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Quick response : technology guide

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American Institute of Certified Public Accountants. Information Technology Division

Quick Response

TECHNOLOGY GUIDE

AICPA
American Institute of Certified Public Accountants

Notice to Readers

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The Information Technology Division expresses its appreciation to the author of this technology guide, Kenneth D. Askelson, CPA. Ken is an Area Audit Manager with the JCPenney Company in Buena Park, CA. He is also a member of the AICPA Information Technology Research Subcommittee.

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Quick Response

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Chapter *1.* ***What Is Quick Response?***

Technology, Concept, Strategy

Quick Response is a business strategy that attempts to identify and meet the demands of the customer by maximizing the efficiency of moving merchandise from raw material suppliers to customers and at the same time reducing the amount of inventory in the merchandise pipeline. Industries that are part of the pipeline and play a key role in the movement of merchandise include manufacturers, suppliers, warehousers, distributors, and retailers. Refer to figure 1.1, "Quick Response."

Figure 1.1
Quick Response

The Merchandise Pipeline

Quick Response

Customers

| Manufacturers | Suppliers | Warehousers | Distributors | Retailers |

Customer Demand

Partnership Objectives

■ Increase the flexibility of the merchandise pipeline to better respond to changing customer demands.

■ Maximize the efficiency of the merchandise pipeline to reduce the investments in inventory throughout the pipeline.

Roger Milliken, CEO of Milliken & Company and a pioneer of Quick Response, considers its mission to be the following, as described in *Industry Week*.[1]

■ Drastically reduce the time for a retailer/seller to replace merchandise that a customer just purchased.

■ Provide real-time information on what is selling and what is not selling at the stockkeeping unit (SKU)-level.

■ Replace hot-selling merchandise in time to "ride the wave"; drop non-selling merchandise and avoid markdowns.

■ Reduce costs and improve profitability for all players in the pipeline.

■ Improve the competitive position of industry in the United States against foreign competition.

Jerry Monday, Manager of Information Systems for JCPenney, indicated in a speech to members of the AICPA Information Technology Research Subcommittee that Quick Response centers on creating new relationships or partnerships among retailers, manufacturers, suppliers, and distributors that did not exist in the past. He said that, historically, these relationships were too often adversarial with no sharing of operational data, thus resulting in the product taking a long time to get through the merchandise pipeline. A Quick Response partnership requires an entrepreneurial relationship that is built on trust, constant communication, the sharing of operational data, high quality, and a shorter merchandise cycle. The partnership requires new business practices, starting with a cooperation that stems from a knowledge of each other's business objectives, opportunities, and constraints. In the past, sales information and inventory levels were not shared with others in the pipeline. With Quick Response, not only sales and inventory levels, but future sales estimates are shared in order to allow the manufacturer/supplier to anticipate and meet the needs of the customer sooner.

Benefits attributed to this new business strategy include increased sales and turnover, more manageable finished goods and work-in-process, better inventory balance, reduced markdowns, increased profits, improved customer service, cost-effective manufacturing by smoothing out the production cycle, and improved distribution efficiency by reducing or eliminating manual receiving and checking procedures.

Quick Response can be effectively achieved only by using various technologies as a tool. The following enabling technologies supporting Quick Response are presented in this technology guide: retail point-of-sale (POS) and SKU-level transaction processing, bar coding and scanning, electronic data interchange (EDI), advance ship notices (ASN) and shipping carton marking, automatic ordering and replenishment, and networks. A minimum starting point to move toward Quick Response would be the implementation of bar coding and EDI.

Process Reengineering

The effective implementation of Quick Response requires changing cultural attitudes within the organization as well as reengineering manual processes. Cultural changes include developing new partnerships and relationships between suppliers, distributors, manufacturers, and retailers that may not have existed previously. It also requires the full support of executive management to review, understand, and consider the ramifications of implementing Quick Response. This

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[1] "Quick Response: The Future is Here." *Industry Week* (vol. 240, August 19, 1991):A4.

includes identifying actual and perceived barriers to change that employees and outside trading partners may have regarding implementation. It also would require a review of the organization to determine whether realignment is needed to best implement and maintain a Quick Response strategy.

Implementing Quick Response requires reengineering manual processes. This would allow for the automation and integration of processes such as manufacturing, distribution, purchasing, receiving, inventory management, and sales in order to improve customer service. It requires all parties in the merchandise pipeline to focus on meeting the needs of the final consumer efficiently and effectively.

What Quick Response Is Not

Quick Response is sometimes perceived to be many things it is not. It is not an accounting method or a way to downsize or rightsize an organization. It is not a way to increase the use of technology by an organization just for the sake of having more technology without the proper business strategies and plans to support it. It is not a one-sided strategy implemented by an organization; rather, it requires new partnerships and relationships with companies along the merchandise pipeline. Finally, it is not a project or packaged solution that provides an easy answer for an ailing company.

Do I Need Quick Response?

In order for a company to stay competitive in a global economy, it is critical to identify and meet the changing needs of its customers. Companies that are most effective and efficient at providing a quality product to meet these needs should gain significant advantages over competition and be profitable. Quick Response is a strategy that attempts to best meet the needs of the ultimate consumer by developing new business relationships and utilizing technology in order to get products quickly through the merchandise pipeline. Various technologies that support Quick Response along with the benefits to retailers and suppliers for implementing this strategy are discussed in the remaining pages of this technology guide.

Enabling Technologies for Quick Response

Retail Point-of-Sale/
SKU-Level Transaction
Processing

Retail point-of-sale (POS) plays an essential role in the Quick Response environment by capturing and collecting sales and adjustment activity for merchandise and services purchased by consumers. Important technologies that support POS include bar coding, scanning, and electronic data interchange (EDI). The POS system consists of hardware and software and interfaces with other systems to accurately record the sales activity of the retailer.

Before implementing other Quick Response technologies, the retailer must have SKU-level transaction processing systems in place. A SKU-level is the lowest level of item identification for merchandise. For example, the retailer may identify men's dress shirts with a subdivision and lot number such that the subdivision represents a category of merchandise, such as men's dress shirts, and the lot number identifies the specific dress shirt. The dress shirt could be further identified by adding an identification number for style, color, and/or size depending upon the record-keeping level (RKL) desired by the retailer. For our example, the retailer tracks the dress shirt by size. In this case, the identification number may appear on the price ticket as follows:

```
Sub 523      Lot 1100 06

        Supp.   1732-7
━━━━━━━━━━━━━━━━━━━━━━━━━━
Size
         15 1/2  X   35

    ║║║║║║║║║║║║║║║║║║

        523   110006
- - - - - - - - - - - - - -
        > $23.00
```
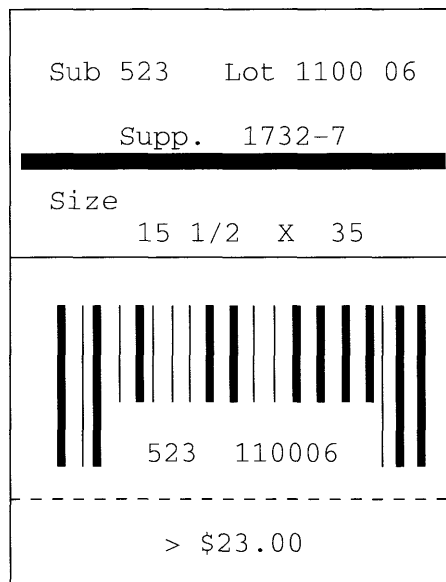
As shown on the price ticket, Sub 523 represents the category of men's dress shirts, and the Lot 1100 06 represents the specific dress shirt where 06 is the identification number for the size of the shirt.

The hardware required for a POS system can include mainframes linked to personal computers (PCs) for processing a sales transaction, scanners for reading bar-coded price tickets, and magnetic-stripe readers for processing credit/debit cards; hardware needs depend upon the retailer's operating complexities and transaction volumes. The more complex configurations can include mainframes that are linked to PC in-store processors, controllers, concentrators, and POS terminals. Refer to figure 2.1, "Point-of-Sale System."

Figure 2.1
Point-of-Sale System
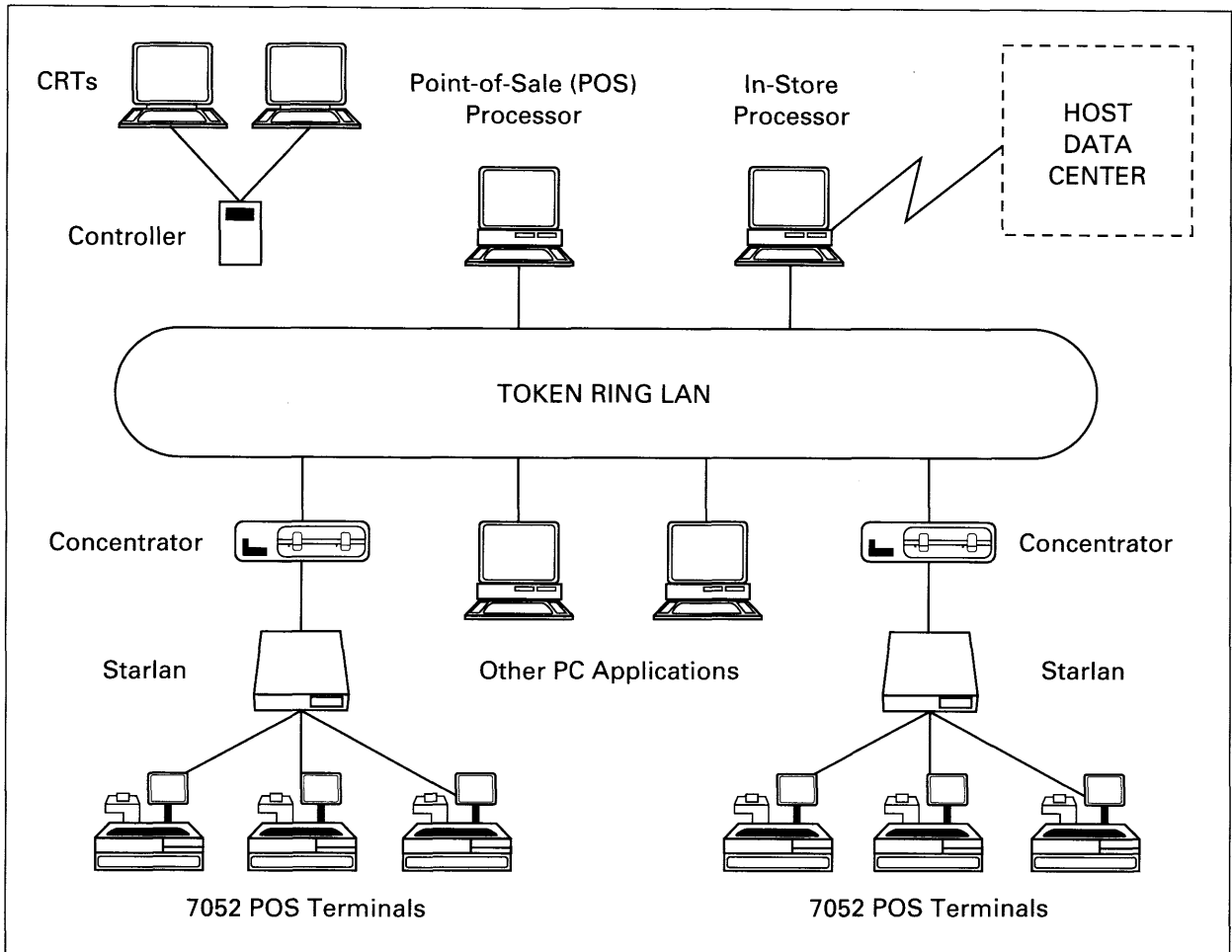
Retailers are now shifting more toward open operating systems, such as DOS, OS/2, or UNIX, rather than the proprietary software and hardware supplied by register vendors in the 1980s. For the larger retailer, you may find DOS operating the POS terminal, OS/2 used for the controller, and UNIX for the in-store processor.

The following illustrates how a sales transaction would be processed using a fully functional POS system.

■ From a menu-driven screen on the POS register that provides various options for recording a sale, the selling associate is prompted to scan the bar-coded price ticket.

■ As the price ticket is scanned, the POS system interfaces with the full-price-lookup-item file (FPLU) and the price-override file before the item's price is returned to the register. The FPLU file maintains the regular retail for merchandise items and the price-override file maintains temporary promotional pricing. The POS system also allows the selling associate to perform a price change function when necessary, if the ticketed retail is different than the FPLU retail. The POS system interfaces with the price management system and will capture any markdown or markup.

- If the Universal Product Code (UPC) ticket is scanned rather than the price ticket, the POS system interfaces with a UPC cross-reference file in order to identify the retailer's item identification number and the price of the item that is returned to the register. UPC codes are obtained from suppliers by using EDI transaction set 832, Price/Sales Catalog.

- If the customer uses a credit card to make the purchase, the selling associate swipes the card through the magnetic-stripe reader. Before the transaction is processed, the POS system interfaces with credit files to obtain credit authorization for the sale.

- If the customer pays by check, the POS system interfaces with a check authorization database system that determines whether the retailer accepts the customer's check.

- After the proper credit or check authorizations are obtained, the selling associate completes the sale using the POS system.

- The POS system interfaces with other systems in order to distribute sales information. These systems include credit systems in order to bill customers, sales reporting systems in order to audit and book sales, inventory management systems in order to update inventory files and provide merchandising reports, and EDI systems in order to share sales and inventory information with the supplier. To share this information with the supplier, the data is reformatted into EDI transaction set 852, Product Activity Data, and transaction set 867, Product Transfer and Resale Report.

Refer to figure 2.2, "Store Sales."

Business Impact/Technology Risk

The POS system is a strategic technology that impacts the way a business is managed. With POS hardware becoming smaller in size, more powerful, and cheaper to purchase, it represents significant savings to retailers when upgrading their systems. As software vendors and retailers move away from proprietary software to more open systems, it will allow the retailer greater flexibility at a cheaper price when upgrading POS hardware and software. With this move to open systems, it will be critical that necessary controls are in place to ensure the integrity of data processed. Successful implementation of POS and other technologies, such as bar coding, scanning, and EDI, provides a competitive advantage for identifying and satisfying consumer needs.

POS provides many advantages, as follows:

- Better customer service through faster checkout

- Improved accuracy of inventory counting and control resulting in better assortments for consumers and fewer out-of-stocks

- Improved replenishment time for ordering, shipping, and receiving merchandise

Figure 2.2
Store Sales

Scan Merchandise Ticket Bar Code

Store

Match UPC to Item (UPC XREF)

Credit

Identify Item Price (FPLU)

Bank Card

Credit Authorization

Process Sale (POS)

Form 95 Inventory Valuation

Bankcard Authorization

Distribute Sale Information (POSI)

Adjust Sales and Inventory (RMM4/Infostore)

EDI 852

ISI Merchandise Reports

Supplier

852 — Product Activity Data
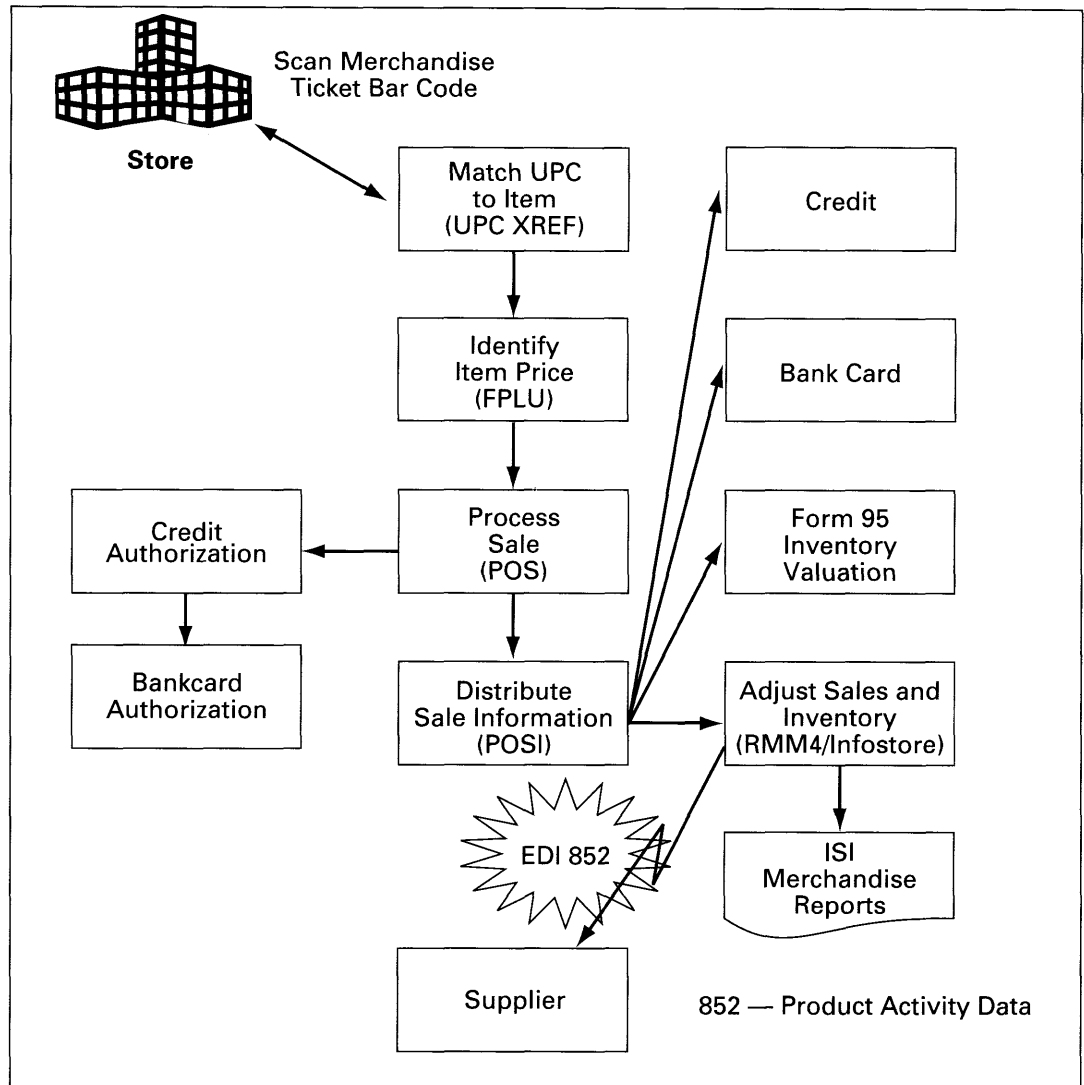
Future of POS

The following are several major trends with POS systems in the retail industry:

- POS hardware will get smaller in size, have greater capacity and power, and be less expensive to purchase.

- POS software will be purchased off-the-shelf at lower costs and will be more reliable, full-featured, and DOS compatible.

- Software vendors will be able to customize POS software quickly and easily at very little cost using computer-aided software engineering (CASE) and object-oriented programming (OOP).

- PC-based POS will become standard in its look and feel allowing a selling associate trained on one retailer's system to be able to easily adapt to another retailer's system.

■ Fiber optics will provide for greater flexibility and capacity for retailers to move massive amounts of data at a low cost thus providing the competitive advantages of retained data about the customer, improved management of inventories, and faster customer service.

■ Nontraditional POS will become more prevalent. These will include interactive kiosks that use touch-screen technology and sound to deliver product information to shoppers without sales help, portable POS that can be moved to high traffic areas during peak periods, and interactive technologies for home use.

Bar Coding/Scanning

Bar coding is one of the technologies used for automatic identification and is essential in implementing effective Quick Response or just-in-time (JIT) strategies. Bar coding is a cost-effective and accurate method of capturing and tracking data that allows the automatic entering into the computer of an identification number assigned to an item. Traditionally, data were entered using a keyboard or keypad, a very labor-intensive process. Bar codes now seem to appear on almost everything—on shipping containers, automobile parts and household appliances, railroad cars, and even envelopes received in the mail.

The bar code is a binary code with information—in the form of numbers, letters, and symbols—encoded in the widths of bars and spaces making up the bar code. Just as we use different languages like English, Spanish, and German, bar codes use different symbologies with names like UPC, Code 39, and Code 128. There are symbology standards that dictate the basic language of bar-code communication. The most commonly used bar-code symbologies have public domain standards and ensure a user that devices provided by different equipment vendors can print and read the same bar codes. There are some fifty bar-code symbologies, and each has its advantages and disadvantages. Some symbologies like UPC and Interleaved 2 of 5 encode only the numbers 0 to 9. Other symbologies like Code 39 and Code 128 can encode letters, numbers, and symbols. UPC and Code 128 are widely used by the grocery and retail industry, while Code 39 and Interleaved 2 of 5 are widely used in industrial and commercial applications.

By far the most commonly used symbology is the UPC code, the one on most merchandise. The benefit of using UPC codes is merchandise tracking at the SKU-level and elimination of affixing a proprietary price ticket to national brand merchandise. A UPC cross-reference file maintained by the retailer links the retailer's merchandise identification numbers and the supplier's UPC codes. UPC codes are obtained from suppliers by using the EDI transaction set 832, Price/Sales Catalog. This allows the UPC bar code to be scanned at POS and provides for accurate pricing and inventory tracking for the item purchased. The manufacturer/supplier normally prints readable numbers at the bottom of the UPC bar code. Refer to figure 2.3, "Bar Code."

The digit on the far left is the system digit and is probably a zero; a zero indicates general merchandise. A three would indicate a health-related item, and a five would indicate a coupon. The next five digits are the manufacturer's unique identification (ID) number. A company must apply to the Uniform Code Council (UCC) for this ID number. The next five numbers are the product code. The manufacturer can assign this number in any configuration desired as long as the retailer knows to which product that number refers. The last digit is a check digit. The check digit is derived by applying a mathematical formula to the first eleven

Figure 2.3
Bar Code

digits of the code. The scanner derives the check digit from the first eleven digits by using the same formula. It then compares its calculations with the check digit printed in the code and checks to confirm that they are the same. If they are not, the scanner knows that it has not scanned the code correctly. This is how scanners achieve such impressively low error rates.

Scanning Bar Codes

The first step in reading a bar code is to convert it into electrical signals. This is the job of scanners. Scanners range from laser scanners to inexpensive *light pens* which are essentially high-tech, penlight flashlights with photo detectors. They all work on a variation of the same theme. A light source is beamed onto the code as the detector is swiped across the code. If the detector is over a dark bar, no light is reflected back and the detector is turned off. If the detector is over a space between the bars, light is reflected back and the detector is turned on. As the detector turns on and off, a pattern of ones and zeros (binary code) is produced and then decoded by a bar-code reader into useful information.

Business Impact/Technology Risk

Bar coding is a strategic technology that often changes the way in which a business is managed. It supports a shift from accounting, batch-oriented systems to real-time, control-oriented operations. Bar coding is key to practical implementation of real-time, transaction-oriented systems. It has become a critical competitive issue. For example, many companies require their suppliers to mark all items with bar codes. Potentially, suppliers who fail to do so will lose business.

Bar-coding applications are emerging in the medical, manufacturing, rental, and retail industries at a rapid pace and support other technologies such as Quick Response, JIT, POS, automated replenishment, and EDI. Bar-code technology provides the following advantages to these industries:

- Better customer service through faster checkout at POS
- More accurate inventory counting and control, resulting in better assortments for customers and fewer out-of-stocks
- Enhanced business partnerships using EDI
- Improved replenishment time for ordering, shipping, and receiving merchandise from suppliers/manufacturers participating in EDI, Quick Response, and JIT.
- Increased productivity and reliability through automated receiving systems that read bar-coded packing slips and check in merchandise against a purchase order or advance ship notice

Future of Bar Coding

We will see many more items with bar codes on them. As applications demand more information on smaller labels, there will be new symbologies. A group of symbologies referred to as two-dimensional codes are being tested. Two-dimensional codes such as Code 49, Code 16K, and PDF 417 are printed in a square block. This technology would allow a description of the entire contents of a package to be printed in code directly on the container. The shipping manifest could also be printed on a package so that it would never get separated from its intended cargo. Instructions for handling hazardous material could be printed on containers. The possible applications of bar-code technology are endless. Because the industry recognizes the benefits of data captured by the computer, bar-code technology will continue to become more sophisticated and find additional applications.

Electronic Data Interchange

EDI, the electronic exchange of business documents in a standard format, is a cornerstone technology along with bar coding for retailers implementing a Quick Response strategy. EDI also plays a significant role for other industries involved with electronic commerce such as banking, manufacturing, transportation, and health care. EDI uses computer systems to accelerate the flow of information between trading partners while improving the accuracy of communication. This information includes a wide range of business documents or transactions, such as purchase orders, advanced shipping notices, invoices, bills of lading, order status inquiries, and many others. To effectively implement EDI, an organization needs an infrastructure with supporting hardware, application and translation software, communication networks, and management to control the entire process.

Companies traditionally conducted business on paper, often using preprinted business forms such as purchase orders and invoices to exchange information with trading partners. Many companies wanted to find a faster and easier way to communicate and process business documents in order to stay competitive and meet customer demands. Computers with business applications along with telecommunications seemed to provide an effective and efficient means to meet these demands.

Initially, trading partners often used proprietary formats for the electronic exchange of business documents. This generally worked well between two trading partners but was not efficient if an organization had numerous trading partners. With the increasing volume of electronic exchanges among trading partners, the need for standard EDI formats became apparent. The American National Standards Institute (ANSI) was chartered to coordinate national standards. ANSI created the Accredited Standards Committee (ASC) X12 in 1979 to coordinate the development of EDI standards. Today, the most common EDI standards are ANSI X12 and EDIFACT, whose primary function is the development of international EDI standards. Subset committees of ANSI were established to recommend and monitor standards for specific industries. The retail industry develops its standard transaction sets under the direction of the Voluntary Interindustry Communication Standards Committee (VICS). A broad range of EDI transaction sets currently exists with new ones under development as EDI expands. Among today's more popular ANSI X12 transaction sets are the 810 Invoice, 850 Purchase Order, 855 Purchase Order Acknowledgment, and 856 Ship Notice/Manifest.

EDI standards have created a control structure to secure EDI information. This control structure consists of three *envelope* layers that surround the electronic transmission of business documents. The outermost control envelope is the *interchange* that serves as a transmission control containing all data from the sending trading partner to the receiving trading partner. The interchange identifies the sender and receiver and provides a unique control number for tracking. Another control envelope is the *functional group* consisting of similar transaction sets such as purchase orders. The functional group control also provides more defined routing instructions for specific departments. The final control envelope is the *transaction set* that identifies the kind of documents and provides a unique control number for the document.

How It Works

An organization's purchase order management system generates information for placing purchase orders. This electronic information is then formatted into EDI 850 Purchase Orders using translation software. Translation software converts data by creating a flat file in an order and format determined by *data mapping*, a process that correlates data fields from business applications with those of EDI documents. EDI formatted purchase orders are then electronically sent to the seller.

EDI purchase orders are electronically transmitted to the seller in ways ranging from direct communications to X.25 packet-switching services offered by outside suppliers of value-added networks (VANs) to X.400 global messaging services. Refer to figure 2.4, "EDI Communication Links." These third-party networks have become more popular because they allow for enhanced and broader communications among trading partners. VAN providers maintain a mailbox for each trading partner by sorting and depositing messages throughout the day. The seller retrieves these orders from the mailbox, formats the data using translation software for their internal applications, and begins the process for completing a sale. As part of this process, the seller returns an EDI transaction set 855 Purchase Order Acknowledgment to the buyer along with several new documents including advance shipping notices, bills of lading, and invoices. In a reverse process, this information is communicated to the buyer who converts them from EDI formats in order to enter them into applications for use in traffic, receiving, and accounts payable. Refer to figure 2.5, "EDI Trading Partner Process," and figure 2.6, "Fully Implemented EDI." VANs offering EDI document translation and transmission services include Sprint, AT&T Easylink, GE Information Services, Ordernet, and Advanits, a subsidiary of IBM.

Figure 2.4
EDI Communication Links

EDI via Direct Connection

Trading Partner A   Trading Partner B
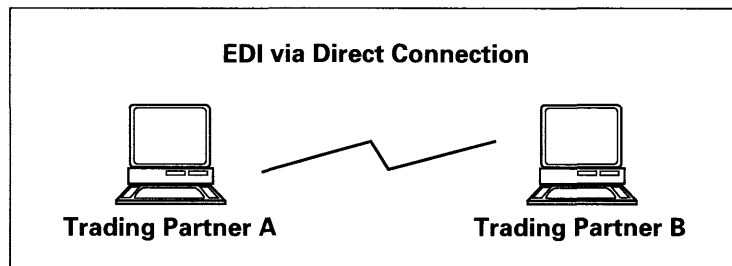
Direct connection is the simplest concept and most direct connection between trading partners using EDI. This generally happens between organizations using a proprietary format. A direct connection works well if the trading partners are few and they have common standards for information.

EDI via Value-Added Network

Trading   VAN Mailbox   Trading
Partner A   Partner B
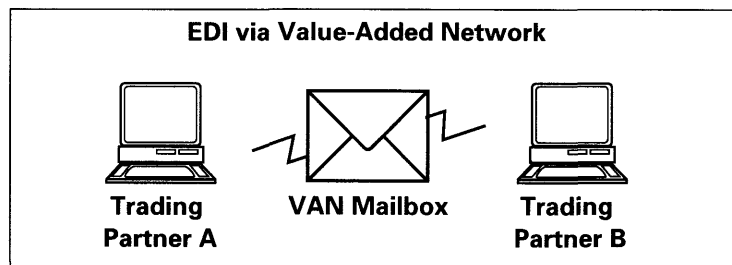
This is the most common communication arrangement for EDI. Trading Partner A sends information to the mailbox of a VAN that is used by both partners. The VAN confirms the integrity of the message and returns a confirmation of the transmission. Trading Partner B accesses the VAN mailbox and receives the transmission from Trading Partner A. It is a necessity to use standard EDI formats such as EDI X12 or EDIFACT when utilizing outside providers' VAN. VANs offer document translation and transmission services.

Value-Added Network — Interconnects

Trading   VAN #2   Trading
Partner A   Mailbox   Partner B
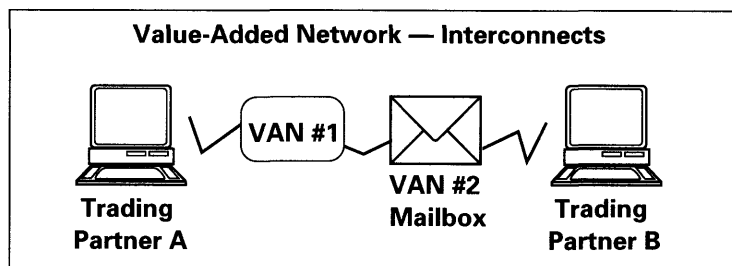
Interconnects are required when trading partners do not share the same VAN. Trading Partner A sends a message to its VAN, which then forwards the message to the VAN of Trading Partner B. Interconnects have unique risks and exposures that trading partners need to assess before using this means of communication link.

Figure 2.5
EDI Trading Partner Process

Figure 2.6
Fully Implemented EDI

Transportation

Retailer

Supplier

864 Text Message: Store Location/Address
841 Specifications/Technical Information
850 Purchase Order
860 Purchase Order Change Request

869 Order Status Inquiry
820 Payment Order/Remittance Advice
830 Planning Schedule
852 Product Activity Data (POS)

870 Order Status Report
855 Purchase Order Acknowledgment
856 Ship Notice/Manifest

810 Invoice
832 Price/Sales Catalog

812 Credit/Debit Memo

997 Acknowledgment

Accounting

Stores

Receiving

Orders

Price

Sales
&
Inventory

Shipping

Billing

Manufacturing

Bank

**International
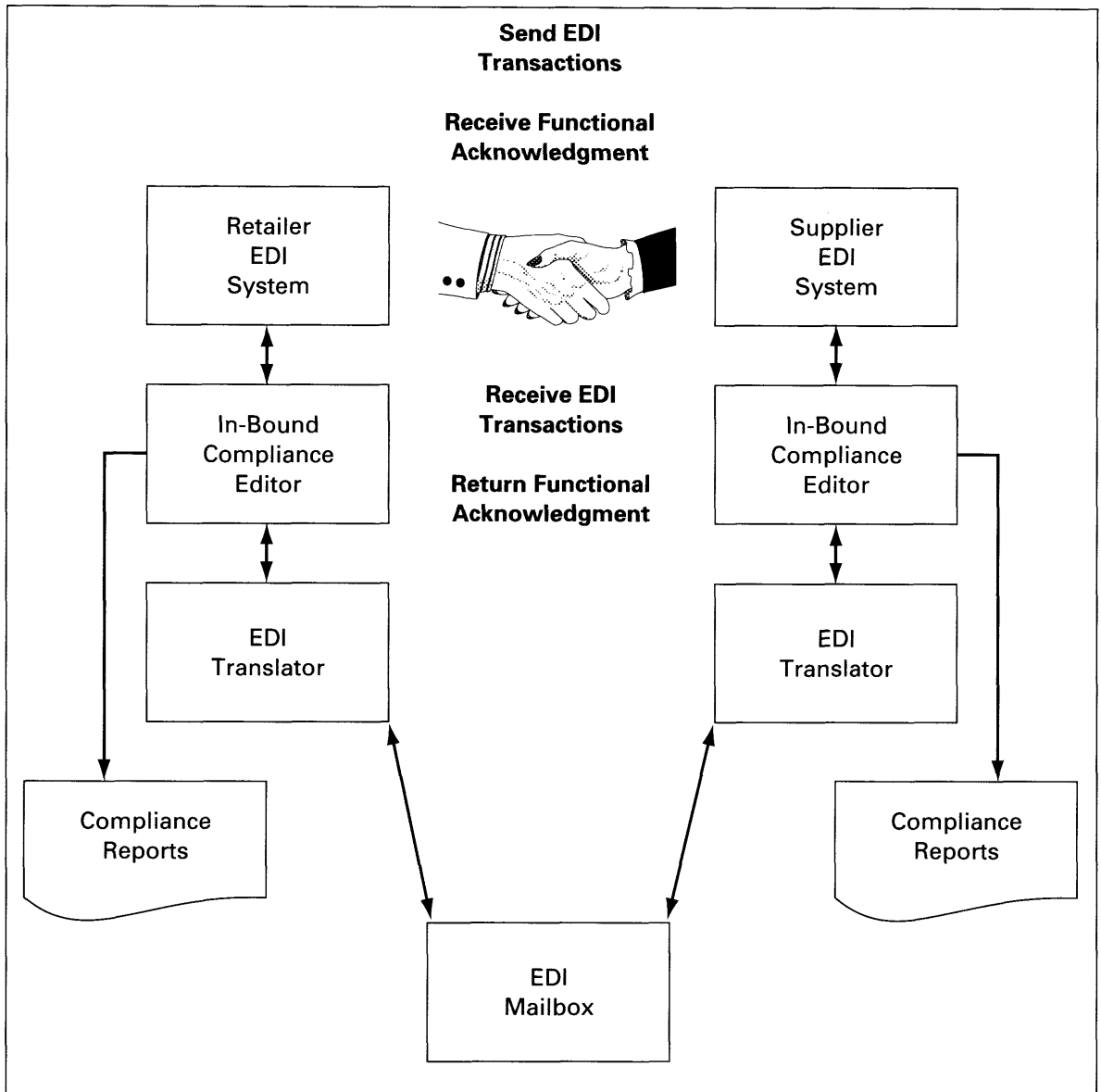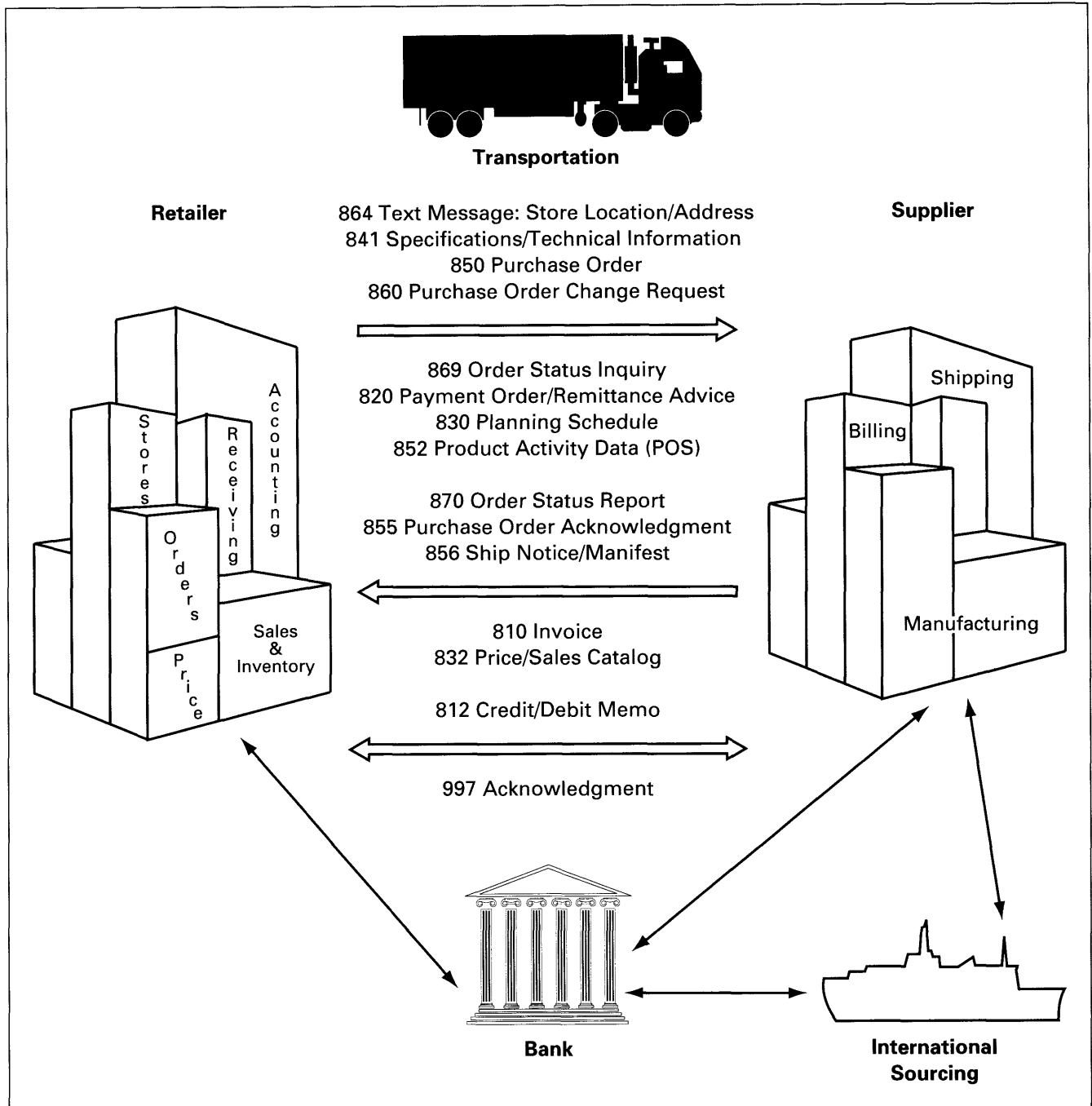Sourcing**

Most companies using EDI favor third-party networks because technical skills are provided and other issues are addressed. These providers are addressing the communication problem of one organization subscribing to one VAN while another organization subscribes to a different VAN. They use interconnect facilities that send messages to one VAN, which then forwards messages to another VAN where the receiving trading partner obtains the information.

Business Impact/Technology Risk

EDI is a strategic technology that changes the way a business is managed. Organizations are recognizing that business process reorganization is an important factor in increasing EDI benefits. Procedures are streamlined, the work flow is restructured, and the business process is simplified. Integrating EDI with existing business application systems is key to realizing the greatest long-term benefits. This application integration allows an organization to conduct its business cycle electronically. Full integration requires a thorough analysis and total management commitment.

Major benefits of EDI include the reduction of paperwork, more timely and uniform communications with all trading partners, and better market position. It provides for one-time data entry, reduced errors, improved error detection, on-line data storage, faster management reporting, higher productivity, rapid exchange of business data, and administrative cost savings. In addition, EDI improves the production cycle and reduces carrying costs as inventory is minimized in the merchandise pipeline.

The following are technological risks and other considerations relating to EDI.

- Out-of-date systems may not link up effectively with EDI or enable the use of all available EDI applications.
- If EDI is applied to business applications that are inadequate to begin with, an already inefficient system may get even worse.
- Trading partners may feel pressure from larger trading partners to either implement EDI or lose business.
- Trading partners may experience difficulties if they are using EDI documents based on older standards or using fields in ways that were never intended.
- Trading partners may have different levels of EDI integration.
- Trading partner agreements may develop even though courts have not considered a case involving EDI transactions.
- Contingency planning is required for back-up procedures, error recovery, security, and network response time.
- New auditing skills are required to identify the risks and exposures related to EDI technology.

Using EDI means a high-level commitment to technology. Users of technology need to stay abreast as changes occur in EDI standards, communication protocols, and hardware. As larger trading partners continue to upgrade EDI software and hardware, this becomes an important issue for all trading partners as part of maintaining compatibility. Each level of EDI integration further affirms the need to upgrade and adapt.

Advance Ship Notices/ Shipping Carton Marking

The advance ship notice (ASN) system incorporates EDI technology and bar-code scanning and interfaces with other systems, such as electronic order files, to provide for the on-line receiving and monitoring of incoming shipments. In a Quick Response environment, suppliers are required to place shipping carton markings (SCM), scannable bar-code labels, on the cartons they ship, and to electronically advise the purchaser of the shipment by sending an ASN. Refer to figure 2.7, "Supplier ASN Label." The ASN is EDI transaction set 856 and is sent electronically from suppliers to customers detailing the contents of their shipments. Receiving the ASN electronically enables customers to prepare for incoming shipments and to automate their receiving process. The ASN is electronically sent directly to the retailer or through a third-party VAN such as GEISCO and Ordernet. The retailer retrieves these transmissions using translation software that also performs edit checks to ensure compliance with EDI standards. ASN is mainly used to specify the contents of a shipment. However, it is also used to report the status of a shipment or order. It allows the supplier to send an order status code representing backorders, partial shipments, shipment complete with substitutions, and others. Additional features of ASN include interfacing with other systems to—

- Verify ASN information against the electronic order file (EOF).
- Provide on-line access to discrepancies and pricing problems.
- Make available on-line handling instructions to communicate system-detected problems.
- Give management instructions for merchandise receiving.

Figure 2.7
Supplier ASN Label

| From MA Creations Anytown, USA | Cust # 5233316 Order # Zone 16 | Carton Number |
| | | 04778090 |

| Purchase Order No. 1234543 | Customer Information |

| Ship To: Good Customer, Inc. Anytown, USA | Qty in CTN 20 | Carton Number 1 of 2 |

CALIFORNIA FREIGHTWAYS T2   UPS Carton ID 0001

00 0 00 17457 477809001 2

04778090

Work Flow

The following illustrates the use of ASN. Refer to figure 2.8, "Receiving." As merchandise is packed or readied for shipment, each item is again scanned at the shipping dock generating an EOF. Every item ready for shipment to the customer on a specific purchase order is now in the computer with complete detail. The computer assigns a shipment ID number that correlates to that specific shipment. An SCM bar-code label, with this encoded shipment ID number, is then placed on the carton(s) making up the shipment prior to its being loaded on an outbound truck. At this time, an ASN is transmitted to the customer using a VAN providing accurate and complete detailed data of this shipment along with the shipment ID number. This data can now be added to the customer's order/inventory database before the shipment arrives. When the merchandise arrives at the customer's receiving dock, the carton bar code is scanned and matched to its EDI ASN. With one scan, the receipt of the carton's contents, including quantities, is verified. The ASN or shipment data can now be used to update the customer's electronic order file, inventory records, and accounts payable systems.

### Business Impact/Technology Risk

ASN is a strategic technology that changes the way a business is managed. It changes the documentation of the receiving process from paper-intensive to electronic documentation. This process significantly reduces the work involved in the receiving process and places greater reliability on the supplier. Although this provides for improved efficiencies, an exposure exists when receipts are updated based upon information provided by the supplier. As a result, a strategy for verifying supplier reliability and monitoring irregularities should be part of the ASN system. Irregularities such as quantity differences, substituted merchandise, partial shipments, shipments past the order cancel date, and erroneous data should be tracked. An important checkpoint on supplier reliability is to have the ASN system prompt receiving and checking associates to verify carton contents at specified intervals. Another safeguard in avoiding disruption to the business process is to have an effective contingency plan in the event of a short- or long-term loss of ASN support.

In addition, ASN, EDI, and bar coding support the financial process of the ordering cycle. For example, the supplier updates his accounts receivable system in anticipation of payment and sends an EDI Invoice (810) to the customer. On receipt of the EDI invoice, the customer will confirm accurate receipt of merchandise using ASN. The customer will send an EDI Payment Order/Remittance Advice (820) to the supplier indicating payment is being made and to his bank instructing it to pay via electronic funds transfer (EFT).

Automatic Ordering/ Replenishment

Automatic ordering/replenishment systems constantly monitor inventory levels relative to sales demand in order to generate purchase orders for merchandise or parts that need to be replenished. This allows retailers or manufacturers to carry the most economical level of inventory and still provide superior customer service. In order to accomplish this, replenishment systems track information such as SKU, model stock, vendor lead times, and forecasted sales rates and trends. Automatic ordering/replenishment is an essential element of Quick Response and supports other technologies such as scanning, POS, and electronic data interchange. The hardware required can range from mainframes to PCs, depending upon the retailer's Quick Response objectives, operating complexities, and transaction volumes. The software can either be proprietary to the retailer or purchased off the shelf.

Figure 2.8
Receiving

856 — Ship Notice Manifest
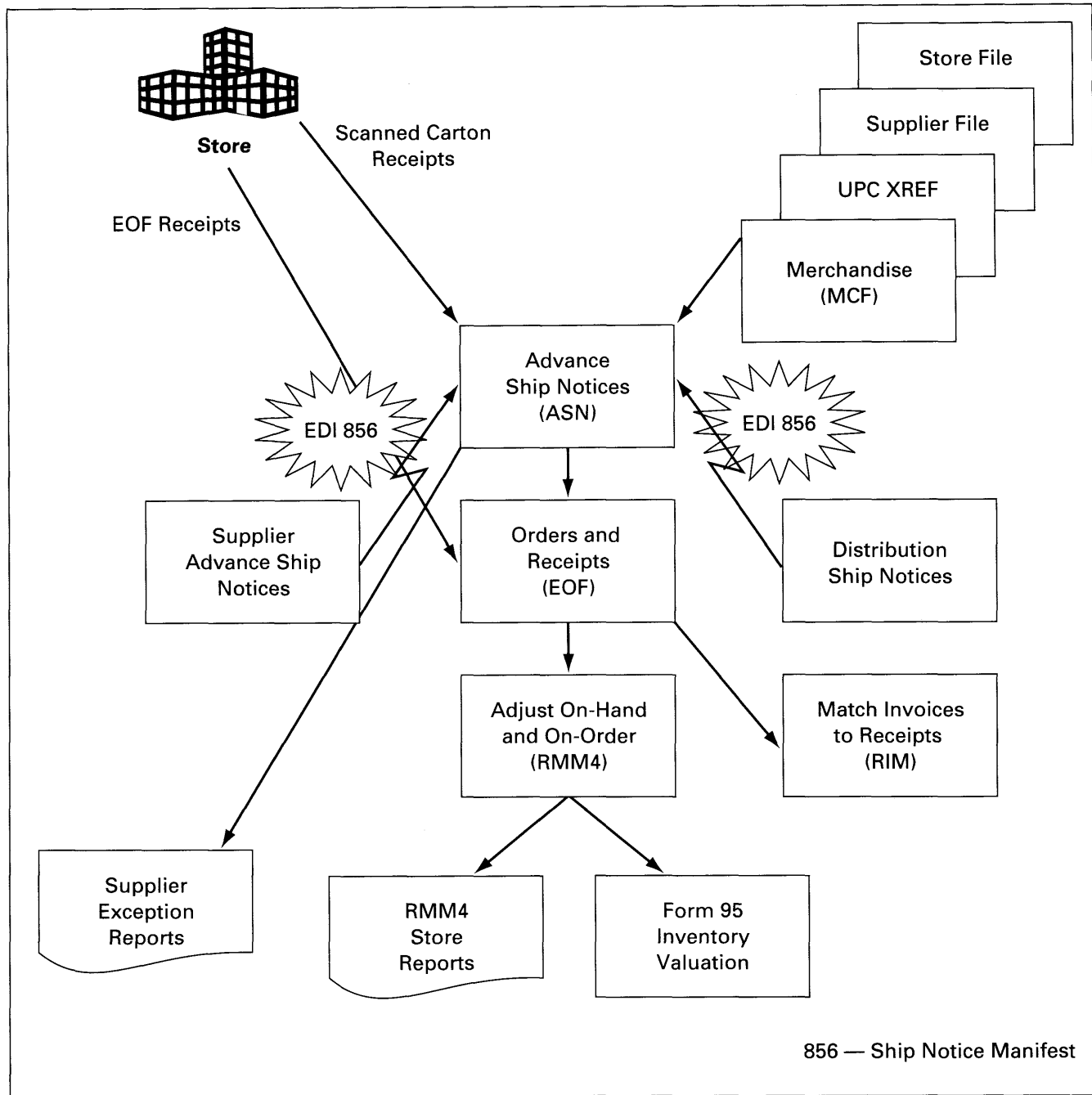
Benefits offered by automatic ordering/replenishment systems include optimizing inventory levels, improving in-stock position, increasing inventory turns, decreasing inventory carrying costs, and providing better customer service.

Work Flow

The following illustrates how automatic ordering/replenishment systems work and interface with other systems. An inventory management system is maintained to automatically track on-hand, on-order, sales, reorder points, and reorder quantities for each SKU. Refer to figure 2.9, "Inventory Management." As merchandise or parts are consumed, the inventory management system will monitor this activity and generate an electronic purchase order, EDI transaction set 850, for the reorder quantity when the on-hand and on-order quantities fall below the reorder point. The electronic purchase order would be transmitted electronically to the supplier using electronic data interchange. Refer to figure 2.10, "Order Writing."

Figure 2.9
Inventory Management

Inventory management maintains OH, OO, Sales History, RPs, RQs, Retails, and RKLs (4, 6, or 10)

Electronic Stock Count

Inventory Management **HOST**

Various Merchandise Reports

EOF Order Information

Sales and Merchandise Analysis

ASN/EOF Receipt Information

POS Sales Information

Figure 2.10
Order Writing

Store File

Supplier File

UPC XREF

Merchandise
(MCF)

Store

Orders

Order
Writing

EDI 850

EDI 864

Local Buys

Open Order
Mangement
(EOF)

Supplier
Orders

Adjust
On-Hand/On-Order

Merchandise
Reports

Store
Reports

Merchandise
Reports

850 — Purchase Order
864 — Text Message: Store Location/Address
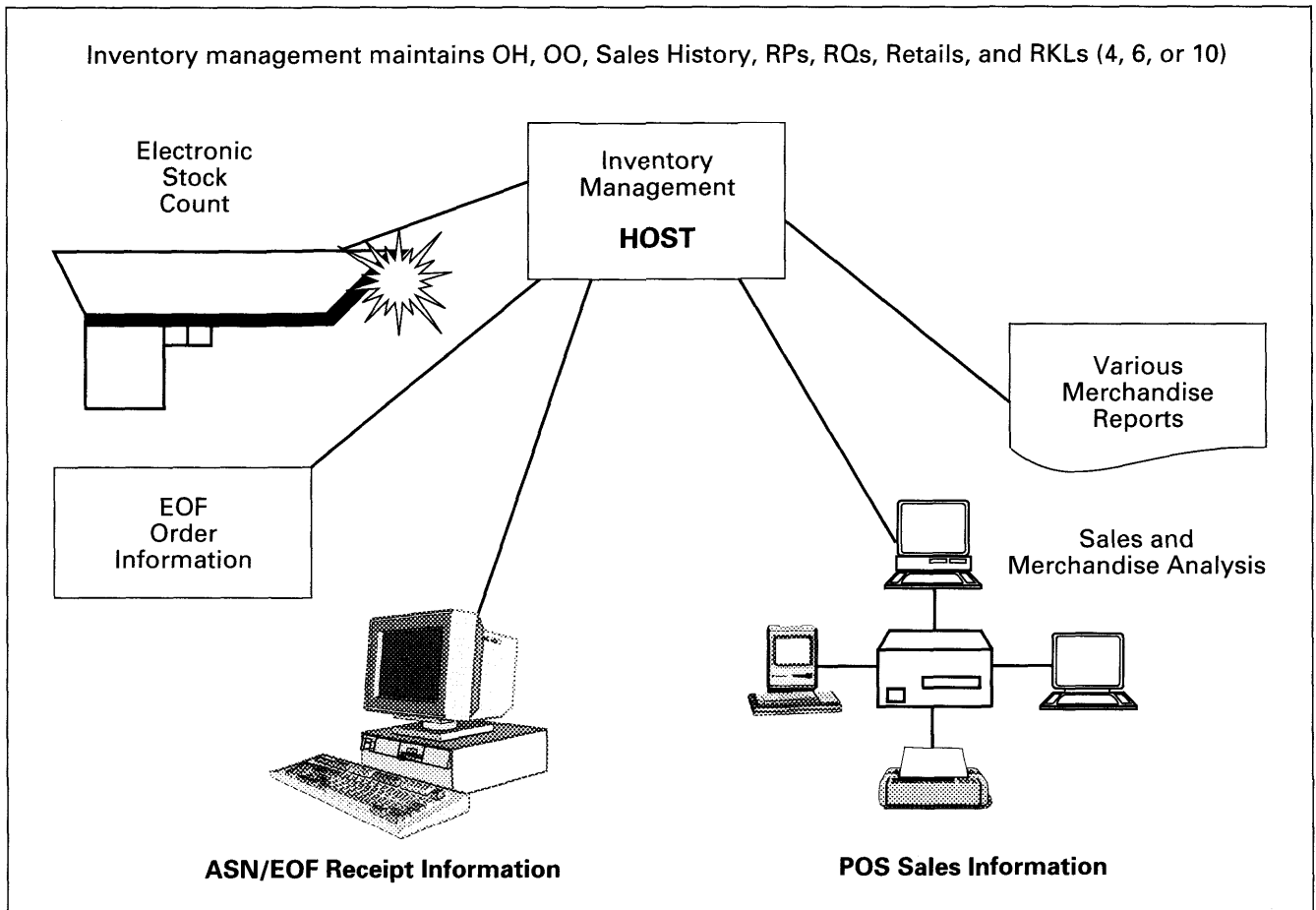
After the order is filled by the supplier, merchandise is shipped and received by scanning the ASN, EDI transaction set 856. The ASN system interfaces with the buyer's purchase order management system and updates the EOF for merchandise received. EOF is a database for all electronically generated orders and maintains purchase order data and receipt information for the buyer's inventory management system.

The supplier sends an electronic invoice, EDI transaction set 810, for merchandise shipped to the buyer. The buyer uses an automated system of matching these invoices to receipts received from the EOF system. If the invoice and EOF receiving information match, payment, EDI transaction set 820, is processed to the supplier. For those situations in which the invoice and EOF receiving information

do not match, exception reports are generated identifying discrepancies and adjustments processed, EDI transaction set 812. Refer to figure 2.11, "Invoicing and Payment."

The following systems work together to automate functions:

- Keeping files of open purchase orders
- Maintaining files of receipts
- Matching receipts to vendors' invoices
- Verifying receipt of merchandise charged/invoiced to the buyer
- Making adjustments for incorrect invoice charges
- Preparing documentation for supplier returns and interstore transfers

Figure 2.11
Invoicing and Payment

810 — Invoice

812 — Credit/Debit Memo (Adjustments)

820 — Payment Order/Remittance
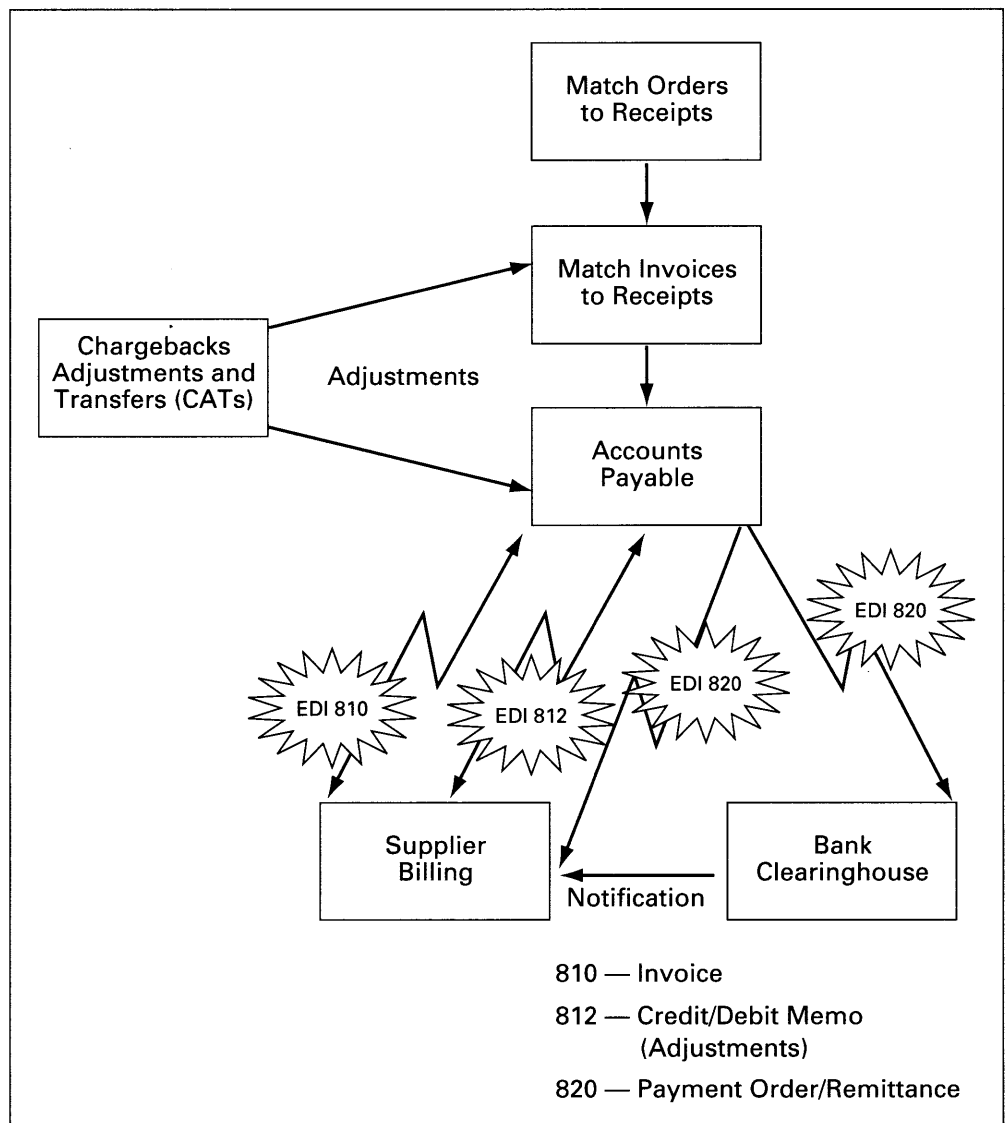
In a Quick Response environment, the supplier can often maintain the reorder point and reorder quantity. This allows the supplier to generate and transmit purchase orders to replenish merchandise based on sales of predetermined and agreed-to model stock. The supplier must communicate the replenishment in the form of a purchase order, EDI transaction set 855, Purchase Order Acknowledgment, often called a reverse purchase order. To support this process, the buyer's sales and inventory information is transmitted to the supplier using EDI transaction set 852, Product Activity. Forecasted needs are also communicated to the supplier using EDI transaction set 830, Planning Schedule. Refer to figure 2.12, "Merchandise Replenishment."

Figure 2.12
Merchandise Replenishment

830 — Planning Schedule
850 — Purchase Order
852 — Product Activity Data
855 — Purchase Order Acknowledgment
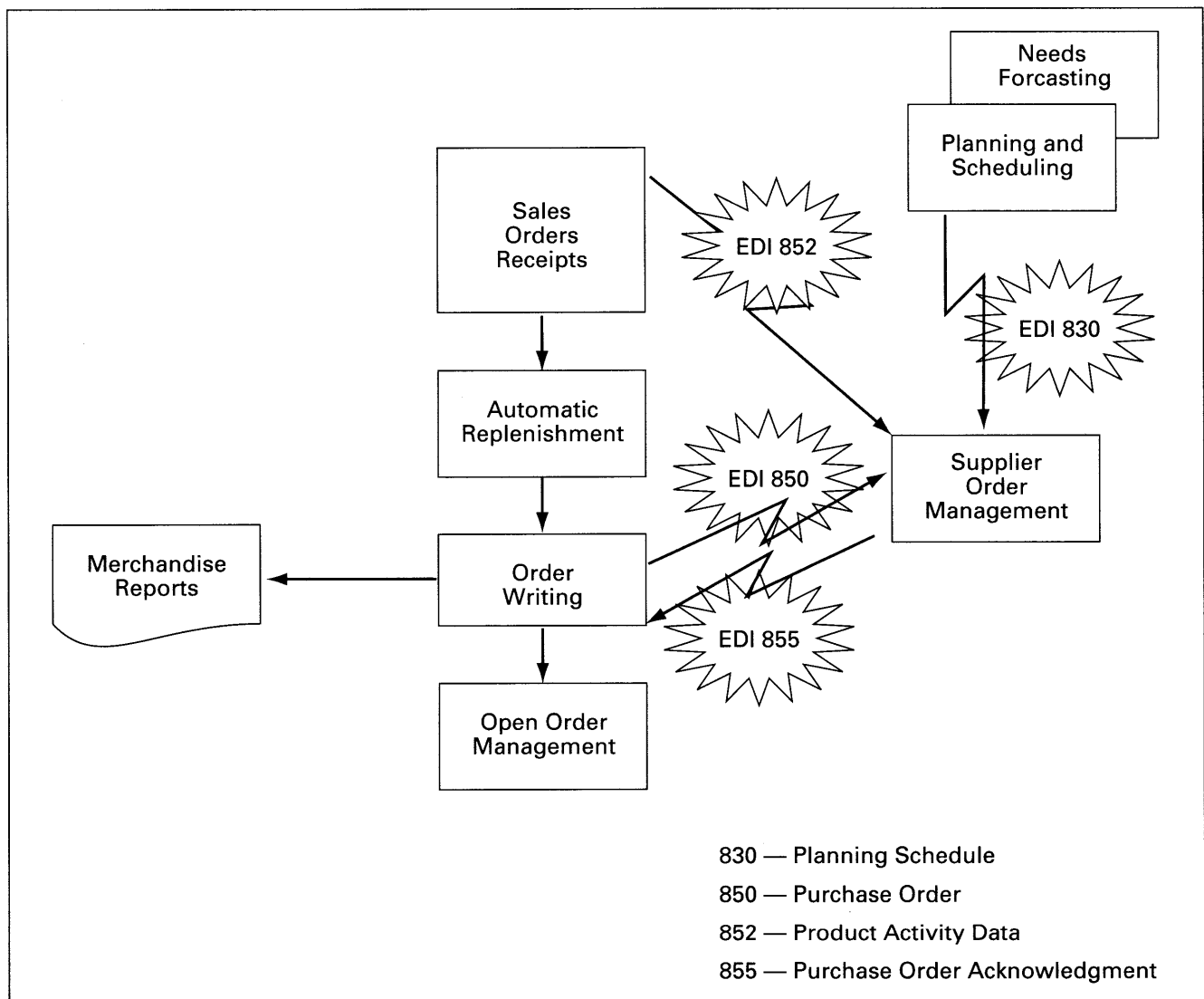
Business Impact/Technology Risk

Automatic reorder/replenishment systems are strategic technologies that have an impact on the way a business is managed. In order to stay competitive, it is critical for a business to identify and respond to the changing demands of customers. Utilization of an automatic reorder/replenishment system enhances the competitive advantages a business has in meeting this changing demand. Companies that do not meet these demands are sure to fail.

Reorder/replenishment systems support the competitive necessity to improve the flow of merchandise through the pipeline and better respond to customer demands. The pipeline is more efficient in that investment in unneeded inventory throughout the pipeline is reduced.

The following are multiple benefits provided by automatic reorder/replenishment:

- Suppliers receive purchase orders faster and more frequently.
- Lost, missing, or mishandled orders are minimized.
- Data input errors are eliminated.
- Electronic interface with the inventory management system is allowed for.
- Creation of internal operational reports is supported.
- Other Quick Response/JIT technologies are supported.
- Planning and shipping of proposed inventory replenishment quantities by suppliers are enhanced.
- Forecasting of buyers' demands and identification of sales trends are better.
- Production planning is more effective and efficient.
- Inventory cycles are shorter.
- Inventory turnover is increased.

Another aspect of an automatic reorder/replenishment system is the control considerations and risks associated with this automation. These risks and other considerations include the sharing of sales and inventory information with outside parties and the related competitive implications; the necessity for outside parties such as suppliers to utilize certain technologies such as EDI in order to maintain business relationships with their current and future trading partners; upgrading hardware and software in order to effectively communicate with trading partners; and ensuring that system and operating controls are in place so that transactions such as placing an order and supplier billing are adequately approved and accurately processed.

Networks

Networks play a strategic role for organizations utilizing Quick Response, specifically in the successful and accurate processing of EDI transaction sets between trading partners. As business documents such as purchase orders are generated by a trading partner's business application, they are converted to EDI transaction sets utilizing translation and mapping software. These transaction sets are then electronically sent to trading partners using communication software and networks ranging from direct communications and VANs to interconnects. Refer to figure 2.4, "EDI Communication Links," in the section entitled "Electronic Data Interchange." The hardware configuration used for electronic communication between trading partners includes computers, modems, and telephone lines.

Direct Communication

Organizations use direct communication to transmit electronic business documents directly to other trading partners; they usually manage their own communication systems. In order to effectively communicate in this manner, each trading partner's hardware and software must be compatible; this can be expensive and require a lot of maintenance. Because it requires a high initial investment including a well-trained staff to support it, direct communication is only practical for larger organizations with a high volume of transactions or organizations with a limited number of trading partners.

Value-Added Network

Most EDI organizations use the services of a VAN as the preferred communication point between trading partners. VANs eliminate the compatibility problems with hardware and software as well as provide the technical expertise that most smaller organizations could not afford. They also make it possible for smaller companies using PCs to conduct business with large companies using mainframe computers. The key service offered by third-party VAN providers is electronic mailboxes that allow for the sorting, receiving, and depositing of EDI transaction sets forwarded by trading partners. These electronic documents are stored in mailboxes until retrieved by the intended trading partner. Electronic mailboxes are the most common service provided by VANs. Other services offered by VAN providers include point-to-point transmission, protocol conversions, translation and data mapping services, consulting, trading partner implementation support, data security, and help desks. VAN providers include AT&T EasyLink, Advantis, GE Information Services, MCI, Sprint, and others.

Interconnect

Interconnects are required when trading partners do not share the same VAN. Third-party VAN providers use an interconnect to establish the linkage that permits transmissions between two VANs. For instance, the electronic documents such as purchase orders can be forwarded from the VAN of one trading partner to those of others. The Interconnect Mailbag was developed to control such transmission. When an interchange between two VANs takes place, the transmission would be enclosed in an additional envelope called a mailbag that would provide immediate notification if something were transmitted incorrectly. The mailbag provides an audit trail by adding a unique pouch number to each transmission and sequence numbers for each document with a trailer record showing the number of records in the pouch. For additional information on interconnects, refer to "How Do You Ruin a Trading Partner Relationship?" and "EDI Interconnect Controls" in the Spring 1993 issue of *InfoTech Update* (see appendix B, "Spring 1993 *InfoTech Update* Abstracts.")

How It Works

Communication service begins when EDI messages are sent between trading partners. Purchase orders originated by a trading partner's business application are converted to EDI transaction sets and transmitted to its VAN. The VAN will evaluate this information for transmission integrity and usually confirm receipt after the data pass these tests. VANs will then perform one of the following services: Forward the data directly to the recipient, forward transaction sets to the electronic mailbox of the recipient, or forward information to another VAN using an interconnect. The recipient trading partner checks for messages from its VAN electronic mailbox during the day and retrieves them for processing. These

messages are formatted with translation software in order to be used by internal business applications that begin the process for completing a sale. As part of this process, the recipient trading partner returns an EDI transaction set 855, Purchase Order Acknowledgment to the originating trading partner's VAN along with several new electronic documents including advance shipping notices, bills of lading, and invoices. In a reverse process, this information is communicated to the originator who converts them from EDI formats in order to enter them into applications for use in such areas as traffic, receiving, and accounts payable.

Business Impact/Technology Risk

Successfully managing the flow of information depends upon strong data communication links between manufacturers, suppliers, and retailers. This communication link is critical in maintaining a Quick Response strategy. A third-party VAN network is a significant provider of this communication link. Organizations are faced with critical decisions when examining the alternatives of upgrading and utilizing electronic networks or losing business.

VANs provide benefits to trading partners by—

- Reducing response time for meeting customer demands.
- Allowing a retailer to communicate with thousands of suppliers.
- Diminishing the need for a large programming staff to support EDI transactions.
- Providing an audit trail for EDI messages.

The following are technological risks associated with networks.

- Smaller companies are forced to use these networks when trading with larger companies.
- The technical support or knowledge needed to use networks may be insufficient.
- Trading partner VANs may fail to adopt the communication standards needed to efficiently transmit messages.
- Proper controls may not be in place to ensure the accurate processing of electronic messages.
- Maintaining or upgrading network technology may entail excessive costs.
- It may be necessary to rely on third-party networks to provide controls to ensure accurate processing of business transactions.

Chapter 3. Retailers' View of Quick Response

Retailers are viewing Quick Response as a business strategy for increasing sales and profits as well as a means of staying competitive in a rapidly changing economic environment. One method for increasing sales and profits is with better in-stock positions for merchandise at SKU-levels. This is where Quick Response plays a key role by achieving faster movement of the right information and merchandise through the merchandising, production, and distribution pipeline, thereby allowing for faster replenishment of merchandise at POS. In addition, Quick Response for retailers is impossible without utilizing technology and developing partnerships with suppliers, manufacturers, and mills to better respond to changing customer demands. The concept is to increase sales while maintaining minimum inventories for all partners in the merchandise pipeline. It also requires the full support of business owners and executive management to effectively implement this strategy.

In order to fully appreciate the impact of a Quick Response process, retailers need to understand the benefits as well as the cultural changes that take place in an organization following the implementation of Quick Response.

Cultural Changes

Quick Response focuses on creating new relationships or partnerships between retailers, manufacturers, suppliers, and distributors. These partnerships require an entrepreneurial relationship that is built on trust, constant communication, the sharing of operational data, high quality, and a shorter merchandise cycle. New business practices, starting with a cooperation that stems from a knowledge of each other's business objectives, opportunities, and constraints, are of utmost importance.

There are a number of examples of this new partnership arrangement. For its Lee jeans, JCPenney now shares sales information and utilizes an automatic inventory management system developed and managed by VF Corporation, as described in *ComputerWorld*, June 14, 1993.[2] Another example is the specialty apparel chain Designs that sends Levi Strauss and Co. a sales data file every week. Levi matches the figures against the model stock and automatically sends a replenishment shipment directly to the store.

With Quick Response, not only are sales and inventory levels shared with others, but future sales estimates are available that enable the manufacturer/supplier to anticipate and meet the needs of the customer sooner.

Again, these partnerships are built around three very basic keys: communication, trust, and commitment—three words that say "easy," but are extremely difficult to implement.

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[2] "Jean Genies." *ComputerWorld* (June 14, 1993):99.

Do I Need Quick Response?

Before implementing Quick Response, the retailer must understand and assess its benefits. Quick Response can help retailers—

- Remain competitive in a very competitive industry by identifying what the customer wants sooner and meeting those needs faster.
- Improve the merchandise mix that allows for a broader assortment of merchandise resulting in improved sales and profits.
- Enhance inventory management by optimizing inventory levels, lowering item inventory quantities, providing better SKU balance, reducing carrying costs and markdowns, and increasing inventory turns.
- Realize operational efficiencies in functional areas such as receiving, sales support, merchandise buying, inventory management, and physical inventory procedures.
- Minimize pricing errors by performing price verifications during the receiving process and price look-up at POS.
- Improve the accuracy of internally prepared reports.

Refer to chapter 2, "Enabling Technologies for Quick Response," for further explanations and illustrations that support these benefits.

Legalities

As a retailer implements Quick Response and the technology that supports this concept, an assessment of legal issues should be considered. One such issue would be the requirements for a contract as described in the Uniform Commercial Code (UCC)—Statute of Frauds when electronic data interchange (EDI) technology is utilized. Traditionally, a business contract is in writing with a signature authorizing the transaction. With EDI, an electronic order is transmitted from the retailer's computer to the supplier's computer or a VAN mailbox, leaving no written evidence of a purchase order. It also requires the retailer to reevaluate provisions of trading partner agreements that would include definitions of contract terms such as payments, purchase order acknowledgment requirements, use of third-party networks, standards for EDI transaction sets, responsibilities of each party, recourse for not meeting responsibilities, and a right-to-audit clause.

Merchandise Suited for Quick Response

Part of the Quick Response implementation plan should include a review of merchandise categories such as *basic, seasonal,* and *fashion* that have unique considerations when used in a Quick Response environment. Basic merchandise categories such as home furnishings, underwear, hardware, and appliances are better suited for initial Quick Response consideration because this staple merchandise is offered for sale continuously by many retailers and is usually sold in high volume. Since basic merchandise, rather than fashion or seasonal goods, is easier for tracking customer demand and identifying consistent sales trends, it is most appropriate for utilizing Quick Response technologies.

Considerations for Implementing Quick Response

Quick Response requires retailers to develop a strong infrastructure to support the implementation, monitoring, and maintenance of its various technologies. This would include assessing the impact of Quick Response, developing an implementation plan, evaluating system requirements, identifying risks and exposures, conducting continuous training, and implementing the plan. This is best accomplished by working in partnership with consultants, suppliers, manufacturers, and other participants on the merchandise pipeline.

Refer to chapter 5, "Implementation of Quick Response," for additional information.

Chapter 4.   *Suppliers' View of Quick Response*

Like retailers, manufacturers and suppliers are viewing Quick Response as a business strategy for increasing sales and profits as well as for staying competitive. They continually face demands for higher quality, shorter product life cycles, improved customer service, and the need to reduce inventories. In order to meet these demands, suppliers are reengineering the process for delivering products to retail customers. This includes developing a greater level of cooperation between retailers, manufacturers, and suppliers. A key technology that supports this concept is EDI, which allows suppliers to effectively communicate information such as stock position, replenishment orders, and invoice advices with other trading partners. The concept of Quick Response for manufacturers and suppliers is to achieve faster movement of information and merchandise through the merchandise pipeline in order to meet the needs of customers. The full support of management is required to effectively implement this strategy.

Many suppliers are using automated production planning and manufacturing systems. Two examples of these systems are material requirements planning (MRP) and manufacturers resource planning (MRP II). MRP automates the process of planning for production to help ensure that the right materials are available at the right time. MRP II provides for the integration of all manufacturing, marketing, financial, and related business systems and is designed to help manufacturers meet market demand while maintaining a balanced level of inventory. System objectives are to provide for more efficient planning, improved customer service, increased production efficiency, lower inventory investment, reduced labor and material costs, and better performance measurements. In order to fully appreciate this process, suppliers need to understand the cultural changes as well as the benefits that are attributable to Quick Response.

Cultural Changes

Quick Response focuses on creating new relationships between retailers, manufacturers, suppliers, and distributors. Trust, communication, sharing of operational data, high quality, and a shorter merchandise cycle are required. New business practices based on cooperation, which stems from a knowledge of one another's business objectives, opportunities, and constraints, are key to success.

Most commonly today, relationships between suppliers and their trading partners are built on a series of separate, often paper-based transactions such as written purchase orders, invoices, and checks. Refer to figure 4.1, "Today's Supplier/Retailer Relationship." Often, the key individual in this relationship is the supplier's sales representative.

Figure 4.1
Today's Supplier/Retailer Relationship
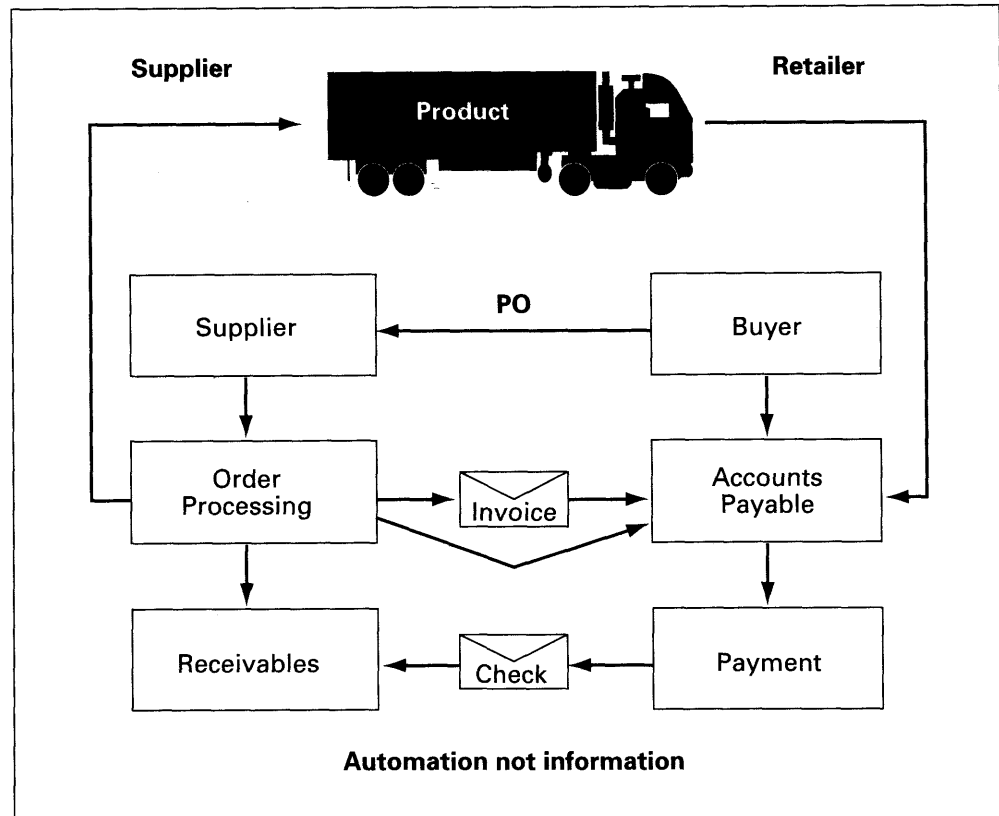
Quick Response brings with it a cultural change that is a departure from the traditional method of doing business. Instead, information is shared with trading partners. For example, a retailer that traditionally managed and maintained inventory levels for selected merchandise now may have suppliers take day-to-day control of managing that inventory. The concept known as vendor-managed inventory (VMI) is similar to managing inventory using a JIT system for manufacturers. Under VMI and Quick Response, POS summaries, sales forecasts, and inventory by SKU are sent electronically from retailers to suppliers who use them to activate inventory replenishment orders. This, in turn, triggers the issuance of purchase orders, purchase order acknowledgments, advance ship notices, invoices tied to on-line price catalogs and electronic funds transfers (EFT). By providing suppliers with relatively accurate forecasts, they can schedule their own production more efficiently and effectively meet individual delivery schedules. This means suppliers play a greater role in analyzing and managing the retailer's inventory while trying to anticipate and meet the demands of the retail consumer. Refer to figure 4.2, "Future Supplier/Retailer Relationship." Effective implementation of VMI provides for replenishment of inventories only when needed by all trading partners along the merchandise pipeline.

Figure 4.2
Future Supplier/Retailer Relationship

Information sharing builds business partnerships
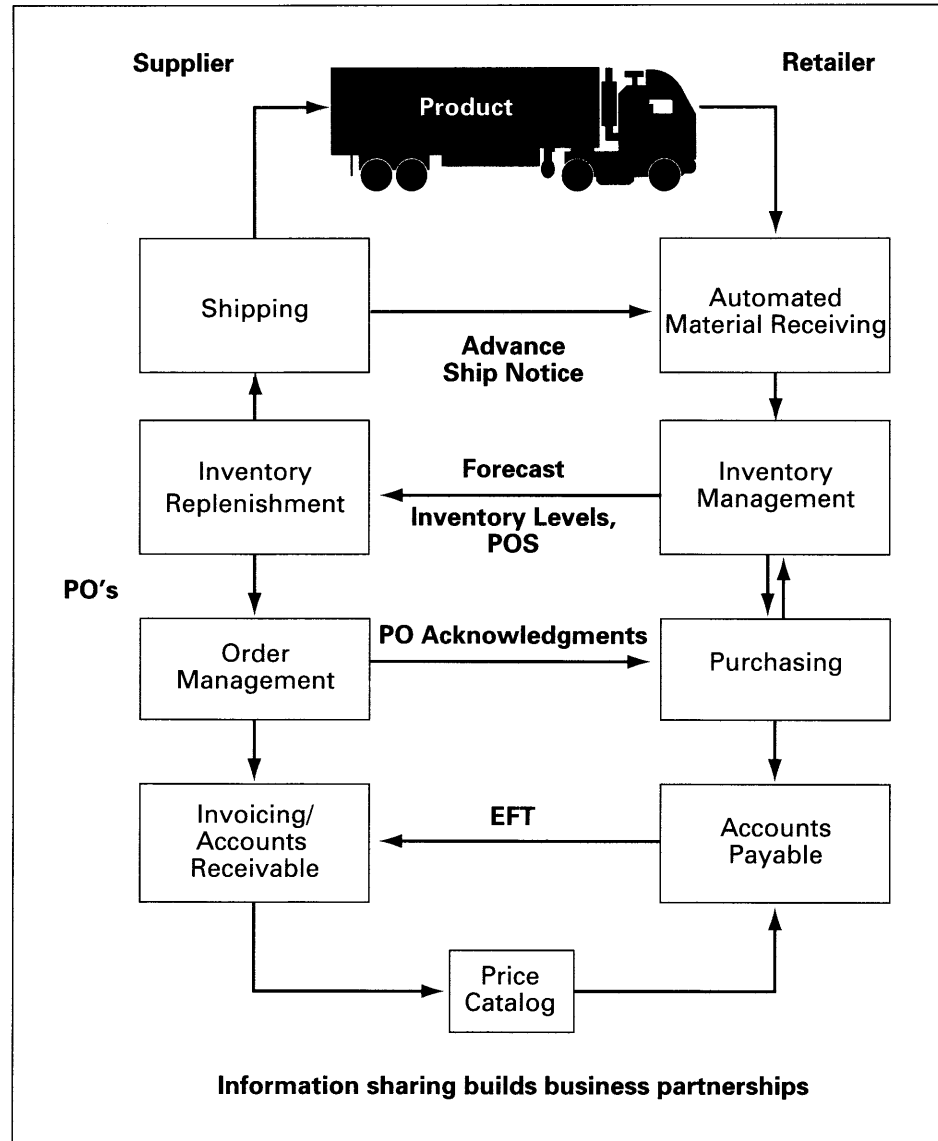
Do I Need Quick Response?

Benefits are similar to those identified for retailers and include the following:

- Increased sales and market share
- Better and more efficient production schedules with accurate sales summaries and forecasts provided by retailers
- Long-term relationships with trading partners resulting in long-term contracts, reduced payment terms, and higher inventory turns

Other factors to consider when reviewing Quick Response benefits include packaging and shipping costs. Since merchandise is replenished more often, it is packaged and shipped in smaller packs; this may result in a reduction of full-truckload (FTL) shipments, thereby increasing shipping costs and impeding productivity.

Legalities

As a result of these new relationships between trading partners, many new legal issues need to be considered. To date, no court has considered the question of the existence of a document sent by EDI. The following are new legal issues.

- Can an electronically generated document such as a purchase order meet the writing, signing, and authentication requirements of the UCC?

- At what point in the process can the retailer cancel an order? Who pays for return freight if these procedures are not followed?

- Are there penalties if inventory levels exceed recommended levels for suppliers supporting VMI? Can the supplier ship excess inventory if it saves freight by having an FTL compared to a less-than-full-truckload (LTFTL)?

- What happens if there is an error in the retailer's sales information that results in an error in inventory replenishment by the supplier?

- Is the supplier required to have minimum inventory levels on hand for emergencies? What happens to this inventory if designs change?

- Who is responsible for errors in bar codes, labeling, and ticketing?

Many suppliers find it helpful to cover these items either in trading partner agreements or in operating manuals given to customers/retailers. Often, these agreements and manuals have been reviewed by the legal department.

Considerations for Supplier Implementation of Quick Response

Preparing operating manuals is only a small step in implementing Quick Response by the supplier. Manuals should cover all of the areas in which supplier organizations and retailers come into contact including the organizational structure. They should address areas such as centralized or decentralized customer service, key contacts for EDI, EFT, advance ship notices, and questions about on-line pricing and other concerns.

Many companies are combining their customer service, production planning, and logistics departments under one manager to implement Quick Response. Inventory replenishment orders and sales forecasts received by customer service representatives become input to production planning schedules of factories and mills.

Quick Response often creates a domino effect in the supply chain. As more retailers use Quick Response, their suppliers, in turn, demand quick response from suppliers. They share production plans with their suppliers, demanding JIT delivery for materials. As a result, raw material providers often store raw materials near factories and mills for quick delivery.

Perhaps the greatest challenge for suppliers is to provide an effective ongoing training program in order to implement the various technologies and systems needed in a Quick Response environment. Refer to chapter 5, "Implementation of Quick Response," for additional information about training.

Chapter 5. Implementation of Quick Response

Assess the Impact of Quick Response

Prior to developing or implementing this strategy, an organization should assess how Quick Response will affect it. The assessment would include understanding the benefits provided with implementation and other areas such as an organization's strategic plans, competition in the marketplace, cost to implement, technology strategies, and organizational changes required to administer, plan, and coordinate this strategy. The development of an effective Quick Response strategy is more than implementing technology. It is a plan that is strategic to an organization and critical for remaining competitive in our interdependent world economy. It requires the development of new business relationships with other trading partners that traditionally did not exist in the past. It also requires reengineering a company's process for delivering products to consumers.

Most successful Quick Response programs have either performed cost justification prior to implementation or evaluated implementation based on precise performance measurements as reported in *EDI World*.[3] The magazine indicated the following three basic approaches to cost justification:

- *EDI cost justification*—A short-term, preimplementation assessment of the costs and benefits associated with EDI deployment
- *Business process cost-benefit analysis*—An extensive analysis of the costs and benefits associated with EDI implementation and process reengineering to achieve a new business process
- *Sustaining metric management*—A continuing, periodic assessment of EDI-related activities using performance measurements

A number of companies are often forced into implementing Quick Response technologies such as EDI because their larger customers require it, therefore bypassing these cost justification techniques. Many others implement this strategy for market or competitive reasons rather than cost-saving reasons.

As discussed in *Chain Store Age Executive*,[4] Quick Response is different for every company. There is no single approach for implementation and no model that works exactly the same in every setting. Even the technologies used for Quick Response must be evaluated separately so each company can implement them to the degree necessary to support their unique strategic and operating objectives. It is also important to understand Quick Response is not an all-or-nothing proposition; nor does implementation mean that 100 percent of all possible Quick Response strategies and technologies are in place.

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[3] McLauchlin, P., and J. Sturrock. "EDI Cost Justification." *EDI World* (vol. 4, no. 8, August 1994):22.

[4] "Quick Response: What It Is; What It's Not." *Chain Store Age Executive* (March 1991):4B.

Develop an Implementation Plan

Although no one plan will work for every company, it is critical that organizations complete a thorough planning process supported by executive management before designing and implementing Quick Response programs. This planning process would identify the program steps that must be coordinated for successful implementation, ensure all steps share common goals and objectives, anticipate and prepare for changes within the organization, and determine the resources and strategies needed for implementation. As with any critical strategic plan, a significant amount of coordination is required to ensure that planning activities are integrated with all functional areas. Components of an implementation plan should include a vision statement, goals and objectives, and a game plan.

A *vision statement* would guide and direct the development, implementation, and continuation of the Quick Response program. An example of a vision statement might provide customers with what they want, when they want it, at the price they will pay, while maintaining minimum inventory levels.

Executive management should establish *goals and objectives* that they expect to meet through Quick Response. They should be guided by management with a good understanding of Quick Response in order to set realistic goals and objectives, yet challenge the organization to increase commitment to Quick Response.

The best programs are driven by a detailed *game plan* that crosses many functional areas within an organization as well as numerous trading partners. Components of this plan should include a communication strategy, as well as plans for merchandise and trading partners, operating guidelines, integrated systems, and human resources. Each component of the plan should have timetables and assignments of responsibility for completion, and should complement the overall Quick Response plan.

The successful implementation of Quick Response will require close communication and coordination with employees and trading partners. The communication plan will identify target audiences, communication messages, formats and standards, and media channels for reaching selected audiences.

Merchandise and trading partner plans would define new relationships with trading partners that should be documented in trading partner agreements. This also may result in preparing new performance and quality guidelines for trading partners as well as identifying the merchandise most suitable for a Quick Response strategy.

Operating guidelines will document process flows of Quick Response functional areas such as merchandising, distribution, warehousing, manufacturing, and accounting. Items to address include policies and procedures, workflows and activities, information flow, control points, and system requirements. During this process, shifts in work activities and the identification of new job functions would be identified that would assist in systems and human resource planning. In addition, cost reductions as well as improved efficiencies in getting goods through the merchandise pipeline may be identified.

A systems plan would be developed that focuses on an organization's strategy for implementing technologies that support Quick Response. This strategy would include a plan for systems integration and highlight deficiencies between business flows identified in the operating guidelines area and existing systems. It will help prioritize new systems and enhancements to existing applications.

Human resource plans will require coordination of all functional areas of an organization and should address the changes in job responsibilities and functions that result from the use of Quick Response. This would include identifying resource requirements, shifts in work activities, as well as the new job skills required. Education and training will become an important area as a result of new operating procedures, enhanced or new technologies, and new or realigned

jobs. Performance measurements, evaluations, and compensation policies and guidelines will need to be reviewed to ensure that they support the objectives of Quick Response.

As part of any good plan, there should be provisions for developing, monitoring, and controlling pilot programs to ensure that the desired results are obtained and problems are identified before full implementation. This would include developing and monitoring performance measures used during pilot testing and after full rollout.

Each component of the implementation plan should be controlled and coordinated in order to keep projects on schedule and identify any areas that require additional support.

Technology Considerations

As previously mentioned, Quick Response does not require that all enabling technologies be in place. However, utilizing any of the enabling technologies discussed in chapter 2, "Enabling Technologies for Quick Response," allows an organization to change the way business processes are currently performed, thereby improving profitability by more efficiently meeting the demands of the customer. Other considerations include developing an integrated systems plan to ensure that key operating and accounting systems communicate with each other, building a supportive systems infrastructure that provides for necessary technical expertise, and evaluating internal controls to ensure transactions are authorized and processed accurately.

Execution of Quick Response Plan

For Quick Response to work, all levels of management and nonmanagement must be supportive. This is best accomplished by a team effort in which key representatives from crossfunctional areas in an organization participate in the development, implementation, and monitoring of the plan. Completion of an implementation plan requires enormous effort and follow-through. No one plan works for every trading partner. The best plan provides detailed work plans that complement an integrated implementation plan and the objectives of Quick Response.

Testing and Control

It is critical that various technologies and key activities implemented with Quick Response be tested in pilot programs. Results from these tests would allow an organization to prove the benefits of Quick Response, establish measurable performance standards, and define and redefine the best approach for full implementation. For example, an organization would conduct a pilot program for processing a trading partner's purchase order using EDI before expanding to other business transactions or other trading partners.

Because of the many critical and complex components that are part of a Quick Response implementation, a thorough top-down planning process should be performed in order to develop the best strategies, utilize the most appropriate technologies, and support a positive corporate environment for successful implementation. In addition to utilizing the talents of its own employees, an organization will often require the expertise of consultants outside the organization. The following section discusses some of the consulting opportunities with Quick Response.

Chapter 6.   Quick Response Opportunities/Risks

Opportunities

Consulting opportunities associated with Quick Response are numerous. They are as far-reaching and compelling as the many components of Quick Response itself. These opportunities can range from assessing the impact this strategy would have on an organization's strategic plans to recommending training classes for specific Quick Response technologies. Other consulting opportunities may include developing a systems strategy, advising clients on the cost benefits of implementing various technologies, reengineering business processes to integrate with Quick Response, generating specific implementation plans, evaluating and recommending supportive hardware and software, planning for trading partner opportunities, and evaluating control risks and making recommendations to reduce these risks. Consulting opportunities can be culled from the material that appears in each section of this technology guide.

Risks

When it comes to implementing Quick Response, many organizations are constrained not by the concept, but by the effort. Quick Response requires change and lots of it. Without proper management and control, the barriers to change and many of the associated risks can become significant. Examples of these barriers and risks are discussed herein.

Failure to fully utilize the necessary management controls is a major risk. These controls, as noted in *Chain Store Age Executive*,[5] are key to success:

- Understanding and assessing the benefits to be gained with Quick Response
- Developing a plan for implementation
- Utilizing an effective communications strategy
- Breaking down functional barriers between departments
- Educating and retraining employees on new technologies such as Quick Response
- Promoting innovation to encourage continuous improvement
- Establishing a pilot program with trading partners in order to demonstrate the benefits
- Creating measurable standards or reward systems for performance
- Identifying the best plan for converting the entire company to Quick Response

An organization runs the risk that a trading partner will not share in the excitement of using this strategy, and that company could be potentially lost as a trading partner. On the other hand, the trading partner also runs the risk of losing business.

Quick Response relies on key enabling technologies. It is critical that the appropriate technologies be put in place in order to minimize risk. Without proper controls and management involvement, successful implementation of Quick Response would be virtually impossible.

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[5] "Ten Steps to Quick Response." *Chain Store Age Executive* (March 1991):16B.

EDI is a cornerstone technology for Quick Response. There are risks associated with this technology. In an article entitled "Developing Security for EDI," Robert Campbell[6] discussed the following EDI security issues.

■ Unauthorized disclosure of sensitive information could result in the loss of a competitive advantage.

■ Unauthorized modification of transaction contents could have a severe impact upon the trading partners.

■ Failure of a major EDI network could result in lost transactions and costly interruption of business.

■ Denial of transactions having taken place by impacted trading partners could cause entire business arrangements to collapse. The failure to establish trading partner agreements could expose companies to this risk.

With EDI becoming more prevalent and transactions more complex, the need for security becomes apparent. Security measures should maintain the confidentiality and integrity of the transaction, as well as provide assurance that transactions are transmitted without interruption and that the originator of the transactions cannot deny their existence. Campbell suggests a basic process for analyzing these security needs. First, analyze the security environment by gaining a fundamental understanding of the EDI operating environment. Second, analyze the information transmitted and define the kind of security needed to protect that information. Third, develop and implement the EDI security strategy.

EDI and other Quick Response technologies will influence the audit process and change the way auditors review business transactions. What was once a process of reviewing paper documents to substantiate account balances or test accounting controls are now paperless transactions. This technology can reduce the risk of errors due to manual input. However, it opens up other concerns relating to trading partners sharing accounting and operational information and allowing trading partners' computer systems to initiate business transactions for themselves. It raises questions regarding timing when a liability exists and when title passes in light of the fact that there is no paper trail. Therefore, computer applications will be more complex and require the auditor to gain a better understanding of the organization's internal control structure. This includes understanding computer system access controls for message authentication technology, such as digital signatures, and encryption technology, such as public key encryption. These controls are critical to provide assurance that all transactions are authorized and are processed accurately. The auditor may want to examine how an EDI transaction is evidenced in its flow through the trading partners' computer systems and any intermediary systems like a VAN. EDI requires the auditor to view application controls differently in order to detect errors that could cause material misstatements in financial statements. These controls are related to financial statement assertions of completeness, existence, valuation, and presentation. Completeness controls ensure that transactions contain all the necessary components when processed. Existence controls provide assurance that transactions were recorded in the appropriate accounting period and reflect the existence of assets and liabilities at the audit date. Valuation controls provide assurance that electronic invoices are received and recorded in general ledger accounts accurately. Refer to appendix A, "General EDI Checklist."

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[6] Campbell, R. "Developing Security for EDI." *EDI World* (vol. 3, no. 4, April 1993):40–45.

Controls to reduce the risk of undetected errors may have to be automated as an integral part of the applications. As EDI evolves, the primary way for management to control transactions could become the establishment of strong controls over the development and maintenance of the computer systems they depend upon. This means defining in greater detail their control functions during the initial system design, not retroactively. Once application controls are built into the computer application, they may become the primary means of protecting assets and assuring accurate financial reporting.

Appendix A. *General EDI Checklist*

I. Objective—Document the electronic data interchange (EDI) environment by taking the following steps.

   1. Determine the method of document exchange.
   2. Determine what documents are exchanged.
   3. Determine the method for translating documents from proprietary to standard format.
   4. Determine whether business units are involved in processing EDI transactions.
   5. Determine whether written agreements exist between the company and trading partners and EDI VANs.
   6. If an EDI VAN is used, document the services provided.

II. Objective—Determine the adequacy of general EDP controls by taking the following steps.

   1. Does a systems development life cycle methodology exist and is it followed?
   2. Are changes to the production data-processing environment controlled?
   3. Are EDI transmissions scheduled? Compare actual transmission times to schedules.
   4. Do the users and data processing have documented backup-recovery and contingency plans for EDI? Are they tested periodically?
   5. Do EDI file retention requirements exist and are they followed?
   6. Do physical controls (access and environmental) exist in data centers that process EDI?
   7. Are controls over communications adequate, including sign-on, password, callback, or other port protection?
   8. Is an access control software package used and does it cover EDI software and data? Is the implementation of such software adequate and does it include ID and password rules — violation monitoring, reporting, and follow-up?
   9. If appropriate, are EDI transactions encrypted to prevent unauthorized disclosure?
   10. Do EDI systems availability and reliability standards exist and are they met, both internally and externally?
   11. Are recognized EDI document format standards used and kept up-to-date?
   12. What mechanisms are in place to define trading partner relationships and how are they maintained?

III. Objective—Determine the adequacy of EDI input controls by taking the following steps.

1. Is adequate authorization required for input to the EDI systems?
2. Are input data edited for EDI standards, verification to trading partner files, etc.?
3. Are sequence numbers and batch totals assigned at input to help track transactions through the EDI systems?
4. Are rejected inputs sent to a pending file for subsequent follow-up? If so, do they receive timely resolution?
5. Is an audit trail of all input activity produced?

IV. Objective—Determine the adequacy of EDI authorization controls by taking the following steps.

1. Is authorization checked at each level of data hand-off, such as input, transmission, and reception?
2. Does authorization include identification and verification of the source of data, such as user ID and password?
3. If appropriate, are electronic signatures, such as Public Key used?

V. Objective—Determine the adequacy of EDI transmission controls by taking the following steps.

1. Do communication hardware and software contain transmission detection and correction functions?
2. Do transmission protocols use redundancy or parity checks for verification of data integrity and completeness?
3. Verify that transmissions only occur at scheduled times unless approved by the proper level of management.
4. If used, evaluate the adequacy of encryption and MAC algorithms and key management.

VI. Objective—Determine the adequacy of EDI processing controls by taking the following steps.

1. Is EDI data subjected to compliance tests for EDI standards, trading-partner relationships, and allowed transaction sets?
2. Are EDI transactions compared to a suspense file to validate legitimacy?
3. Are rejected EDI transactions removed from the processing flow? Are these resolved on a timely basis?
4. Is an audit trial produced of all EDI processing activity?

VII. Objective—Determine if the level of controls is sufficient to provide legal authenticity of EDI transactions by taking the following steps.

1. Are communications secured from unauthorized users?
2. If appropriate, is encryption or message authentication used and adequately administered?
3. Are traditional controls, such as sequence numbers, receipt acknowledgments and signatures used and adequately administered?

4. Are EDI transactions tested for reasonableness and consistency to previous data exchanged and business transactions?

5. Are there adequate controls for paper and electronic recordkeeping?

VIII. Objective—Determine if trading partner agreements adequately cover the legal requirements of the company by taking the following steps.

1. Are the definitions for *written* and *signature* detailed in the agreement?

2. Does the agreement specify the ability of subsequent EDI transactions to modify the agreement?

3. Are all terms and conditions detailed?

IX. Objective—Determine if third-party service agreements adequately cover the legal requirements of the company by taking the following steps.

1. Are audit requirements and rights specified?

2. Who is liable for loss and/or misuse of data?

3. Are all services to be provided listed?

4. What reliability and recoverability requirements are specified?

Appendix *B.*   *Spring 1993* InfoTech Update Abstracts

How Do You Ruin a Trading Partner Relationship? Just Dial, Dump & Pray

By Mark Eckman

Some very routine transactions between trading partners have hidden risks. A retailer submits an electronic data interchange (EDI) transaction to a manufacturer through a value-added network (VAN). If the manufacturer uses a different network, the network's interconnect should transfer the data from one VAN to the other. Do you have controls over the interconnect process, or do you dial, dump, and pray that it works? The delay resulting from a lost transaction could have catastrophic effects on the trading partner relationship.

Dial, dump, and pray typically controls interconnects, but divine intervention may not prevent the problems. As EDI eliminates human interaction, some compensating controls are prudent. The following are a few examples.

- Positive functional acknowledgment of new transactions and a procedure to recover missing transmissions
- Sequence numbers and time/date stamps strengthen the authentication and acknowledgment process
- Limit tests evaluating the reasonableness of values on critical codes, such as invoice amounts, extended prices, and quantities, to limit exposure to corrupted data
- Error logs that detail each problem situation, document the operation of controls, and provide a history of the problems encountered
- If practical, the specification of a common VAN to avoid interconnects
- Documentation of the controls in your trading partner agreement

A new data transmission standard to avoid interconnect problems, called Mailbag (see the following article on Mailbag) will soon be available for VANs to use as a control. Contact your VAN and ask them for details.

EDI Interconnect Controls—Does The Postman Always Ring Twice?

By Mark Eckman

Removing human intervention is one of the major benefits of electronic data interchange (EDI). Losing transactions between value-added networks (VANs) can eliminate this benefit. Manual controls can compensate, but require still more attention by the trading partners. A new tool to provide more control over interconnects is coming—it is called Mailbag.

Mailbag will provide an audit trail for interconnects by adding a unique pouch number to each transmission between VANs. Sequence numbers for each document, and a trailer record showing the number of records in the pouch, further identify missing documents.

Even with Mailbag, a need exists for internal controls at trading partner levels. VANs use the Mailbag controls, not trading partners. Consider adding controls to your process for functional acknowledgment, positive verification of transmissions, and follow up procedures to insure data integrity. Your VAN should specify procedures to correct bad transmissions using Mailbag. Ask your VAN to specify their procedures to ensure Mailbag works as intended.

Mailbag is a first step. Interconnect processing should improve as VANs adopt the standard, but data integrity remains the responsibility of the trading partners.

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