consolidation/Restructuring

a. Manufacturer Consolidation

The grocery industry will probably continue its tendency towards consolidation, with large food conglomerates acting as the source of most food items.

b. Food Broker Bypass

A number of large grocery chains—such as Safeway, Lucky, Raley's, and Wal-Mart—are requesting to place purchase orders directly with food manufacturers and even produce cooperatives, and bypass the traditional intermediary, food brokers. These retailers cite shortened delivery times as the main objective. EDI purchase orders and invoices are the means by which these large buyers want to place orders.

The brokers are being “carbon copied” on the transmissions and are still considered representatives of the manufacturer. Down the road, however, the ease of direct communications made possible by EDI could eliminate the need for a broker. The food brokers INPUT interviewed expressed nervousness about this trend. However, all retailers and manufacturers interviewed held that the broker's role will always be necessary.

The broker does more than simply provide a one-stop shopping service for many product lines to many retail outlets. It handles many information processing functions: it establishes replenishment levels, deals with spoilage problems, works up promotions, etc.

In order for the distribution linkages of manufacturer-broker-retailer to collapse to just manufacturer-retailer, the services of food brokers have to be picked up by either manufacturers or retailers.

The automation of these services through software and network services is a good opportunity and could begin in the next two years.

c. Partnering

Close relationships that often involve the sharing of financial burdens and consumer information are taking place in the grocery industry.

Partnerships can eliminate production bottlenecks, keep inventories at a minimum, and easily identify service and quality problems. Companies typically assign teams that consist of data processing personnel as well as sales and purchasing people to fix problems.

Retailers and large food manufacturers are partnering. Procter & Gamble (P&G) has sales office at Wal-Mart's Bentonville, AR headquarters to better coordinate supply shipments. P&G now receives daily data by satellite on Wal-Mart's Pampers sales, and forecasts and ships orders automatically. As a result, Wal-Mart can maintain smaller inventories and still cut the number of times it runs out of Pampers. P&G's on-time deliveries have increased in proportion from 94% to 99.6%. Also, P&G's annual volume at Wal-Mart grew by more than 40%, or \$200 million.

Wal-Mart has similar relationships with other suppliers—even farm cooperatives—and EDI is the link.

Quaker Oats has a program in which it shares sales data with retailers.

Retailers in malls share a VSAT uplink station to transmit data.

Deluxe Data Systems is working with food wholesalers to encourage more supermarket chains to invest in ACH/POS systems. The wholesaler would offer the service and share in the transaction income. The wholesaler would be more of a full-service provider to the supermarkets it serves and also be able to offer enhanced information on customer habits.

Kraft has an arrangement to sell to hospitals through Baxter Travenol's ASAP system.

Procter & Gamble, Donnelley Marketing, and CheckRobot Inc. entered into a joint venture to create the electronic marketing software and services provider, Advanced Promotion Technologies Inc. This is a case in which a user becomes a vendor of electronic commerce services.

One reason a partnership can be important involves electronic scanning systems, which provide retailers with data about segments of markets. To profit from this information, retailers need to cooperate with manufacturers. A representative for Procter & Gamble says his company could save as much as \$1 billion annually because of partnering.

d. Decentralized Commodity Exchanges

As noted in Chapter III, food cooperatives and agricultural bulletin boards bring commodity trading outside of the central, large commodity exchanges. The automation of the large commodity exchanges is decentralizing the market exchange of commodities from a specific time and place to a virtual global 24-hour marketplace.

4. New Distribution Channels

With the existence of electronic home shopping services with delivery options, new distribution channels are emerging. Consumer-to-wholesaler connections may even bypass the retailer.

Direct mail promotions based on POS data capture on specific consumers could be delivered through E-mail/home shopping networks.

5. New Payment Vehicles

Debit and smart card payments are altering the purchased quantities and pricing possibilities in stores. Consumers buy more with credit cards. Instant payment with debit cards theoretically could allow retailers to lower prices (because of the added interest income earned).

6. Product Ownership Changes

With better visibility over inventory made possible by information systems, new product ownership arrangements are possible. Manufacturers could theoretically hold title to all products up to the point of sale when the exchange is made with a consumer (who pays with a debit card). The retailer—and other distribution intermediaries—never actually purchase the goods from the manufacturer. The retailer is saved immense sums in not having to hold its own inventory. It becomes an appendage of the manufacturer.

The use of EFT payment mechanisms, which allow greater flexibility among buyers and sellers in negotiating allocation of float benefits, plays a critical role here in consumer and corporate transactions.

The implications of shifting financial obligations made possible by communication technologies are enormous and offer a new set of money-making opportunities in the production and distribution of food.

7. Yield Management Pricing

Frequent-shopper programs enable yield management pricing for groceries. Consumers who are loyal to a given brand are rewarded with lower prices on subsequent purchases (or purchases on other items). Eventually,

there are no uniform prices for any of the store's 25,000 items; for a given item, there are as many prices as there are consumers. Such a move could conflict with price discrimination (Patman-Robinson Act) and civil rights laws (poor people possibly paying the highest prices because they would not opt to join sophisticated frequent-shopper programs).

8. New Profit Centers—Consumer Information

Consumer purchase and product-movement data is very valuable to both manufacturer and retailer (half a billion dollars is spent on this in the grocery industry every year). This data is a good source of revenue for retailers and will continue to grow. Consumers may eventually demand a piece of this revenue stream when they are sufficiently organized to claim that they are the originators/creators, and therefore owners, of this data.

9. Health Care/Grocery Linkage

Nutritious foods and good eating habits are a component of good health. Electronic commerce systems are linking these two human concerns in many ways:

- The on-line, on-demand printing of recipes on coupons at the point of sale, triggered by purchases
- Personal medical data contained in consumer smart cards helping to match appropriate foods
- The more efficient selling of groceries to hospitals and other health care facilities through electronic linkages

Also related to human health is recycling, and electronic systems are helping stores recycle better.

- Consumers getting reimbursed for returns
- Stores recycling more of their own waste (produce and meat refuse, shipping pallets, cardboard, etc.)
- Better packaging by food manufacturers

B

Opportunities for Electronic Commerce Service Providers

Many of the impacts on business practices cited above are driving and reinforcing opportunities for providers of electronic commerce systems. Exhibit V-3 lists some of the key opportunities.

EXHIBIT V-3

Electronic Commerce Vendor Opportunities in Grocery

- Market data on institutional buying patterns
- Greater EDI penetration
- Software and services for consumer information data
- Integrating POS systems
- Integrating EDI, IVR, and facsimile with applications
- Community-wide solutions

1. Market Data on Institutional Buying Patterns

Food manufacturers can buy market data on consumer purchasing behavior at retail chains. No comparable data services are available to them for their institutional (restaurants, hospitals, schools, etc.) customers. This represents a market opportunity.

An effort organized by the International Frozen Food Manufacturers Association (IFFMA) is under way to provide some data in this area. The association will ask its membership to agree to submit a record of monthly sales (invoicing) activity to the association. The data will be aggregated and returned to participants, allowing the IFFMA to monitor sales by food category, quantity, and price.

Because the data is based on sales to manufacturers' distributors, the data will represent sales made to distributors and to large restaurant chains. It will not provide outlet-level detail. The Chicago-based information services company NPD will perform the data collection and collation.

EDI transaction data could be used in this program.

2. Greater EDI Penetration

EDI use is still very minimal in the food industry. Links between wholesalers and manufacturers, wholesalers and brokers, manufacturers and manufacturers, and those in the agribusiness community could increase 100-fold.

The grocery industry has a robust EDI data format standard, the Uniform Commercial Standard (UCS), which will serve it for years to come.

The food industry is recommending the use of "offer sheets" to improve the transactions between food manufacturers, brokers, and distributors. The offer sheets specify all prices and allowances for products offered by the manufacturer, performance requirements, deal timing, reimbursement vehicles, and payment terms. The sheets can be electronic or paper.

Significantly, offer sheets come prior to purchase orders. Currently, purchase orders initiate a business transaction. But under this scenario, disputes over invoices arise, which lead to deductions (\$10 billion worth of deductions occur annually).

The standard offer sheet serves as the base document for the purchase order/invoice cycle and the billback and merchandising reimbursement cycle.

A contract numbering system is required to integrate the standard offer sheet into the business transaction cycle. Today, the purchase order is the cornerstone of the sales cycle. Changes need to be made to build a new foundation centered on the offer sheet.

The objective is to link, through the use of a unique reference number, the offer sheet to all downstream transactions related to the buy period or the performance period indicated on the offer sheet.

By having this linkage and communication of the sales offering (signed by both the buyer and the seller), the terms of the sales agreement will be clear and will not be subject to interpretation. If confusion does occur later, a clear audit trail is present to quickly and efficiently resolve discrepancies.

The design of the standard offer sheet form is simple. The industry challenge, however, is to integrate these forms into daily processing.

3. Software and Services for Consumer Information Data

Electronic marketing is still in its infancy. The potential is huge. Already, data collected on consumer purchases is beyond the processing capacity of most retailers and manufacturers. All manufacturers and retailers that INPUT interviewed expressed interest in developing systems that analyzed POS data, but all held that such projects were 18 months or further into the future.

Citicorp POS Services, when it began its services in 1989, collected more data than it had capacity to effectively process and derive meaningful reports from.

There is a need for high-capacity storage and huge data base management systems. Who should provide this service is anyone's guess: the traditional providers (Nielsen, IRI), retailers, manufacturers, value-added networks, card processing vendors, or new service providers.

It is a wide open and very large niche. Fulfilling it successfully will probably necessitate the collaboration of a handful of experienced grocery players (both users and vendors).

4. Integrating POS Systems

Grocery stores have standalone systems for POS, DSD, scales, time and attendance, pharmacy, video, EFT, payroll, and ordering. Retailers needing to compare and correlate data from more than one source can trip over leased phone lines and computer printouts, but come up short on answers. Working off a single data base is still a fantasy for nearly everyone. Keying the same information into different systems over and over again is inefficient and error-prone.

There is a movement to design a Standard Interchange Language, an application interface guideline that would allow different systems to exchange data. Systems vendors would build products conforming to the language. The UCC was asked to administer the language, but it has not accepted the charter at this time.

Opportunities exist to consolidate systems, particularly at the point of sale.

- Data capture that can be sold to market companies also drives EDI.
- Direct mailings to consumers can be done over home electronic networks.
- Couponing, payment services, product-movement data services, and EDI can be offered through a single source, particularly for the small corner store.

5. Integrating EDI, IVR, and Facsimile with Applications

Integrating EDI, interactive voice response (IVR), and facsimile-server systems to applications (purchasing, order entry, shipment status, inventory, etc.) is in its infancy.

The same order entry system that accepts EDI orders also accepts IVR orders.

The installed base of facsimile machines in the U.S. is estimated to be 10 million. This compares with 25,000 EDI users. EDI users represent a quarter of one percent of fax users. INPUT estimates that the number of purchase orders transmitted over fax networks is 100 to 1,000 times greater than purchase orders over EDI networks.

Although the success of the fax machine may throw water on EDI prospects, at closer glance it represents a tremendous opportunity.

Modern facsimile machines, as well as the new highly popular fax-server, which turns a PC and a laser printer into a virtual fax machine, are computing devices. They are just as capable of performing as a corporate messaging port as a computer running EDI translation software. They may even prove to be more capable because they are normally left on all the time as opposed to the PC or other computer platforms that are either shut off or otherwise periodically made inaccessible from outside the company.

Fax-EDI software opportunities include:

- The basic fax-server software is being purchased and installed by food distributors, brokers in the supermarket and the institutional sectors of food distribution. For fax-server vendors this is a lucrative market.
- Software that monitors outgoing documents and keeps records (so that POs can be kept in a machine-readable/structured format for later reconciliation with invoices)
- Software that monitors incoming documents. The most advanced is character recognition. Also, the use of binary file/ASCII file transmissions via facsimile is possible. Vendors in this area include TRW, Intel, Berkeley Systems, Inc., and Technekron.

As mentioned in Chapter IV, offering many EC services throughout the food chain is not a guaranteed success strategy, as shown by Citicorp's setbacks in electronic marketing and Quotron.

The area of product-movement data services offers some of the most promising possibilities. With the electronic capture of a transaction, the compilation and reselling of this data should be a relatively easy value-added service. Some of the possibilities include EDI transaction data bases and EDI transmissions of POS data scanned at the check-out station (from retailer to manufacturer—like computer-aided ordering systems).

6. Community-Wide Solutions

As a consequence of the potential integration of systems at the POS station and of all-electronic transactional systems (EDI, IVR, facsimile) up and down the grocery distribution chain, transcorporate integration becomes possible.

Third-party value-added network providers could potentially play a big role in integrating/consolidating the grocery trading community.

Sterling Software's ORDERNET's central role in pharmaceutical distribution and ARI Network Services Inc.'s potential role in the agribusiness sector illustrate how a VAN can become indispensable to a trading community.

Currently, one significant opportunity is to provide transcorporate accounting for various business practices in the grocery industry.

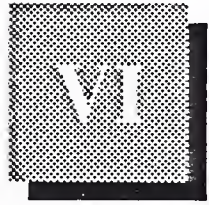
- If manufacturers hold title to goods up to the point of sale, perhaps a VAN would be required to sort out who owes whom what and when, and to take care of all the accounting and, ultimately, funds transfers.
- A charge-back procedure may evolve in the food brokerage business similar to other industries (notably pharmaceutical distribution). As more and more manufacturers sell directly to retailers, food brokers may be forced to deliver products at prices that they haven't negotiated. Consequently, the broker will be owed money by the manufacturer. Keeping track of these shipments and reimbursements (charge backs) would be solved by a third-party VAN.

One area that probably won't be successful is a UPC product catalog for grocery items. Such a community-wide solution exists for the apparel industry. It won't come about in grocery because the time element is different. Apparel makers change UPC codes more frequently than do food manufacturers.



Conclusions

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Conclusions

The grocery industry is driven by millions of consumer transactions at food stores and restaurants.

The industry is possibly the most advanced at electronically capturing and relaying this “final demand” activity information back to suppliers, including growers.

Nevertheless, there still remain more transactions and interorganizational communications to be captured and processed electronically. The effort to do this will continue to drive demand for electronic commerce services.

More important than the prospects for large outlays in electronic commerce systems (and their associated benefits) is a new institutional role that is emerging in the grocery trading community.

There is now a subindustry within the grocery industry that builds and/or uses systems that gather and relay information concerning commercial transactions. Put another way, a certain segment of the grocery community has disengaged from growing, processing, or moving physical products and is solely concerned with capturing, processing, or moving information about the movement of physical products—a \$1.8 billion industry.

The emergence of this industry underscores the growing benefit that information is playing in the industry. *Information* is better understood as the communication of requests (by consumers), promises (by suppliers), and intermittent reports on the status of fulfillment that takes place in a chain of commercially transacting players.

The emergence of the industry suggests that the traditional players in the industry see information/communication as a distinct factor of production and are altering business practices to employ it.

Several specific developments and needs illustrate the kind of qualitative change the grocery community should expect:

- The changes coming to the food brokerage niche where information processing is offloaded to systems, and the brokers' added value is increasingly in the human relations, high-touch area.
- The need by manufacturers for better processing of scanned supermarket data so that they can see more clearly and in better detail what is happening in their markets and how to respond.
- The need by manufacturers for better marketing information on the institutional (restaurants, hospitals, schools, etc.) grocery markets.

The grocery community is deliberately enhancing and streamlining its communication capacities and adopting business practices that leverage these capacities.

The predominant value generated in the grocery industry will remain food. The electronic commerce infrastructure, which allows for the communication of requests and promises, is not even one percent of the total cost of food. Yet electronic commerce expenditures will increase as a portion of the overall food bill. The value of the infrastructure is hard to determine but the trend is clear: the food industry is increasingly becoming an information industry. Discovery of many commercial opportunities await those that supply and/or use information systems.

Despite its tight electronic integration, the grocery industry still has great potential for further electronic integration.

Future integration will undoubtedly result in:

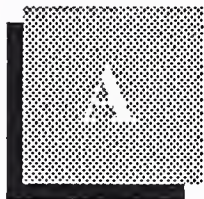
- Further consolidation of electronic commerce vendors (perhaps EDI service providers offering product-movement data)
- Further consolidation of food manufacturers and retailers
- Lower priced grocery items

Because food is a physical good, the business of food retail will always be locally/regionally based—unlike banking, where communications allow a bank to provide services over large distances so that its natural market domain is virtually the world. Food retail competition will always be geographic, despite advances in electronic systems. Even in the area of home shopping networks, local distribution is still necessary.

Agricultural and food processing competition, however, is global. International competition and developments in transportation/communications will continue to change the competitive dynamics of these sectors of the grocery industry.

Retailers—especially in competitive metropolitan markets—face the prospect of investing in electronic commerce systems or being put out of business by competitors. These systems investments will pay off in terms of greater inventory turns and higher sales.

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