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April 4, 1994

Dear Colleague,

Enclosed is the eighth in a series of reports from INPUT's Client/Server Software Program, entitled *Client/Server Applications Trends - Retail Trade*. The sixth and seventh reports in this series, covering telecommunications and state & local government industry segments, are expected to ship soon.

Traditionally in retailing investment per capita in computers is low, compared with other industries. Client/server computing is changing this. Savvy retailers are relying on complex networks to connect to their suppliers and capture point-of-sale information. Home shopping over interactive networks promises to revolutionize the retail industry. Companies that do not have their electronic infrastructure in place will lose.

In this report 153 applications were analyzed by INPUT in 110 companies, including department stores, supermarkets and restaurants. Some of the major findings of the report are:

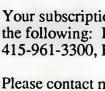
- Business efficiency is a key reason that retailers are moving to C/S systems.
- Concern about keeping up with technology and making systems dependable is higher than in some other industries, where reliability is less critical and users have greater technical awareness. In particular, networking needs to be simple, affordable and robust.
- Virtual inventory and merchandise information systems are areas of high growth.
- Approximately 22% of respondents are migrating to a C/S architecture.

Three case studies of retailers illustrate the issues faced by purchasers of client/server systems. Perceptions of vendors provided from the user survey are given in the final chapter.

Your subscription includes access to INPUT's library and consultants. You may reach me using the following: Internet e-mail - amhey@cup.portal.com, APPLELINK - AMHEY, Telephone - 415-961-3300, Fax - 415-961-3966.

Please contact me with your questions and comments.

Sincerely yours,



Angela M. Hey

Program Manager - Client/Server Software

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VERTICAL MARKET ANALYSIS

Client/Server Applications Trends

Retail Trade

Client/Server Markets and Applications Program

APRIL 1994

Client/Server Applications Trends

Retail Trade

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Introduction

This report analyzes trends in client/server (C/S) applications in the retail trade market segment. It is the eighth in a series of vertical market reports produced as part of INPUT's Client/Server Markets and Applications subscription service.

A Objectives

Based on a user survey, this report addresses the following issues regarding the retailing sector:

- To what degree is the industry migrating to client/server architectures?
- Which applications are likely to be targeted for implementation over the next two years, and which are headed for a downsized client/server environment?
- Who is managing implementation or conversion of client/server applications? The central information systems (IS) function, user management, retailing's local IS function or third parties?
- To what degree are industry participants looking to outside vendors for products and services?

B Scope

The analysis focuses on the retail trade industry sector within the United States. This particular study surveys 110 different companies. Approximately 80% of the companies are retail stores and the remaining 20% are restaurants.

The Standard Industrial Classification (SIC) codes listed in Exhibit I-1 define the market.

EXHIBIT I-1

Retail Trade Respondents by Industry Sector

Code	Description	Number of Different Companies	Companies (Percent)
52xx	Building Materials, Hardware, Garden Supply, and Mobile Home Dealers	5	5
53xx	General Merchandise Stores	29	26
54xx	Food Stores	24	22
55xx	Automotive Dealers and Gasoline Service Stations	3	3
56xx	Apparel and Accessory Stores	13	12
57xx	Home Furniture, Furnishings and Equipment Stores	9	8
58xx	Eating and Drinking Establishments	21	19
59xx	Miscellaneous Retail	6	5

C
Methodology

Data for this analysis is taken from INPUT's applications database, built from 1993 telephone interviews.

Respondents identified 153 applications or projects they would be implementing over the next two years using their own terminology, rather than using a predetermined set of definitions. Once the survey was completed, INPUT analyzed the project descriptions and coded them into 10 application categories.

Exhibit I-2 lists the applications in each category. Detailed descriptions of each application type is contained in Appendix A.

The sample size is relatively small compared to the size of the market. Graphs and charts are provided to supplement intuition rather than a statistically rigorous analysis of the market.

EXHIBIT I-2

Definition of Retail Trade Application Categories

Application Category	Application Type
Retail Trade Applications	**Description/Examples**
Distribution & Warehousing Systems	Direct Store Delivery System, Distribution, Freight Payment, Shipment Tracking, Warehouse Management
Electronic Commerce	EDI, Electronic Fund Transfers (EFT), Electronic Payments, Quick Response System, Vendor Interface
Inventory	Inventory Systems, Perpetual Inventory, Rotating Inventory
Marketing Systems	Consumer History, Coupons, Customer Demographic Database, Home Shopping, Merchandise Information
POS Payment Systems	Check Authorization, Credit Checking System, Debit Point-of-Sale Payment System
Purchasing	Ordering, Purchase Tracking, Purchasing, Replenishment Systems
Store Systems	Bar Code - Scanning, Energy Monitoring, Integrated Store Systems, Portable Label Printing System (UPC Marking), Price Look-up, Verification, Price Changing, Scales Management, Shelf Planning System, Store Register Systems, UPC Item File Maintenance System, UPC Item Marking System, Video Rental System

EXHIBIT I-2 (Cont.)

Application Category	Application Type
Cross-Industry Applications	
Financial	Accounts Payable/Receivable, General Ledger, Integrated Financial Systems, Investment Management, Property Management, Treasury Management
Human Resources	Applicant Tracking, Benefits Administration, Labor/Job Scheduling, Management Development, Payroll, Time and Attendance
Infrastructure	Hardware, Software & Network Upgrades
Office Systems (includes 3 spreadsheet applications normally included under Planning & Analysis)	Electronic Mail & Messaging, Desktop Publishing, Integrated Office Systems, Spreadsheets, Word Processing
Telecommunications	Voicemail

In addition to the survey, additional interviews provided information for the case studies in Chapter V. These discuss user perspectives on C/S systems.

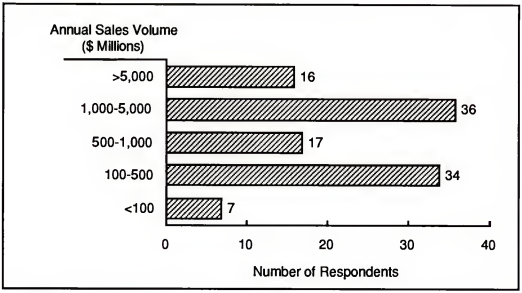
D
Characteristics of the Sample

1. Sample Demographics

Exhibit I-3 shows company distribution according to annual fiscal year 1992 sales.

EXHIBIT I-3

Distribution of Respondents by Sales Volume—Retail Trade



Total Respondents: 110

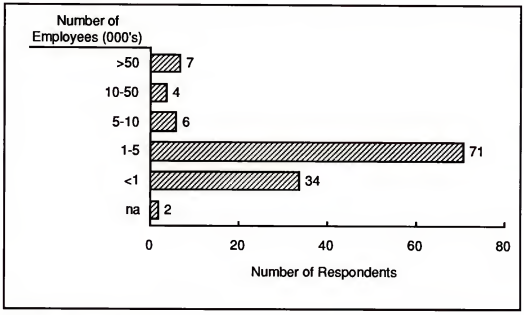
Companies surveyed have an average annual sales volume of $2,930 million. The institutions are grouped into four size categories:

- Very Large - Greater than $5 billion in annual sales
- Large - Between $1 billion and $5 billion
- Medium - Between $500 million and $1 billion
- Small - Under $500 million

The average number of employees is approximately 29,600. Exhibit I-4 shows the distribution.

EXHIBIT I-4

Distribution of Respondents by Number of Employees
Health Services



Total Respondents: 124

2. Characteristics of Survey Respondents

User managers, with direct responsibility for line or staff operations in a functional area other than IS, responded to the questionnaire in Appendix B. Respondents occasionally referred interviewers to the IS organization. Consequently, respondents, whose distribution is shown in Exhibit I-5, include:

- Line Manager—A manager/executive responsible for line operations at a corporate, store or divisional level (e.g., vice president of operations, store manager, director of product distribution, etc).
- Staff Manager—A manager/executive in charge of staff operations at a corporate or divisional level (e.g., vice president of human resources, chief financial officer or director of purchasing).
- IS Manager—A manager/executive whose primary responsibility is the management of information systems activities at a corporate or divisional level.

EXHIBIT I-5

Job Classification of Respondents—Retailing

Job Classification	Respondents (Percent)
Line Manager	27
Staff Manager	76
IS Manager	4

Staff managers represent finance, distribution, inventory, marketing, store operations, human resources and warehousing.

E Organization

The remainder of the report is organized into five chapters:

- Chapter II, Executive Overview, summarizes the findings of this study. It provides recommendations for vendors and purchasers of C/S systems.
- Chapter III, Applications Analysis, discusses key applications that will undergo conversion or reimplementation by retailing firms over the next three years. It addresses:
  - Trends in retailing applications
  - Leading issues
  - Analysis of the applications by application category
  - Where client/server systems are being installed
  - Target platforms and platform combinations
  - Anticipated changes in the system environment
- Chapter IV, Management and Budgets, analyzes who will manage the projects and the budget size. It discusses:
  - Project management and control strategy
  - Outside resources

- Near-term expenditures for applications development
- Growth rates for budgets

- Chapter V, Retail Trade Application Case Studies, describes client/server implementations in representative industry applications.
- Chapter VI, Vendor Analysis, reviews respondents comments on leading vendors and identifies technology vendors supplying solutions for the retail market.

F
Related Reports

INPUT has published another report on retailing, within the market analysis program, that complements this report:

Retail Trade Markets, 1993-1998

This report focuses on general industry statistics and trends. It describes retailing applications in detail.

Executive Overview

This chapter summarizes the key findings in the report.

- Section A provides a background on the retail industry
- Section B discusses key findings
- Section C provides key statistics
- Section D gives recommendations
- Section E gives conclusions

A
Industry Background

Retailing is undergoing significant changes with:

- The re-engineering of the supplier/retailer relationship
- The growth of discount malls and mail order catalogs
- Mergers and acquisitions of major chains
- Paper handling reduction using electronic forms, imaging and database management systems

There are tremendous pressures on retailing, a somewhat inefficient institution, given the growth of discount malls, home shopping and specialty mail order catalogs. Retailing is labor intensive and the spending, per head on computing equipment, is lower than in most industry sectors.

Well-publicized success stories in retailing include, Wal-Mart's superstore growth and J. C. Penney's recent turnaround. The growth and turnaround can be attributed to careful use of

information systems. Wal-Mart has a perpetual replenishment system that makes key suppliers responsible for managing inventory. As part of its merchandise information system, J. C. Penney has implemented a perpetual replenishment system that is integrated at the point-of-sale ECR system. By consolidating data centers, further savings have been achieved. Replenishment systems, using C/S technology, are revolutionizing retailing.

B
Key Findings

1. Client/Server Migration

Despite the much-publicized success stories of Wal-Mart and J.C. Penney, the surveyed retailers were slower than respondents in other industries to adopt C/S solutions. Only 24% of applications will be implemented using a C/S architecture, according to respondents. However, retail budgets are growing faster than in many industries. Hence, there is a tremendous opportunity to revolutionize retailing with C/S computer architectures.

2. Applications Opportunities

The main opportunities for C/S applications are:

- Merchandise information systems using EDI
- Quick-response systems
- Virtual inventory systems
- Virtual home shopping systems
- Efficient Consumer Response systems (ECR)
- POS payment systems (debit, credit, check authorization and collection systems)

3. Downsizing

Fred Meyer, a Portland, Oregon retailer described in Chapter V, indicated a desire to migrate applications from an IBM ES/9000 mainframe to IBM RS/6000 workstations. The trend to replace mainframes with workstations in retailing is just beginning. INPUT believes this will continue as organizations adopt RISC-based hardware that offers good price/performance. According to the survey, few organizations were downsizing. Reponses indicated many were interested in making business more efficient.

4. Outsourcing

Although secondary research indicates outsourcing as a key strategy for retailers, with 35% of companies using some outsourcing, in this survey, only 7% of new or improved applications were considered for implementation using outsourcing. There are opportunities in electronic commerce systems that trade between retailers, customers and suppliers for new outsourcing services.

5. Systems Management

Retailing is an industry strongly dependent upon corporate IS for systems management. With the advent of client/server systems, there is a slight increase in user participation in systems design. However, this is mainly in financial and human resources systems not managed by IS management or store operations personnel. Store personnel are less likely to participate in system design than corporate staff users.

C
Key Statistics

The survey covered 111 companies and 153 applications. Of the 111 companies surveyed, 107 respondents answered the computer applications segment of the questionaire that identified future trends.

The percentage of applications moving to C/S is 24%, somewhat lower than in insurance and health services markets.

Budgets for new client/server systems are growing at 30% and for corresponding non-C/S systems at 19%. This makes retailing one

of the fastest growing markets for C/S systems. However, retailing implementation of C/S systems lags behind some industries.

D Recommendations

1. For Vendors

The retailing market is ripe for C/S computing. The critical success factors for software vendors, value-added resellers and system integrators will be the ability to:

- Network the installed base of systems
- Sell and install systems efficiently with low overhead
- Work with suppliers and key retailing customers
- Gain successful reference accounts
- Support geographically dispersed stores cost-effectively
- Work effectively with hardware vendors

Hardware vendors need to ensure they have a clear migration path for their customers to newer platforms.

Major software consulting vendors need to partner with specialists in communications, point-of-sale (POS) systems and inventory management to develop integrated C/S packages to support retail operations.

2. For Retailers and Restaurants

Client/server technology, integrated with EDI technology, is revolutionizing the supplier/retailer interface and can help improve business efficiency by reducing time and the paper trail, to process orders and reconcile payments.

E
Conclusions

Although there is stiff economic competition in the retail industry, retailers are more committed to technology advancement today than they have ever been. Retail technology is entering a time of accelerated growth and radical change. Retailers are scrambling to keep up with the demands of customers and challenges in the industry. Today, technology is no longer just a tool to keep pace with change and growth, it is driving a revolution throughout the retail trade.

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Applications Analysis

This chapter analyzes retailing applications in detail. It contrasts C/S applications with non-C/S applications.

- Section A discusses retail applications trends.
- Section B discusses leading IS issues as reported by respondents.
- Section C discusses C/S applications. It estimates the percentage of new, implemented systems using a C/S architecture and describes opportunities for C/S applications.
- Section D discusses target platforms, i.e., mainframe, minicomputer or LAN.
- Section E shows how the systems environment is changing.

A
Retail Applications Trends

A decade ago, IT was retailing a powerful new tool for:

- Managing inventory
- Tracking and responding to customer needs
- Communicating with suppliers

Today, IT is:

- Influencing "consumer behavior"

- Creating radically new approaches to:
  - Product delivery
  - Inventory management
  - Customer payment alternatives
- Giving way to new retail concepts

The following key trends will shape retail IT development and implementation in the next few years:

- Increased outsourcing
- Rapid growth in C/S technology
- Increased spending on POS equipment and payment systems
- Computer-based integrated merchandise allocation systems
- Virtual home shopping
- Virtual inventory

1. Increased Outsourcing

Outsourcing continues to be a viable approach to retail IT management. Industry estimates indicate 35% of retailers are presently outsourcing at least one system function and plan to continue to outsource new developments. Outsourcing will become increasingly popular as retail companies find they cannot develop innovative technology solutions on their own, and within the time requirements needed to be competitive. In particular, quick response systems and EDI systems are areas where outsourcing is likely to grow.

2. Rapid Growth in C/S Technology

Approximately 85% of retail IT systems are primarily implemented on a mainframe/minicomputer environment, according to industry estimates, and radical changes in IT systems development are predicted. Over the next 2 years, close to 60% of new systems will be implemented on a mainframe or minicomputer and nearly 30% of new applications on a LAN

platform. Hence, one can expect the number of applications running on mainframes to gradually decline.

Retailers are moving from mainframe/minicomputer platforms due to many factors including:

- Improved, easier to use C/S software development tools
- Standard, cost-effective hardware
- Ease of adding numerous applications without replacing computer hardware

A client/server environment allows a company to grow, change and add numerous applications. It allows users to design the user interfaces that match their requirements on PCs and workstations.

3. Increased Spending on POS Equipment and POS Payment Systems

According to some industry estimates, POS terminals and devices presently account for more than 50% of store IT expenditures in the retail industry. This can reach as high as 65% in supermarkets and grocery stores. Supermarkets/grocery stores will continue to improve their POS equipment, and plan to install:

- Check authorization and collection systems
- Direct debit and credit systems
- ACH EFT debit systems
- Video rental systems
- "Frequent shopper" coupon systems

Retailers want to provide multiple methods of payment to:

- Simplify and encourage spending
- Cut down on bad check losses
- Generate customer loyalty to garner repeat business

4. Computer-based Integrated Merchandise Allocation Systems

More than 50% of retailers are using computer-based merchandise allocation systems and have rapidly integrated "quick response" technologies (EDI) with computer-based merchandise allocation systems. Integrated merchandise allocation systems is expected to be one of the major growth areas for C/S systems over the next five years. The reason is, retailers, who are using this technology, are reporting:

- Dramatic increases in inventory turns
- Increased sales
- Increase in customer satisfaction
- Reduction in inventory levels
- Reduction in operating costs
- Reduction in interstore transfers
- Reduction in markdowns

5. Virtual Home Shopping

Virtual Home Shopping is retailing's new frontier—a $4 billion business that retailers expect will explosively grow.

- Macy's has announced "TV Macy's," a 24-hour channel scheduled for launch in the fall of 1994. Other retailers are taking advantage of such existing channels as QVC Network and Infomercials.
- Saks Fifth Avenue, Marshall Fields, and Bloomingdale's have recently sold merchandise on "NBC Direct."
- Nordstrom has announced plans to develop an "interactive shopping" service using digital technology still in development.

Home shopping will accelerate retail "interactive shopping" and allow consumers to request information and place orders using their TV sets. Just as technology allowed banking via PC, phone or ATM machines in the 1980s, consumers in the 1990s are able to shop anywhere, anytime.

6. Virtual Inventory

Virtual inventory is the elimination of physical inventory through the use of electronic storage and delivery (EDI). Economics of the 1990s is driving the demand toward virtual inventory technology.

Egghead Software has developed a new virtual inventory service called Egghead Express, developed to better serve the company's corporate customers and scale order processing costs. Egghead's customers can electronically order software through its electronic catalog where the customers simply "point and click" to place an order. It is pure EDI—with no human intervention until a pick list is generated in the warehouse. By doing away with manual paper purchase orders, this system dramatically cuts the cost of preparing transactions.

Blockbuster Entertainment has also developed a virtual inventory system called "Soundsational." This system is a joint development effort created by Blockbuster and IBM. It allows network distribution of electronic entertainment products directly to Blockbuster's stores, eliminating the store's need to carry physical inventory. The customer may access CDs, videotapes and audiotapes.

The system allows Blockbuster's customers to identify, preview and select products by touching a kiosk screen. The customer will inform the front desk clerk of his or her selection. The clerk will then order the product from a central host computer using a PC. The host system will then transmit the product to the store, where it will be manufactured (with packaging artwork) in a few minutes.

The system is currently being tested but will not be fully implemented until the:

- Technology is faster
- Licensing agreements are complete
- In-store equipment can manufacture and assemble products rapidly and economically

Egghead and Blockbuster benefit from virtual inventory with:

- Improved inventory management
- Better customer satisfaction
- Increased revenue and margins

The content providers benefit from:

- Fewer returns
- Access to their entire catalog
- New international opportunities

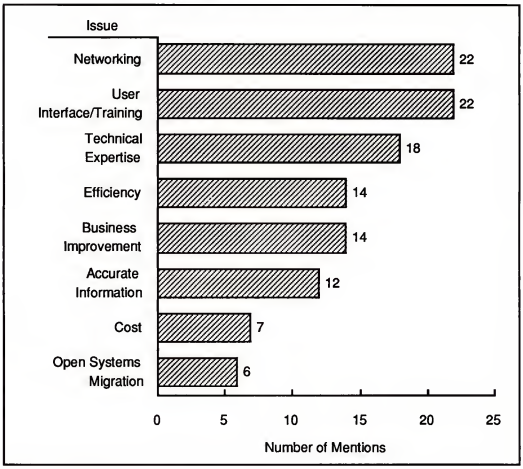
B
Leading IS Issues and User Concerns

1. Ranking of Leading IS Issues

When asked to identify the major issues relevant to IS in the next two years, 107 respondents gave free-form answers that were coded by INPUT. Some respondents gave multiple answers and others gave none, resulting in 115 responses tabulated in Exhibit III-1.

EXHIBIT III-1

Leading IS Issues—Retail Trade



Total Responses: 115

2. Discussion Of Issues

Key issues shown in Exhibit III-1 are discussed in detail below.

3. Networking

Retailers need networks, WANs and LANs, to work easily and reliably.

Concern was expressed among survey respondents that EDI systems can be unreliable and hard to use. Networking is also a prime concern of accounting departments, where EDI is being added to financial systems.

Linking corporate head offices to stores using a WAN is a key priority for retailers. Several large chains use satellite transmission between sites. Ensuring WANs are supported by applications software is a prime concern. Many organizations are interested in reducing the paperwork between offices using networking.

Retailers are also concerned about LANs. These are used to connect store floors to store back offices where the systems are used. They need to be simple to administer, reliable and provide fast customer response when linked to POS equipment.

4. User Interface and Training

Almost one-fifth of respondents mentioned they either need better user interfaces to their systems or better user training. A key concern of retailers is high personnel turnover among stores and the lack of money to train them. Hence, any store system must be as easy to use as a cash register.

Retailers also want simple interfaces to inventory systems—systems that can be very complex. Training of store and warehouse personnel is critical for those implementing perpetual inventory and "quick response" systems.

Customer databases that show customer demographics, purchase patterns and buyer's histories (Frequent Shopper Systems) are another areas where user interfaces can be improved. Shelf planning systems also require a simple user interface.

5. Technical Expertise

More than 10% of respondents are concerned about keeping up with technology. This concern is becommng more prevalent among retailers than among other market segments. Being aware of how competitors and others in the industry use the technology is another concern.

6. Efficiency

Many retailers are concerned with making their business more responsive to customer demand and reacting quickly to changing market conditions. There are several areas where retailers want to speed up operations:

- Distribution management
- Payroll
- Ordering
- In-store check authorization and payment methods (i.e., credit, debit)

Retailers are particularly interested in installing merchandise allocation systems using EDI technology and Quick Response Systems. Several stores are interested in improving their personnel scheduling with time and attendence systems.

7. Business Improvement

Several respondents are interested in using systems to improve their business. They want:

- Merchandise allocation systems using EDI
- Human resource systems to manage employee information and benefits
- Direct store delivery systems (DSD)
- Shelf planning systems
- Price look-up, verification and changing systems

Two organizations, one a restaurant chain, the other a retail chain, are adding laptop computers to improve communications between stores and head offices.

8. Accurate Information

Information is required for several store functions, in particular:

- Orders must be correctly entered into a data entry system
- Pricing must be accurate in POS systems
- Store managers and corporate executives need accurate reports from finance and inventory
- Human resources
- Consumer research database

Stores are particularly interested in getting timely and accurate sales reports to corporate offices. One company is decentralizing its human resources database so job applicants and new hires can enter data at its local store, rather sending a form to a central personnel office.

Time and attendance tracking is another area where accurate information is essential. Many payroll systems are linked to time clocks. However, some stores are interested in improving their time recording along with tracking other employee-related performance factors, in order to create incentive pay schemes.

9. Cost

Most organizations are interested in substituting technology for labor, thereby reducing payroll costs. Very few, explicitly named systems cost as an issue. However, nearly all retailers insisted on seeing a return on investment within one to two years.

10. Open Systems Migration

Six companies mentioned migrating to open systems was a concern. Retailers are interested in cross-platform technologies and migrating software from one platform to another. One is concerned about porting code to a UNIX platform and wants the operating system to provide a stable environment for developers.

11. Other Leading IS Issues

Systems integration, networking and communications are concerns of three. Several personnel issues were raised:

- Growing chains want to be able to expand with minimum systems impact as new staff is hired.
- Some established chains are concerned about layoffs and do not want to cut jobs.
- Other established chains want to replace people with systems, particularly cutting down on staff who order by using more automation.
- Retraining mainframe programmers to work in a networked environment.

Unlike other industries, standardization was not raised as a *major* issue, except by one respondent implementing an EDI system. This may be because many standards have already been established for electronic commerce—bar-codes and accounting in the retail industry.

In this survey for C/S applications, 36% of respondents were interested in an increase of standards, and for non-C/S applications, only 15% were interested in standards. This compares with the average among 2,000 users, across multiple industry sectors, surveyed in INPUT's annual user survey.

C
Client/Server Applications

1. Client/Server Penetration by Application Category

C/S systems will achieve relatively low penetration rates in the retailing industry over the next few years. Respondents were asked if they were using, or planning to use, client/server systems. Exhibit III-2 shows the number of applications surveyed in each category of the applications categories given in Exhibit I-2. It also denotes the number of respondents indicating that C/S would be a major strategy.

On average, C/S architecture is targeted for 37 of the 153 applications, or 24% of the systems. Though not as pervasive in

retailing as in the manufacturing sectors, this is considerably lower in some other industries like health care and insurance.

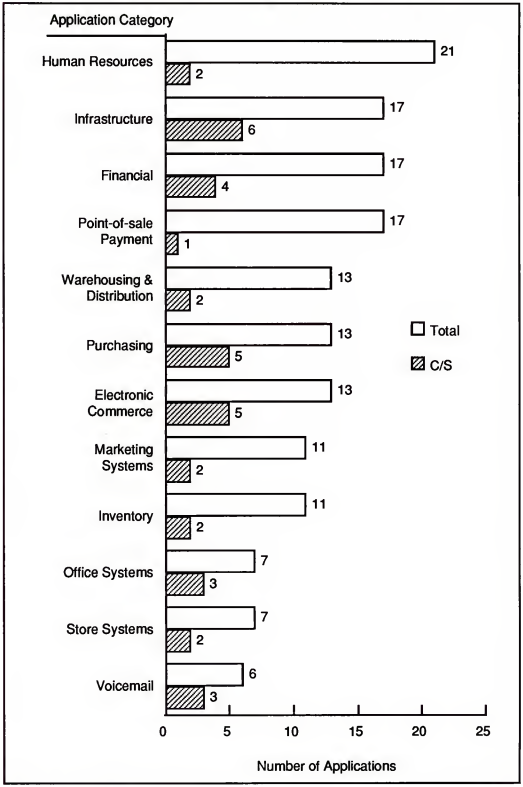
Approximately half of the applications are specific to retailing, rather than cross-industry applications. These applications include:

- Distribution & Warehousing Systems
- Electronic Commerce
- Inventory
- Marketing Systems
- POS Payment Systems
- Purchasing
- Store Systems

For these key retailing systems, the percentage using a C/S architecture is about 22%, showing that in core business operations there is slow movement toward C/S systems.

EXHIBIT III-2

Planned Application Changes and Use of C/S by Category—Retail Trade

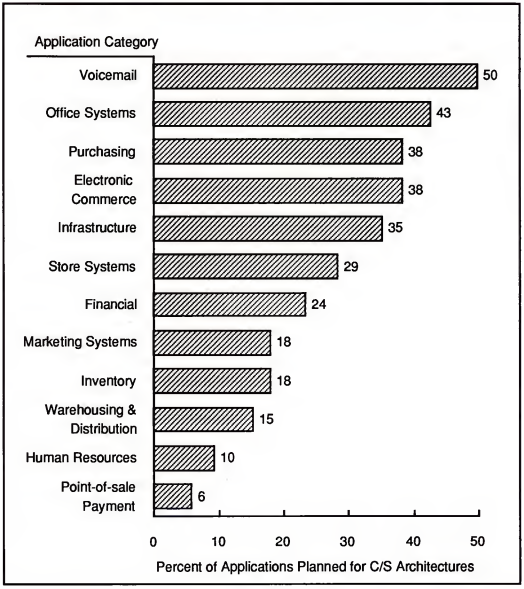


153 Applications; 107 Respondents

Exhibit III-3 takes the same data as Exhibit III-2 and expresses C/S penetration as a percentage of systems installed for each application category. The application categories are then ranked according to the percentage of systems that are migrating to C/S architectures.

EXHIBIT III-3

Use of C/S by Application Categories—Retail Trade



Below each category in the chart above, is a detailed explanation suggesting opportunities for system vendors.

Voicemail, six respondents are implementing voicemail systems and three are implementing client/server systems. In these cases, they are integrating their PBX with corporate computing systems, rather than relying on a standalone voicemail system. This is a key trend that is likely to continue as companies like Novell and AT&T integrate telephony with networked computing.

Office systems, in particular electronic mail systems, are strong candidates for client/server implementation. Typically, office systems rank high in many other vertical markets. However, the penetration of C/S systems (43%) is somewhat lower than the corresponding 73% penetration in the health services market where client/server systems are more prevalent. In particular, office LANs that run word processing and electronic mail are being extended to integrate with inventory and ordering systems. Corporate staff is also interested in analyzing point-of-sale data to develop targeted promotions based on purchasers' buying behavior.

Purchasing systems are being integrated with EDI and inventory systems. Purchasing systems include order entry, order management and automated ordering. The systems that plan to use a client/server architecture are all order entry systems.

Electronic commerce includes EDI systems. In particular, the main growth in C/S systems is for Quick Response systems. Client/server architectures are preferred where EDI systems integrate with inventory and purchasing systems.

Many retailers need to upgrade their *infrastructure.* Three respondents mentioned they are replacing IBM's AS/400 computers with faster RS/6000 RISC-based workstations. One respondent was upgrading hardware to move away from the mainframe. In addition, three respondents are upgrading their hardware to implement a client/server architecture—the primary reason for changing their computing environment.

Store systems are undergoing re-engineering efforts as stores use information captured at checkouts. The systems being implemented as client/server systems are those that combine point-of-sale information with consumer research and ordering systems.

Financial systems in retailing typically lag behind those in other industries, with a relatively low 24% migrating to a C/S architecture.

Marketing systems include customer demographics databases and merchandise information systems. Customer demographics databases are rapidly moving toward client/server architectures.

Inventory systems moving to a C/S architecture, are for inventory planning. As it is, many inventory management packages run on a minicomputer or mainframe. Until there are complete packages that run across multiple platforms using a C/S architecture, retailers will be reluctant to adopt C/S architectures for this application.

Warehousing and distribution systems include distribution systems, shipment tracking systems and warehouse management systems. One distribution system and a freight payment system are moving toward a C/S architecture, but in general, most are implemented on mainframes and minicomputers.

Human resources systems are not moving as fast to C/S architectures in retailing as in some other industries. Labor scheduling software is frequently implemented on a mainframe.

POS payment systems are moving to C/S architectures, but respondents indicate that either their POS terminals are on a simple peer-to-peer LAN or connected as terminals to a minicomputer or mainframe. The main reason given for upgrading POS systems was for more efficient customer tracking.

Exhibit III-4 gives a detailed breakdown of the data collected. It shows, for each category, the number of applications surveyed in the category, the strategy and the main platforms and major resources used.

EXHIBIT III-4

Detailed Data from the Industry Survey

	Strategy			Platform			Resources							
Application Category	Num. Apps.	C/S	Down-sizing	C/S or LAN	Mini	Main-frame	Corp IS	Div'l IS	User Staff	SI	Other Out-side Svcs.	Pack-aged SW	Using EDI	Out-srcd
All Applications														
Inventory	11	2	1	1	0	9	9	0	3	4	1	4	11	1
Marketing Systems	11	2	2	4	2	5	5	3	5	1	8	4	6	1
Electronic Commerce	13	5	0	4	2	7	6	2	4	2	6	2	13	2
Purchasing	13	5	1	5	5	2	8	0	4	1	2	8	9	0
Warehousing & Distribution	13	2	0	3	2	6	11	3	5	1	4	3	9	1
Point-of-Sale Payment	17	1	3	2	3	6	7	3	6	3	8	6	7	1
Financial	17	4	3	8	2	8	13	6	15	7	7	12	7	0
Infrastructure	17	6	3	8	2	7	10	5	6	4	8	8	7	1
Human Resources	21	2	1	3	1	14	16	5	4	1	6	8	9	2
TOTAL - All Applications	153	37	17	43	21	69	98	29	60	28	60	63	83	10
Client/Server Applications														
Voicemail		3	1	1	1	1	1	0	1	1	2	1	0	0
Store Systems		2	0	0	0	1	2	0	1	0	1	0	0	0
Office Systems		3	0	2	0	2	1	1	2	1	2	3	1	0
Inventory		2	0	1	0	2	1	0	0	1	0	1	2	0
Marketing Systems		2	1	2	0	0	0	0	1	0	2	1	1	1
Electronic Commerce		5	0	2	0	4	3	1	2	2	4	1	5	1
Purchasing		5	1	4	0	0	1	0	2	0	1	4	3	0
Warehousing & Distribution		2	0	1	0	2	2	0	1	0	0	0	1	0
Point-of-Sale Payment		1	1	0	0	0	1	0	0	0	1	0	0	1
Financial		4	1	1	1	2	4	0	4	3	2	4	1	0
Infrastructure		6	3	4	1	2	6	2	2	2	3	3	4	0
Human Resources		2	0	1	0	1	2	0	1	0	0	0	0	0
TOTAL - C/S Applications		37	8	19	3	17	24	4	17	10	18	18	18	3
Comparison of C/S Applications with Other Applications														
Percentage for All Applications (%)		24	11	28	14	45	64	19	39	18	39	41	54	7
Percentage for C/S Applications (%)		100	22	51	8	46	65	11	46	27	49	49	49	8

An explanation of the column headings follows:

- "Number of Applications" is the total number of applications for each of the application categories.
- The "Strategy" heading contains two subheadings, "Client/Server" and "Downsizing." The "Client/Server" count by category indicates the number of applications, within the category, being implemented using a C/S architecture. The count under the heading "Downsizing" represents the number of client/server applications being implemented as part of a general downsizing strategy.
- The "Platform" heading indicates the number of times one of the three major platform classes was mentioned as the key implementation platform.
- The "Resources" heading covers six potential sources of resources being employed as part of the implementation process. More than one response per application was permitted.
- Finally, for each application, respondents were asked to indicate whether the application would use EDI or be outsourced. The last two columns give a tabulation of those responses.

An explanation of the rows is as follows:

- The first set of rows represents the leading application categories.
- The "TOTAL—All applications" row adds up the rows describing the application categories.
- The above rows are repeated for applications where the respondents indicated a major strategy to move to C/S systems.
- The next to last row takes the "TOTAL—All applications" and divides each column total by the number of applications to get a percentage. The final row calculates a similar percentage for C/S applications, for comparison with the population as a whole.

2. Observations on the Sample Mix

The following observations can be made about the C/S applications in the above table:

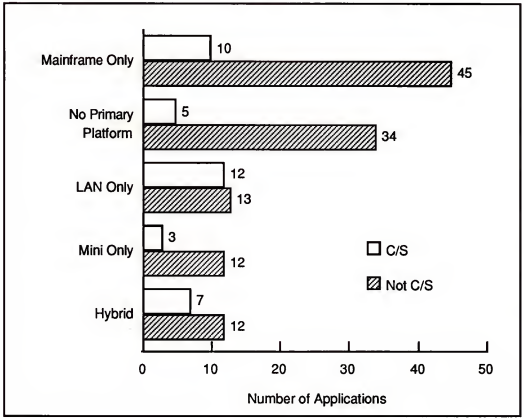
- Retailing is behind many other sectors in moving to C/S architectures.
- Downsizing is twice as likely to be a consideration where C/S systems are being implemented.
- C/S migration is at the expense of minicomputers more than mainframes. In general, 14% of applications are using a minicomputer as a primary platform with only 8% of applications moving toward a C/S architecture using a minicomputer.
- Outside services, including system integrators and user management, are more likely to be involved in implementing C/S architectures than other systems.

D
Target Platforms

Exhibit III-5 shows the target platforms for the 153 applications in the sample for which platform information was available. Users were asked to identify their primary application platform for applications undergoing major changes. Some respondents did not specify a platform, while others specified multiple platforms. For example, a single application could be on a LAN implementation and a mainframe. Three respondents specified that they are planning to implement a multi-tier C/S system with LAN, minicomputer and mainframe.

EXHIBIT III-5

Target Platforms for Planned Applications Development



Overall, there is still a strong reliance on mainframes, with 45% of applications using a mainframe, either alone, or with other components. Out of 55 mainframe applications, 10 are C/S systems. Respondents answered "no primary platform" when no a particular preference was voiced for any given primary platform. Hence, this category may also include hybrid systems.

An analysis of platform by institution size indicates mini-computer-only solutions are found in smaller organizations with less than $500 million in annual revenues. Larger organizations are much more likely to integrate LANs with mainframe or minicomputer servers.

E
Anticipated Changes in the Systems Environment

Respondents provided information on specific changes in their systems environment over the next two years. Responses fell into four categories.

1. Upgrades

Sixty-three (63) of 107 respondents, or 56%, anticipate they will be upgrading their systems over the next two years. Of those wanting to upgrade, just over 20% are moving to client/server systems. This is slightly lower than the sample estimate (24%) of applications moving to C/S systems. The upgrades were evenly distributed across all SIC codes and all sizes of companies.

2. Increased Standardization

Movement toward increasing standardization in platforms and operating environments was predicted by 22 of 107 (about 20%) of the respondents. This is much lower than in some other industries. It may be because retailing has highly specialized vendors and limited platform choices that exist in other areas like health services. Retailers typically use more mature technology than other industries, hence, vendors already support standards. Also many industry standards have already been defined for systems interoperability in retailing.

3. Migration to C/S

A relatively low proportion of retail trade respondents (24 %) are adopting C/S migration strategies, compared with other industries. However, for key applications like customer databases and perpetual inventory systems, C/S technology is key.

4. Downsizing

Only 10% of applications are being downsized. Downsizing is not, generally, a major strategy in the retail trade sector, however, there is definitely a move toward it among larger retailers.

The main applications being re-engineered in organizations that are downsizing are:

- Financial
- Point-of-sale
- Marketing systems

In addition, organizations downsizing are interested in upgrading their hardware to more cost-effective platforms. For example, one organization is interested in moving applications off

the mainframe. Other organizations are interested in implementing faster RISC-based workstations.

G
Client/Server Implementation by Company Size

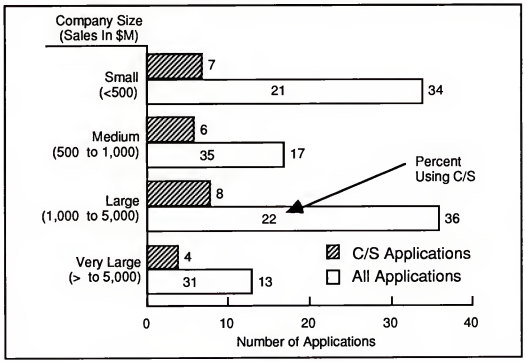
Of the 100 companies interviewed, 25% indicated a movment toward a C/S strategy.

Exhibit III-6 shows C/S implementations are more likely in very large institutions (more than $5 billion in annual revenues) and medium-sized ($1 billion to $5 billion) with the probability of having a C/S strategy being 35% and 31%, respectively. An explanation for this is that very large companies need to cut costs and have the resources to invest in systems that enable them to remain competitive.

Small companies are more conservative and less likely to move to a C/S architecture. Medium-sized companies tend to be flexible and ready to implement a C/S architecture to improve their customer databases and ordering systems.

EXHIBIT III-6

Use of C/S as a Function of Company Size



IV

Management And Budgets

This chapter discusses applications management and budgeting. The chapter is organized as follows:

- Section A provides an analysis of the role that IS departments and user management play in project management of applications.
- Section B analyzes resources being used to implement applications, the emphasis being on development rather than overall project management.
- Section C analyzes expenditure plans, that is, estimated budget sizes for investment in new systems.
- Section D analyzes budget growth rates—the amount that respondents expect their annual budgets to grow over the next two years.
- Section E shows high growth, large budget applications.

A
Project Management

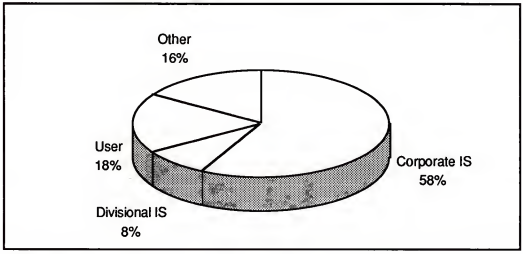
Respondents were asked, for each application, who was managing the project. Corporate IS is the project manager for more than half the applications in the retail trade. Corporate IS has more influence on retail systems than in many other industries. Many of the projects classified as managed by "other" were managed by a joint committee of IS and users.

- Eighteen percent (18%) of the respondents' applications will be handled by user management. This is comparable to manufacturing industries and much lower than the 40% found in banking and finance.
- Corporate IS will manage 58% of the projects. Divisional IS will manage 8%.

Of 200 applications, 83 of them are moving, or have already migrated, to client/server solutions. Exhibit IV-1 graphically shows the project management responsibilities, as a percentage, for all applications.

EXHIBIT IV-1

Project Management for Applications

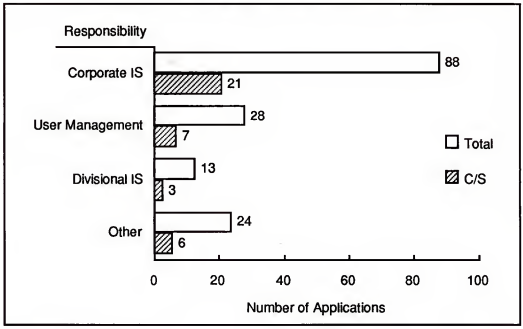


Total Respondents: 153

Exhibit IV-2 shows the number of applications managed by each organization for the entire application set and exclusively for client/server applications.

EXHIBIT IV-2

Primary Project Management Responsibility



Total Applications: 153

Unlike other industries where C/S systems are sometimes more likely to be managed by users, in retailing C/S applications are managed by IS organizations. This is because in retailing, the user organizations are typically store or warehouse personnel. They have no time to manage computers. One-third of the systems managed by users are accounting or human resources systems and another third are marketing information systems. The remainder are inventory systems.

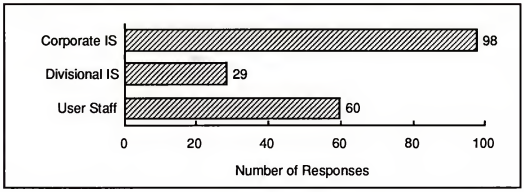
B
Implementation Strategy

Sources of Development Resources

Exhibit IV-3 shows the resources required to implement the 153 applications. In some cases, an organization is mentioned more than once. Corporate IS still plays a strong role in applications development in the retail sector, being mentioned 98 times.

EXHIBIT IV-3

Internal Sources of Applications Development Resources



For almost 40% of the projects, user line or staff management will assume direct implementation responsibility. This is close to double the corresponding average for the manufacturing industry sectors.

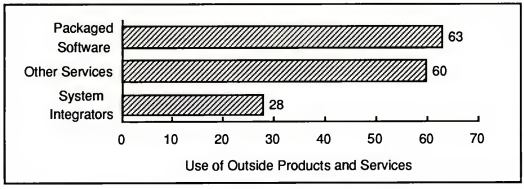
Size of institution is not a differentiating factor for project implementation strategy. Central IS, a primary resource in 64% of the applications, continues to have a key role in systems implementation whether the organization is large or small.

1. Use of Software Products and External Resources

As shown in Exhibit IV-4, more than 40% of the implementations planned for the next two years will use software packages.

EXHIBIT IV-4

Use of Outside Products and Services

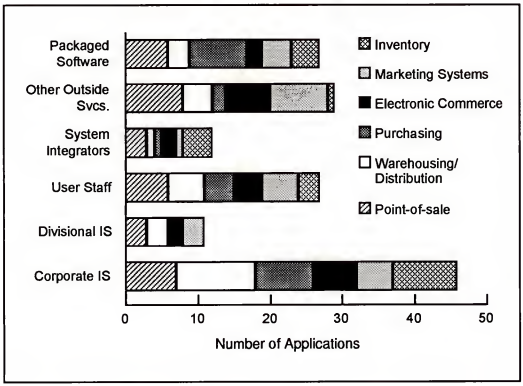


2. Resource Use by Application Category

Exhibit IV-5 takes the major application groupings and identifies resources used to implement them.

EXHIBIT IV-5

Applications Development Resources



The length of each row measures the number of resource mentions and clearly, central IS is the most frequently used resource.

Software packages are most frequently used for purchasing and warehousing applications. They are also likely to be used for cross-industry accounting and office automation applications.

C
Expenditure Plans

Exhibit IV-6 shows the anticipated amount each respondent expects to spend on applications changes in 1994. The spending amounts, shown as a range, are plotted against the number of mentions. The shading differentiates C/S as a key strategy and those that are not, marked non-C/S. As can be seen in the $1

million to $5 million range, a high proportion of C/S systems are planned. These are most likely production systems, given the size of the expenditures. At the top end of the range, six respondents indicated they would spend more than $10 million on implementing a C/S strategy.

EXHIBIT IV-6

Expected IS Spending in 1994

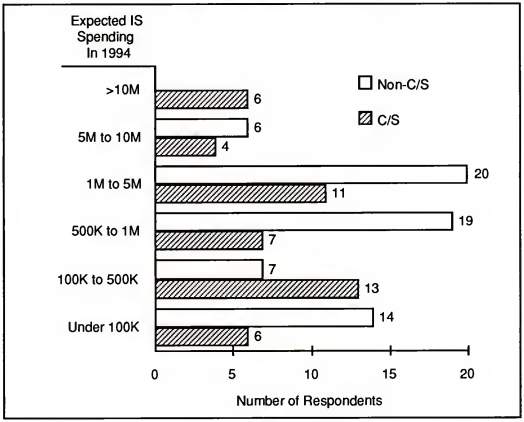
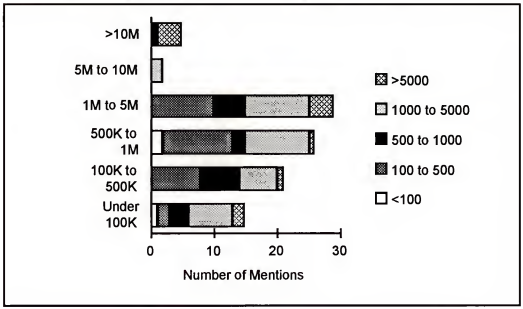


Exhibit IV-7 shows planned spending by company size. The legend give company revenues in $ millions. Companies usually spend no more than 1% of their revenues on new systems.

EXHIBIT IV-7

Spending on Applications Changes by Company Size



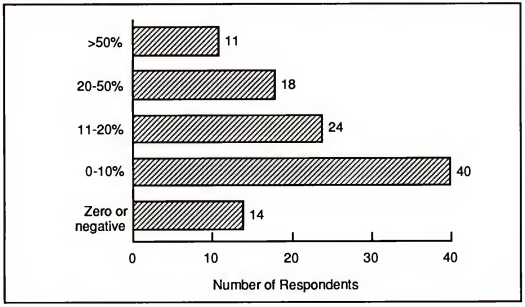
D
Budget Growth Rate

Respondents were asked how much they expected their IS budget to grow annually over the next few years excluding hardware, for applications exclusively. Spending rates for applications improvements and IS overall (this includes personnel costs, equipment upgrades and support) are above industry norms. On average, total IS and applications development spending are expected to grow at an annual rate of 18%.

Exhibit IV-8 shows the distribution of application budget growth rates. As can be seen, most respondents expected a 0-10% growth rate. However, 20% of the respondents reported a 20% to 50% rate of growth.

EXHIBIT IV-8

Annual Spending Growth Rates for Applications Development

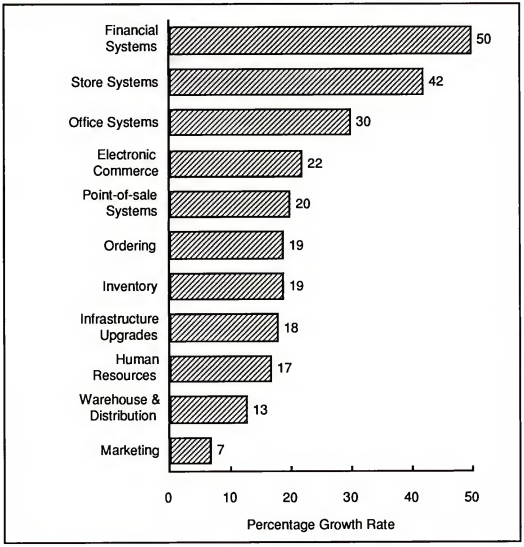


Examining the data in more detail, the applications being implemented, where the budgets are growing the fastest, are shown in Exhibit IV-9.

Budget growth rate is higher in the retailing industry than in some other sectors. Financial applications budgets are rapidly growing as traditional accounting applications are integrated with merchandise information systems and suppliers' systems to create perpetual inventory/replenishment systems.

EXHIBIT IV-9

Budget Growth Rates for Select Applications



E
Investment in IT and Budget Growth Rate

The survey did not ask for specific application budgets. However, it did ask respondents to identify how much they were investing in IT. For each application, the opportunity was ranked as high growth, if the average growth rate was over 30%, medium growth, if it was from 15% to 30% and slow growth, if it was less than 15%. Opportunities were identified as large, if the budget was usually greater than $1 million and small if the budget was less than $1 million. This resulted in Exhibit IV-10 for the application categories.

EXHIBIT IV-10

Investment and Budget Growth

	High Growth >30%	Medium Growth 15% to 30%	Low Growth <15%
Large Budget ($ Millions)	Financial	Electronic Commerce	
Small Budget ($ Thousands)	Store Systems	Human Resources Infrastructure Inventory Warehousing Office Systems	Purchasing Marketing Systems

The survey suggests that the best opportunities are in financial applications and electronic commerce. Store systems also offer profitable growth opportunities.

Retail Trade Application Case Studies

This chapter presents case studies based on interviews with three retailers. The organizations were selected because they show diverse activities that characterize the retail trade. The first is an emerging chain of specialty apparel that is outsourcing its C/S systems. The second is a supermarket chain recently acquired by a larger chain and uses HP and IBM computers. The third retailer is planning to replace an IBM mainframe with RISC-based workstations.

INPUT interviewed professionals at the following institutions:

- Allied Stores—discount accessories retailer
- Bel Air Markets (subsidiary of Raley's)—supermarket chain
- Fred Meyer—superstore chain

The above organizations had different levels of activity in client/server systems.

The organizations surveyed do not feel applications software vendors offer a wide enough range of packaged solutions. Thus, they rely on internal resources or close cooperation with an outside vendor to customize software to meet their needs.

A
Alliance Stores, Pasadena, CA

Alliance Stores corporate headquarters is located at 711 Mission Street, Pasadena, California 91030. The company is three years old and specializes in women's fashion accessories. The company

presently has 25 stores located throughout the country in various discount malls.

Alliance Stores plans to continue its expansion to one hundred stores over the next five to ten years. The company sales in FY1992-1993, were just over $7 million. Each year that Alliance Stores has been in business, sales have doubled. The survey was conducted with the founder and CEO of Alliance Stores, Robert Greening.

1. IS Organization Structure

The IS structure is centralized at the corporate headquarters, with a Director of IS and one full-time and one part-time data entry person. The company has implemented a Merchandise Information System (not using EDI); accounting system; sales audit system; human resource system; and electronic mail system, since the founding of the company. The development of these systems is outsourced through a small company, Data Strategies, which devotes 100% of its time to Alliance Stores. The heart of these systems is (1) Merchandise Information System and (2) the Accounting System. Because the systems are not integrated with each other, data entry personnel have to separately input orders into each individual system.

2. New Applications to be Implemented in the Next Few Years

Alliance Stores plans to implement LAN and WAN; a price look-up system, POS Audit System; and a fully integrated EDI Quick Response System throughout all its stores. It also plans to fully integrate the Merchandise Information System and Accounting System in order to have a perpetual inventory/replenishment ordering system. Alliance Stores plans to outsource this development effort in 1994. However, it has not chosen the systems integrator for this development and installation.

3. C/S Development

Alliance Stores plans to have its applications running in a C/S environment by spring 1994. Alliance Stores is a young company and has had the luxury of developing systems from scratch in a C/S environment. Michael Greening, the CFO and IS Director, has managed the C/S development from the start by implementing corporate and store systems. He is planning and

upgrading the company's systems with the goal of having efficient systems accommodate a chain of 100 stores. Alliance stores will outsource all its developments with selected systems integrators and specialized systems vendors for specific applications.

4. Hardware, Software and Networking

The company has fully used standard 486 PC clone hardware for all its applications at the corporate and store system level. All applications are running on a MS-DOS or Windows operating system. Dial-up lines are used with 9600 modems for the electronic mail system. As yet, no LAN or WAN has been installed throughout the stores.

5. IS Budget

Alliance Stores has spent approximately $200,000 annually for developing and maintaining IS applications. It plans to spend 1% of total sales annually, for maintaining and developing new systems, over the next few years.

6. Vendors Providing Computers, Development, Systems Integration and Specific Applications

Exhibit V-1 shows the vendors that supply Alliance Stores, its products, strengths and weaknesses. The main strength of the company is that it is outsourcing many critical functions in order to grow. Its electronic mail is outsourced to MCI, which it finds very beneficial.

EXHIBIT V-1

Vendors Supplying Alliance Stores

Vendor	Product/Service	Strengths	Weaknesses
Data Strategies	Merchandise Information	• Small - Alliance gets 100% of its attention • Specifications designed specially for Alliance Stores	• They are not big enough to grow with Alliance
Retail Accounting	Accounting Systems	• Very good software	• Not easily modifiable • Not integrated with Merchandise Info.
ADP	Human Resource System	• Excellent system. Payroll is networked to ADP	
MCI	Electronic Mail	• Excellent system • Provides total written communication between headquarters and stores • As the chain grows, Alliance plans to continue using MCI Mail as its choice of an electronic mail system	

7. Application Trends

Alliance Stores sees EDI applications, bar code scanning applications and Home Shopping as future applications in its niche of the retail market.

8. Most Successful Applications

For Alliance Stores, MCI Electronic Mail has been the biggest success. It has electronic mail fully installed in each store and at corporate headquarters. Alliance Stores uses electronic mail for reporting discrepancies and for receiving vendor merchandise.

Since Alliance Stores is so new, it has not had any application failures. However, it is anxious to have its Merchandise Information System fully integrated with its other corporate applications. In addition, it wants to fully use EDI technology to communicate, exchange and document information with its vendors.

9. Summary

Alliance Stores is fully committed to information technology for its growth and expansion over the next few years and to C/S technology for its rapid growth. However, they plan to completely outsource development of C/S systems.

Alliance Stores is also committed to fully using EDI technology for such vital inventory management activities as merchandise allocation/replenishment and reporting. It recognizes the valuable role EDI plays in increasing inventory turns, sales and customer satisfaction, as well as EDI's role in reducing inventory levels and operating costs. In summary, Alliance Stores no longer sees Information Technology as merely a tool for keeping pace with its rapid growth and change. IT is helping to drive its growth.

C
Bel Air Markets, Sacramento, CA (Subsidiary Of Raley's)

Bel Air Markets corporate headquarters is located at 500 West Capital Avenue in West Sacramento, California 95605. This supermarket chain is 39 years old and was founded by the Wong family in 1955. The company presently has 18 stores located throughout the Sacramento area. The company sales in FY1992 and 1993 was $375 million. In 1992, Bel Air Markets was acquired by Raley's, a 60-store chain, located in the Sacramento, CA and Reno, NV areas. Raley's does approximately $1.35 billion in sales, at the present time.

Although Bel Air was acquired, its operations are completely separate, except for a few centralized corporate functions that include finance and accounting, human resources, information technology, advertising and buying functions.

This survey was conducted with:

- Gordon Wong, Director of IS
- Gordon Mack, Manager of Data Processing
- Terry Tremelling, Corporate Controller

1. IS Structure

Presently, the Bel Air Markets IS organization is structured with a Director of IS, Manager of Data Processing, Store Systems Manager, Communications Manager, three programmers, a PC Manager and several data entry personnel. The Bel Air's IS Director currently reports to the CIO at Raley's Stores. Since the acquisition, the focus of IS systems development has been to consolidate critical operational applications with the Raley's applications and eliminate duplicate applications. Bel Air has traditionally developed applications in a UNIX, microcomputer environment, whereas, Raley's has traditionally developed applications in an IBM mainframe, VM environment. Both companies plan to continue, in the short run, this IS separation, except for critical operational applications. Bel Air and Raley's are just beginning to put together a five-year plan to develop and re-engineer critical applications in a C/S environment.

2. IS Consolidation

Bel Air is approximately 85% complete in transferring its accounting systems over to Raley's accounting systems. Raley's uses Millennium Accounting Software. Raley's, Bel Air Markets and Savemart own their own warehouse called "SuperStore Industries." They are in the process of merging the inventory ordering systems with these three supermarket chains for use with their wholesale warehouse.

4. Applications That Were Implemented in the Last Three Years

In the last few years, Bel Air Markets has implemented:

- Novell LAN
- NCR 2127 cash registers

- Check Authorization and Check Collection System
- ACH/EFT System
- Direct Debit EFT System
- Credit System
- Video Rental System
- Electronic Mail System
- Energy Monitoring System
- Bakery warehouse ordering
- Computer for students system (in exchange for store receipts, students get computers)

It has also installed a Verifone POS terminal, store controllers, multiplexers and leased telephone lines from each store back to corporate headquarters.

5. New Applications That Will be Implemented in the Next Few Years

Bel Air is presently implementing a labor scheduling system and plans to implement a WAN to do EDI merchandise allocation system, specifically, a merchandise inventory/replenishment ordering system. This system will be implemented on the Raley's IBM mainframe, initially, but will be moved to a C/S environment over the next five years. Bel Air also plans to implement a time-and-attendance system, shelf planning system and a price look-up, verification/price changing system. These systems will be implemented on Bel Air's HP9000 platform. Bel Air also plans to replace its store platform (286 PC Clones) with an IBM RS/6000, so Raley's and Bel Air will have the same POS and computer equipment in each store.

6. Client/Server Development

Bel Air plans to move its POS Payment Systems applications to a client/ server environment for Bel Air Stores and Raley's Stores. Both chains agree C/S technology will be their goal in the next five years, after they have reasonably consolidated their mission

critical applications. They also plan to outsource any new software development and acquire new software, rather than develop internally. They also have plans to outsource much of their maintenance.

7. Hardware, Software and Networking

Bel Air's goal over the next five years is to completely move to a C/S PC networking environment, and develop and re-engineer its systems from Raley's mainframe environment to a networked RS/6000 environment. It plans to continue with a LAN within corporate headquarters and implement a WAN for use between stores, corporate headquarters, its wholesale warehouse and suppliers.

8. IS Budget

Bel Air Markets spend approximately $1 million annually for developing and maintaining its IS applications. Over the next few years, the store plans to annually spend 2% to 3% of total sales, to maintain and develop new systems. This IS budget is a completely separate budget from Raley's IS budget.

9. Vendors Providing Computers, Development, Systems Integration and Specific Applications

Exhibit V-1 shows vendors that supply Bel Air Markets, its products, strengths and weaknesses. Bel Air has chosen technically innovative solutions.

EXHIBIT V-2

Vendors Supplying Bel Air Markets

Vendor	Product/Service	Strengths	Weaknesses
Retail Profits, Inc.	Check Auth. & Collection ACH/EFT System Direct Debit & Credit System Video Rental System Electronic Mail System	• Small enough so Bel Air got 100% attention • System specifications custom designed • Check Auth. & Collect. System saves chain millions of dollars annually • Software is elegant, bug-free and modifiable, based on Oracle database	
NCR (now AT&T GIS)	POS Cash Register System	• Excellent POS H/W	• Expensive installation and maintenance
BASS	Price Look-up & Change System	• Very accurate Software, and installation was fast & efficient • System is a great time saver	

10. Application Trends

Bel Air foresees more EDI applications for purchases and deliveries of merchandise in its future installations. With EDI installations, Bel Air will be able to eliminate the expensive and time consuming paper trail, and dramatically reduce their transaction costs and errors with suppliers.

11. Biggest Successes & Biggest Failures

Bel Air Markets Check Authorization and Collection System has been its biggest success, along with its POS Payment Systems (e.g., ACH/EFT, Direct Debit & Credit). These systems were developed by retail profits and have saved the chain millions of

dollars annually in bad check losses and have made its store's front-ends run smoothly and efficiently.

Bel Air's biggest failures are:

- Outsourcing the development of a Direct Store Delivery System. The system was never completed and was abandoned at an undisclosed cost.
- POS Lottery System. This system was originally a great success, due to Retail Profits, Inc., that developed the system for the California State Lottery. However, once the California State Lottery took over the ownership and maintenance of the system, it became impossible for Bel Air to maintain the system.

12. Summary

Although Bel Air is in the throes of merging its UNIX microcomputer software applications with Raley's mainframe applications, it is fully committed to a PC-networked C/S environment for its future development. It plans to outsource most development for rapid and efficient implementation along with a major portion of its maintenance. Bel Air is committed to using EDI technology, especially for vital inventory management applications and smooth operations, with its own wholesale warehouse and suppliers.

Bel Air has always been a technology pioneer. More than 18 years ago, Bel Air was the first supermarket chain to implement scanning technology in Northern California. Six years ago, it was the first supermarket chain to implement EFT in the Northern California area. Much of Bel Air's success can be attributed to its being fully committed to Information Technology, excellent customer service and strong management with astute foresight.

D
Fred Meyer, Portland, OR

Fred Meyer's corporate headquarters is located at 3800 South East 22nd Avenue, Portland, Oregon 97242. The Company specializes in large "Super Stores"—several stores under one roof. The stores include a grocery supermarket; home improvement; discount apparel; jewelry; record and small appliance stores, etc. The

chain operates 105 super stores and 20 to 25 standalone jewelry stores. The company sales in FY1992 and 1993 were approximately $2.8 billion. Most of the stores are located in the Portland, Oregon area with several located in the state of Washington and one in California. During the last five years, Fred Meyer has shown a steady 5% to10% increase in annual sales. The survey was conducted with Jack DiGennaro, Store Systems Application Development Manager.

1. IS Structure

Presently, the Fred Meyer IS Organization is centralized with a CIO, director of network services, director of store systems and a director of administrative services. The company has implemented the following:

- IBM 4680 registers in all stores
- WAN Spread Spectrum communications network
- Direct Store Delivery System (DSD)
- Check Authorization and Collection System, developed by IBM
- Quick Response EDI Merchandise Information System, developed by PRJ Associates
- Budgeting System
- Interim Ordering System

2. New Applications to be Implemented in the Near Future

Fred Meyer plans to replace the IBM ES/9000 mainframe with IBM C/S RS/6000 computers at its corporate headquarters and run RS/6000 computers in each store. It also plans to continue implementing an EDI replenishment system with all its suppliers. Approximately 25% of the company's suppliers are implemented on the Fred Meyer EDI Replenishment System. Fred Meyer also plans to implement a Warehouse Management System and a full EFT, on-line, Debit and Credit System. The company also plans to implement electronic Pricing, Frequent Shopper Coupon and Home Shopping Systems.

3. C/S Development

Fred Meyer is committed to C/S technology with a goal of having all its applications moved to a C/S environment over the next five years. The company also plans to outsource most new software development and system integration, rather than develop internally. Ninety percent (90%) of software development will be outsourced. PowerBuilder is the client/ server software tool of choice for most re-engineering and new software development.

4. Hardware, Software and Networking

As it moves to C/S applications, Fred Meyer plans to develop and re-engineer its systems from a mainframe environment to a RS/6000 environment. Plans are to continue with a WAN for use between stores, corporate headquarters, a wholesaler's warehouse and its suppliers.

5. Vendors Providing Computers, Development, Systems Integration and Specific Applications

Exhibit V-3 shows vendors that supply Fred Meyer its products, strengths and weaknesses.

EXHIBIT V-3

Vendors Supplying Fred Meyer

Vendor	Product/Service	Strengths	Weaknesses
IBM	• 4680 Registers • Check Auth. & Collect'n.	• Excellent POS H/W • Quality installation & maintenance	• Expensive installation & maintenance
Symbol Technologies	• Spread Spectrum WAN	• Excellent WAN system • Will continue to use this WAN as its systems grow and change	• None mentioned
PRJ Associates	• Quick Response, EDI • Merchandise Info. System	• Excellent S/W and fully integrated with IBM technology	• None mentioned

6. Application Trends

Fred Meyer foresees more EDI applications for:

- Purchases
- Deliveries of merchandise
- Sharing information with its suppliers

The company also sees more customer service applications such as home shopping system services and frequent shopper couponing systems as important strategic systems to keep and increase market share and revenues.

7. Applications Successes and Failures

Fred Meyer's POS IBM 4380 Systems and its Shelf Space Audit System (SPA) have been its biggest successes. The POS 4380 Cash Register Systems has provided everything needed at the front-end of its stores, and an easy environment to add additional applications that are fully integrated into the store systems environment.

The Shelf Space Audit System has been a great time and labor saver, but most importantly, has dramatically decreased inaccurate replenishment of merchandise and space allocation throughout the chain.

Fred Meyer's biggest failure has been implementing an IBM AS/400 inventory system in each store, along with AS/400 computers that have proved to be a costly hardware blunder. The computers have now been replaced with RS/6000 computers with better price/performance.

8. Summary

Fred Meyer is fully committed to Information Technology and C/S technology for its future development and focused steady growth over the next five years. Plans are to outsource at least 90% of its development for rapid and efficient implementation. Fred Meyer is committed to EDI Technology, especially for its Quick Response Merchandise Information System and smooth, accurate operations and information exchange with its wholesaler and suppliers. Fred Meyer sees "Customer Service" applications such as Home Shopping System Services and Frequent Shopper-Couponing Systems as the technology to help it increase its revenues, margins and market share by the late 1990s.

VI

Vendor Analysis

A
Survey Results

As part of the survey, respondents were asked to identify key vendors. These vendors were then given a satisfaction rating on a scale of 1 to 5, with 1 being dissatisfied and 5 being very satisfied. In addition, the proportion of their customers, who mentioned C/S as a key strategy, was estimated. Given the sample sizes are very small, these results should be used to aid understanding rather than as absolute measures. A tabulation of the major vendors identified is given, with some respondents mentioning more than one vendor. In all, there were 194 vendor mentions. Several regional, small vendors were named and many with only a single mention . Only the vendors cited more than four times are analyzed in Exhibit VI-1.

The first column gives the vendor, followed by the number of mentions, then the average rating, the percentage of customers mentioning C/S as a strategy and finally, comments raised by respondents.

EXHIBIT VI-1

Vendor Analysis

Vendor	Number of Mentions	Average Rating	Percent Migrating to C/S (%)	Notes
Apple Computer	6	4.2	50	Four respondents noted ease of use. In one case, Macs were used as clients for an IBM AS/400 server. Shelf-planning and market basket analysis are two areas where software vendors offer solutions on a Macintosh platform.
Compaq	15	4.1	27	Respondents commented on good value for money and good service.
Digital Equipment	6	3.7	67	No problems with equipment were mentioned.
Hewlett-Packard	10	3.6	40	Most of the stores had purchased HP PCs for a range of applications. Two stores had purchased laser printers that were performing well. One company with PCs and a mainframe reported reliability problems with an EDI system. A major clothing chain gave a low rating because it felt that an HP mainframe was over-priced and could not be upgraded affordably.
IBM	69	3.9	20	Systems ranged from mainframes, through AS/400s and RS/6000s to PCs. Several companies had purchased point-of-sale systems from IBM. Many customers were very satisifed. Cost of maintenance was raised as an issue, on the other hand, several respondents cited customer support as a key IBM strength. Concerns about IBM's organization such as bureaucracy and IBM's internal communications were raised.
NCR (now AT&T GEIS)	10	3.3	60	NCR is rated highly for its POS equipment, but two respondents mentioned the company was weak in support and slow to respond. Another respondent had selected NCR over IBM for a new platform for retail systems because the company appeared to understand the customer better.
Unisys	5	3.6	40	Unisys computers are being used for point-of-sale systems and also in payroll systems. Reliability is a key feature. Two respondents felt the company was slow to respond.

In general, there were many small, regional resellers implementing specific applications, such as the vendors mentioned in the case studies. Hardware manufacturers, especially IBM, still retain strong account control. There is less use of mail order and computer stores for PCs than in some other markets.

Established hardware vendors like HP, IBM, NCR and Digital Equipment are recognized as being able to supply client/server solutions. These are the vendors that have account control in retailing.

The retail market is still highly fragmented with many retailers relying on small, local, value-added resellers for customized solutions. This should provide opportunities for system integrators and solutions vendors that focus on the retail market. Any vendor entering the market needs to be aware of the tight margins and be able to sell efficiently.

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Appendix A
Applications Details

This appendix provides definitions of all the applications identified in this study. The applications are grouped according to categories. Exhibit A-1 includes all applications unique to INPUT's definition of the retailing industry sector. Exhibit A-2 contains definitions of applications identified in this study INPUT defines as cross-industry.

A
Description of Applications

In retailing in particular, applications are being integrated to reflect business processes. Hence, ordering and inventory systems, traditionally two separate areas for a large retail chain, are being combined. Thus, the definitions in practice are somewhat overlapping. The terminology used is taken, largely, from respondents' questionnaire responses.

In the future, more applications will be integrated and it will be more appropriate to consider the entire workflow of an application, that will tend to be made from modules.

EXHIBIT A-1

Retail Trade Industry Application Types

Retail Trade Applications	Description/Examples
Distribution/Warehousing Systems	Systems that manage delivery and warehousing. Inventory and EDI systems are in separate categories, although there is significant overlap in practice.
Direct Store Delivery System	Tracks deliveries and output directly from the manufacturer and wholesaler to a store.
Distribution	Covers a range of functions such as delivery schedules, truck loading, vehicle routing, shipping, billing, inventory control, accounting.
Freight Payment	Payment system for freight and deliveries to a store.
Shipment Tracking	Tracks shipments as they are sent from warehouses to stores and also between stores.
Warehouse Management	Supports warehouse operations assisting in location decisions, shipment activity, bills of lading, physical inventory reporting.
Electronic Commerce	General-purpose systems to support Electronic Data Interchange.
EDI Systems	Systems that use the EDI format for transferring electronic documents.
Electronic Fund Transfers (EFT)	These are systems that transfer funds electronically to another account using a switch (e.g., Interlink, Star, etc.) or Automated Clearing House (ACH). The systems may be online, meaning the transmission takes place in real time or offline when the transmissions are sent as a batch.
Electronic Payments	Allows customers a choice of payment methods (e.g., check, debit, credit, etc.)
Quick Response System	A system for ordering goods on an "as needed basis." When inventory runs low, goods are ordered according to pre-determined business rules using EDI.
Vendor Interface	Any system that interfaces with a vendor's system.

EXHIBIT A-1 (Cont.)

Retail Trade Applications	Description/Examples
Inventory	
Inventory Systems	Any system that tracks inventory, whether in a store or in a warehouse. For example, a MRP II (material requirements planning II) system is an inventory system.
Perpetual Inventory	An inventory system that is continually updated.
Rotating Inventory	A system that enables retailers to move and rotate inventory between stores for rapid turnover.
Marketing Systems	
Consumer History	Shows consumer records with history of purchases, good and bad credit information, mailing list information.
Coupons	Manages coupon reimbursement, tracks coupons, disburses cupons to customers.
Customer Demographic Database	Analyzes demographic shopping patterns of customers.
Home Shopping	Takes orders from customers via remote communications (phone, written order, TV, PC using modem), tracks orders, payments and order fulfillment.
Merchandise Information	Provides executives with information on how merchandise is moving, where it should be located in a store, how many returns, key supplier and merchandise ordering, receivables and payment information.
POS Payment Systems	
Check Authorization and Collection	Checks consumers' credit based on checking payment history.
Credit Card System	Any system for processing customer credit payments.
Credit Checking System	Checks consumers' credit for a variety of credit cards (e.g., Visa, Mastercard, Discover etc.)
Point-of-Sale Payment	System that manages the cash register and pricing and tracks consumers' payments.

EXHIBIT A-1 (Cont.)

Retail Trade Applications	Description/Examples
EFT Direct Debit System	Debits customer's checking account - online.
EFT-ACH Debit System	Debits customer's checking account - offline.
Purchasing	
Ordering	Order entry, may be part of an accounting system and Merchandise Information System. Typically tracks orders, may or may not use EDI to connect to systems.
Purchase Tracking	Part of Merchandise Information System
Purchasing	Systems to order and track purchases. Part of Merchandise Information System.
Replenishment Systems	Systems that order goods as inventory levels fall. Perpetual inventory systems make decisions based on merchandise information.
Store Systems	
Bar Code - Scanning	Bar code scanning may be undertaken for inventory tracking and also at the point-of-purchase for reading prices from UPC codes.
Energy Monitoring	Monitors energy use, from heating and lights to refrigerators. May also include security system.
Integrated Store Systems	These combine many functions required in a retail store, point-of-sale systems.
Portable Label Printing System (Universal Product Code)	Systems for marking goods with UPC bar code labels. Used in supermarkets for pricing.
Price Look-up & Verification	System for looking up price of goods.
Price Changing	System for changing the price of goods.
Scales Management	System for managing scales in a supermarket, where different goods have different prices per lb. and prices are pre-entered into the system.
Shelf Planning System	Plans the layout of goods on the shelf.

EXHIBIT A-1 (Cont.)

Retail Trade Applications	Description/Examples
Store Cash Register Systems (ECR Systems)	Systems to manage store cash registers and point-of-sale terminals.
UPC Item File Maintenance System	Maintains a database of UPC codes.
UPC Item Marking System	Marks items with UPC codes.
Video Rental System	System enabling consumers to check out videos, keep track of video inventory and return dates for stores that rent videos.

EXHIBIT A-2

Cross-Industry Application Types by Category

Application Category/Type	Description/Examples
Cross-Industry Financial	
Accounts Payable/Receivable	Traditional systems to handle invoicing and payments and manage receivables.
Cost Accounting	Systems to analyze the costs of goods and services.
Financial Reporting	Financial systems for the generation of management info.
Fixed Assets	Systems to track the book value and depreciation of assets.
General Ledger	General ledger.
Integrated Financial Systems	Integrated accounting modules with reporting.
Other financial	Foreign exchange; Banking Reporting Systems.
General Infrastructure	
Database Conversion - General	Migration to a new database architecture.
Database Conversion - Relational/ Distributed	Migration to a relational or distributed (or both) architecture.
Data Conversion	Projects to convert the data from one database environment to another.
Hardware Upgrades	Projects to upgrade or migrate to new hardware.
Imaging Systems	Installation of infrastructure to support imaging applications.
Operating System Upgrades	Operating system upgrades.
Platform Migration - C/S	Projects to upgrade or migrate to new client/server hardware.
Platform Migration - General	Projects to upgrade or migrate to new general purpose hardware or networks.
Human Resources	
Human resources information system	Human resources information system, HRIS.
Payroll	Payroll processing.
Benefits Administration	Manages employee benefits.

EXHIBIT A-2 (Cont.)

Application Category/Type	Description/Examples
Office Systems	
Electronic mail and messaging systems	Electronic mail systems.
Word Processing Systems	Installation of applications that use word processing.
Planning and Analysis	**For this application, the spreadsheet applications were combined with office systems.**
Financial Modeling	Systems to support financial business modeling and analysis.
Spreadsheets/Databases	Applications that use desktop spreadsheets and databases.
Telecommunications	
Voicemail	Voicemail systems.
Other	
Computer-aided drafting	Drafting system for designing a new store.

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Appendix B
Questionnaire

A
Questionnaire for Retail Trade Case Studies

I. General Information

1. Company: _____
2. Address: _____

   _____

   _____
3. Total sales this fiscal year: _____
4. Growth over past 5 years—% of Market company owns - Locally? Nationally?
5. Respondent(s)

   Name: Title: Phone/ext.:

II. Specific Retail System Information

1. What is your company IS (or MIS) System organization structure?

e.g., (1) Corporate Central IS

(2) Divisional System IS

(3) Communications & Network Services

(4) Store Systems

(5) Other

2. Which new applications have you implemented in the last five years?

3. Which new applications do you plan to implement in the next few years?

4. Of these applications, which organization has/had the primary responsibility for the project/application installation?

   __ Corporate IS __ User Management __ Other

   __ Divisional IS __ Store Systems

5. Which applications do you plan to re-engineer or replace in the next five years?

6. Which applications involve EDI/Network linkage with customers, suppliers or others outside?

7. Do you have plans to develop or move mission-critical applications to client/server?

   If yes, which applications are most critical and in what time-frame do you foresee making the transition for each system or application?

8. Which applications have already/or are in the process of moving to client/server?

9. To what degree are you looking to outside vendors for products and services? (%)

10. What applications or developments are you planning to outsource, and from which vendors are you evaluating for these applications or development?

    Packaged software:

    Systems integrators:

    Other professional services:

11. What platforms are most likely to be used? (H/W, Op. Systems)

12. Are you planning to use client/server tools for your development? If so, which tools? (PowerSoft? Gupta? Other?)

13. What is your total budget for systems this year, and over the next several years?

14. What is the expected cost for each application you are planning to implement or re-engineer?

15. What vendors have been providing you with computers, systems integration, applications, etc.?

Vendor	Product/Service	Strength/Weaknesses

16. Which applications involve EDI/Network linkage with customers, suppliers, wholesalers, others outside?

17. What applications trends do you see coming in retailing over the next 2 to 5 years? (e.g., Home Shopping? Virtual Inventory? etc.)

18. What applications have been your biggest successes and which ones have been your biggest weaknesses?

19. Which applications provided you with the biggest return on investment, and which ones did not provide the expected return on investment?

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Appendix C
Vendors

This section gives the names and addresses of vendors mentioned in the report.

EXHIBIT C-1

Vendor Addresses

Vendor	Address
Apple Computer, Inc.	20525 Mariani Avenue Cupertino, CA 95014 Tel: (408) 996-1010
Compaq Computer Corp.	20555 SH 249 MO 040514 Houston, TX 77070 Tel: (713) 370-0670 Fax: (713) 374-1740
CompUSA	See local yellow pages for nearest store
Data General Corp.	4400 Computer Drive Westborough, MA 01580 Tel: (508 848-5000
Digital Equipment Corporation	146 Main Street Maynard, MA 01754 Tel: (508) 493-5111 Fax: (508) 493-8780
Dell Computer Corp.	9505 Arboretum Blvd. Austin, TX 78759 Tel: (512) 338-4400 Fax: (512) 728-3653
Gateway 2000	610 Gateway Drive North Sioux City, SD 57049 Tel: (605) 232-2000

EXHIBIT C-1 (Cont.)

Vendor	Address
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IBM	Old Orchard Road Armonk, NY 10504 Tel: (914) 766-1900 Fax: (914) 765-6021
NCR Corp.	1700 S. Patterson Boulevard Dayton, OH 45479 Tel: (513) 445-5000 Fax: (513) 445-4184
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