Chapter 5

Business-to-Business Strategies: From Electronic Data Interchange to Electronic Commerce

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Objectives

In this chapter, you will learn about:

- Strategies that businesses use to improve purchasing, logistics, and other support activities
- Electronic data interchange and how it works
- How businesses have moved some of their electronic data interchange operations to the Internet

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Objectives (continued)

- Supply chain management and how businesses are using Internet technologies to improve it

- Electronic marketplaces and portals that make purchase-sale negotiations easier and more efficient

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Purchasing, Logistics, and Support Activities

- Three major categories of e-commerce (Fig. 1-1):
  - Business-to-consumer (B2C)
  - Business-to-business (B2B)
  - Business processes that support selling and purchasing activities
- A business unit's processes can be described by its value chain (Fig. 1-9)
  - **Primary activities**: Purchase, logistics, design, manufacture, market, sell, after-sale service & support
  - **Support activities**: human resource, finance, administration, technology development
- The potential for cost reductions and business process improvements in purchasing, logistics and supporting activities is huge

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FIGURE 1-1   Elements of electronic commerce

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FIGURE 1-9   Value chain for a strategic business unit

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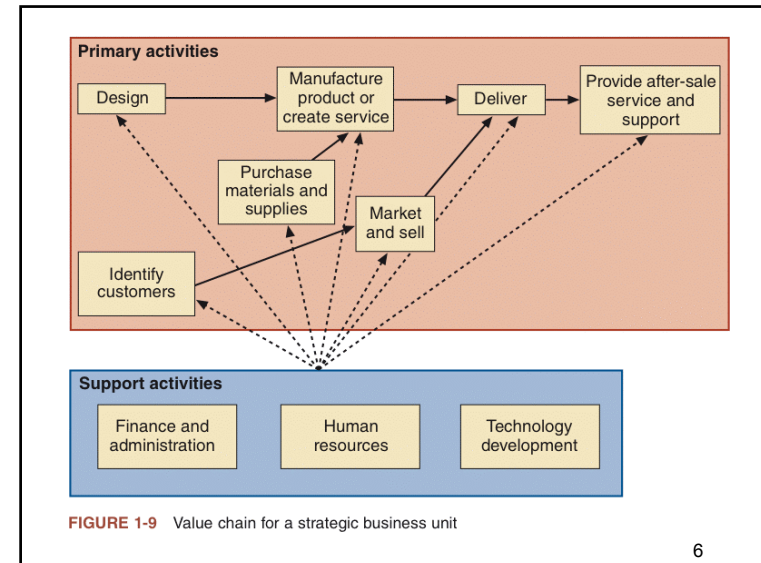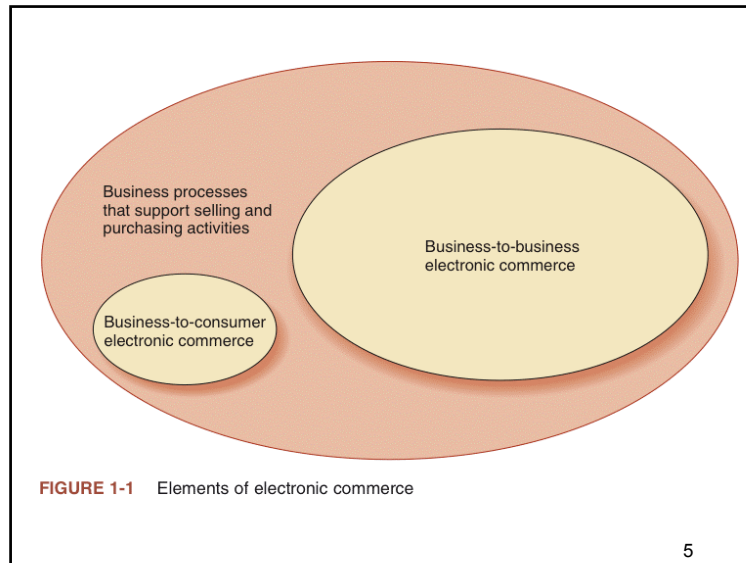
Purchasing, Logistics, and Support Activities

- Purchasing activities
  - Identifying vendors, evaluating vendors, selecting specific products, placing orders and other activities related to purchasing issues
- Supply chain
  - Part of an industry value chain (Fig. 1-10) that precedes a particular strategic business unit
  - Include all predecessors

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FIGURE 1-10   Industry value chain for a wooden chair

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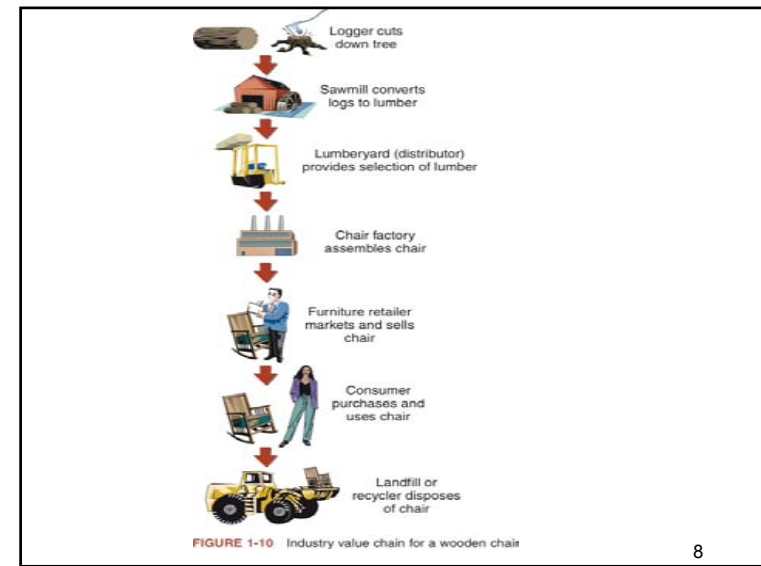
Purchasing, Logistics, and Support Activities (continued)

- Procurement
  - Referring to all purchasing activities plus the monitoring of all elements of purchase transactions – identify qualified customers, prepare them for bids, select the lowest bid, etc.,
  - Many companies have procurement departments
- Supply management
  - Term used to describe procurement activities and processes

Purchasing, Logistics, and Support Activities (continued)

- Sourcing
  - Procurement activities devoted to identifying suppliers and determining their qualifications
- E-procurement or e-sourcing
  - Use of Internet technologies in procurement and sourcing activities
  - Special B2B Web sites can be very useful
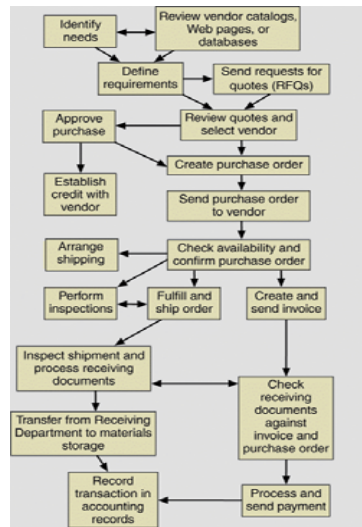- Business purchasing process is much more complex than most consumer purchasing process

FIGURE 5-1 Steps in a typical business purchase process

Direct vs. Indirect Materials Purchasing

- Direct materials
  - Materials that become part of the finished product in a manufacturing process (e.g. lumber $\rightarrow$ chair)
  - Large firms divide direct material buying into two parts
  - 1: Replenishment/contract purchasing
    - The company negotiates long-term contracts for most of the direct materials that it will need (at low price and good delivery term)
  - 2: Spot purchasing
    - Buying additional direct materials from the market
- Indirect materials
  - Other materials used to support the manufacturing of the products (e.g. tools, machineries, replacement parts, etc.)

Direct vs. Indirect Materials Purchasing

- Companies can purchase indirect materials from vendors' B2B Web sites
  - Save time and costs in processing orders
  - Online product information updated continuously
- E.g.:
  - http://www.grainger.com
  - http://www.mcmaster.com
  - http://www.staples.com/
    - B2C Web site
    - Offer business solutions to business procurement department

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Logistics Activities

- Logistics activities include management of
  - Inbound movements of materials and supplies
  - Outbound movements of finished goods and services
  - E.g. receiving, warehousing, controlling inventory, scheduling and controlling vehicles, distributing goods, …
- Objective of logistics
  - To provide the right goods in the right quantities in the right place at the right time
- Logistics management
  - Important support activity for both sales and purchasing activities
- The Web and Internet can help manage logistics activities to lower the costs and improve the efficiency
  - Schneider National (www.schneider.com) provides real-time shipping information and logistics services
  - Companies use Intranets to coordinate logistics activities

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Support Activities

- Support activities
  - Include categories of finance and administration, human resources, and technology development
  - Brooklyn College (https://portal.brooklyn.edu) uses the Web site and the intranet to manage its support activities
  - ABS (http://www.abs125.com/) help firms to manage their employees' benefit programs

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E-Government

- Use of electronic commerce by governments and government agencies to:
  - Perform functions for their stakeholders
  - Employ people, buy supplies from vendors, and distribute benefit payments
  - Collect taxes and fees from constituents
- E.g.
  - pay.gov   (Pay federal tax, license and other fees)
  - my.ca.gov (One site to access the services of all California state government agencies)
  - nyc.gov   (One site to access all NYC agencies)

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Electronic Data Interchange

- EDI is the direct transfer of business data between the computers of one or two businesses
- EDI-compatible firms are firms that exchange data in specific standard formats
  - Business information exchanged is often transaction data and other information related to the transaction
  - E.g. purchase orders, invoices, bills of lading, EFT…
- Most B2B electronic commerce is an adaptation of EDI or based on EDI principles
  - In 2002 the dollar amount of EDI transactions was three times the total amount of all other B2B electronic transactions

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Early Business Information Interchange Efforts

- 1950s
  - Companies began to use computers to store and process internal transaction records
  - Information flow between businesses continued to be printed on paper
- 1960s
  - Businesses began exchange transaction information on punched cards or magnetic tape
  - Advances in data communication technology allowed trading partners to transfer data over telephone lines
  - Different trading partners use different data formats
- 1968
  - A number of freight and shipping companies formed the Transportation Data Coordinating Committee (TDCC)
  - TDCC created a standardized information set for shipping and transportation industry

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Emergence of Broader EDI Standards

- American National Standards Institute (ANSI)
  - Has been the coordinating body for standards in the United States since 1918
  - Does not set standards itself
  - Has created a set of procedures for the development of national standards
  - Accredits committees that follow set procedures

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Emergence of Broader EDI Standards (continued)

- Accredited Standards Committee X12 (ASC X12)
  - Approved by ANSI to develop uniform cross-industry EDI standards in 1979
  - Includes information systems professionals from over 800 businesses and other organizations
  - ASC X12 standard includes specifications for several hundred transaction sets (Fig. 5-4)
- Transaction sets
  - Names of formats for specific business data interchanges
- Though X12 standards were adopted by U.S. businesses, companies in other countries continue to use their own national standards

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104 - Air Shipment Information
110 - Air Freight Details and Invoice
125 - Multilevel Railcar Load Details
151 - Electronic Filing of Tax Return Data Acknowledgement
170 - Revenue Receipts Statement
180 - Return Merchandise Authorization and Notification
204 - Motor Carrier Shipment Information
210 - Motor Carrier Freight Details and Invoice
213 - Motor Carrier Shipment Status Inquiryry
214 - Transportation Carrier Shipment Status Message
304 - Shipping Instructions
317 - Delivery/Pickup Order
325 - Consolidation of Goods in Container
350 - U.S. Customs Release Information
404 - Rail Carrier Shipment Information
410 - Rail Carrier Freight Details and Invoice
421 - Estimated Time of Arrival and Car Scheduling
440 - Shipment Weights
466 - Rate Request
511 - Requisition
810 - Invoice
812 - Credit/Debit Adjustment
813 - Electronic Filing of Tax Return Data
820 - Payment Order/Remittance Advice
828 - Debit Authorization

829 - Payment Cancellation Request
840 - Request for Quotation
841 - Specifications/Technical Information
842 - Nonconformance Report
843 - Response to Request for Quotation
846 - Inventory Inquiry/Advice
847 - Material Claim
850 - Purchase Order
853 - Routing and Carrier Instruction
854 - Shipment Delivery Discrepancy Information
855 - Purchase Order Acknowledgment
856 - Ship Notice/Manifest
857 - Shipment and Billing Notice
859 - Freight Invoice
860 - Purchase Order Change Request–Buyer Initiated
861 - Receiving Advice/Acceptance Certificate
865 - Purchase Order Change Acknowledgment/Request–Seller-Initiated
867 - Product Transfer and Resale Report
869 - Order Status Inquiry
870 - Order Status Report
879 - Price Change
893 - Item Information Request
920 - Loss or Damage Claim–General Commodities
924 - Loss or Damage Claim–Motor Vehicle
997 - Functional Acknowledgment
998 - Set Cancellation

FIGURE 5-4   Commonly used ASC X12 transaction sets

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Emergence of Broader EDI Standards (continued)

- 1987
  - United Nations published its international EDI standards under the title EDI for Administration, Commerce, and Transport (EDIFACT, or UN/EDIFACT) (See Fig. 5-5)
- Late 2000
  - Many EDI systems support both ASC X12, EDIFACT, and other standards
  - ASC X12 organization and UN/EDIFACT group agreed to develop one common set of international standards, however no date has been set to implement it

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AUTHOR - Authorization
BOPCUS - Balance of Payment Customer Transaction Report
BOPDIR - Direct Balance of Payment Declaration
BOPINF - Balance of Payment Information from Customer
COARRI - Container Discharge/Loading Report
COHAOR - Container Special Handling Order
CONAPW - Advice on Pending Works
CONDPV - Direct Payment Valuation
CONITT - Invitation to Tender
CONPVA - Payment Valuation
CONQVA - Quantity Valuation
COPRAR - Container Discharge/Loading Order
COREOR - Container Release Order
COSTCO - Container Stuffing/Stripping Confirmation
COSTOR - Container Stuffing/Stripping Order
CREADV - Credit Advice
CUSDEC - Customs Declaration
CUSRES - Customs Response
DEBADV - Debit Advice
DELFOR - Delivery Schedule

HANMOV - Cargo/Goods Handling and Movement
IFCSUM - Forwarding and Consolidation Summary

IFTCCA - Forwarding/Transport Shipment Charge Calculation
IFTDGN - Dangerous Goods Notification
IFTFCC - International Transport Freight Costs/Other Charges
IFTMAN - Arrival Notice
INVOIC - Invoice
INVRPT - Inventory Report
ORDCHG - Purchase Order Change Request
ORDERS - Purchase Order
ORDRSP - Purchase Order Response
PAXLST - Passenger List
PAYMUL - Multiple Payment Order
PAYORD - Payment Order
PRODEX - Product Exchange Reconciliation
QALITY - Quality Data
QUOTES - Quote
RECADV - Receiving Advice
REMADV - Remittance Advice
REQDOC - Request for Document
REQOTE - Request for Quote
SSREGW - Notification of Registration of a Worker
STATAC - Statement of Account
SUPRES - Supplier Response

FIGURE 5-5   Commonly used UN/EDIFACT transaction sets

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How EDI Works

- EDI
  - Though the idea is straightforward, its implementation can be complicated
- Example:
  - Consider a company that needs a replacement for one of its metal-cutting machines
  - Paper-based purchasing process
    - Buyer and vendor are not using intranet for internal business processes – information is printed on paper
    - Information transfer between buyer and vendor is also paper based and is delivered by mail, courier, or fax
  - EDI purchasing process
    - Flows of paper within the buyer and vendor is replaced by data communication networks
    - Mail service between the buyer and vendor is replaced by an EDI network

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FIGURE 5-6 Information flows in a paper-based purchasing process

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FIGURE 5-7 Information flows in an EDI purchasing process
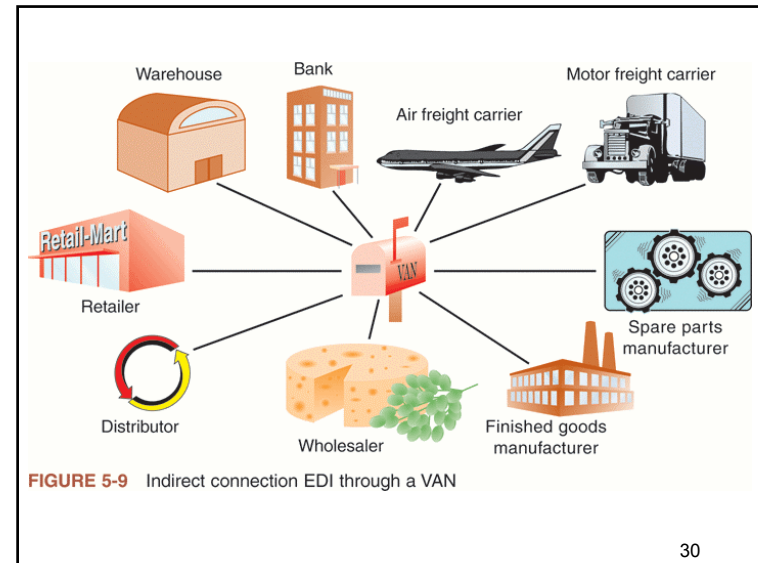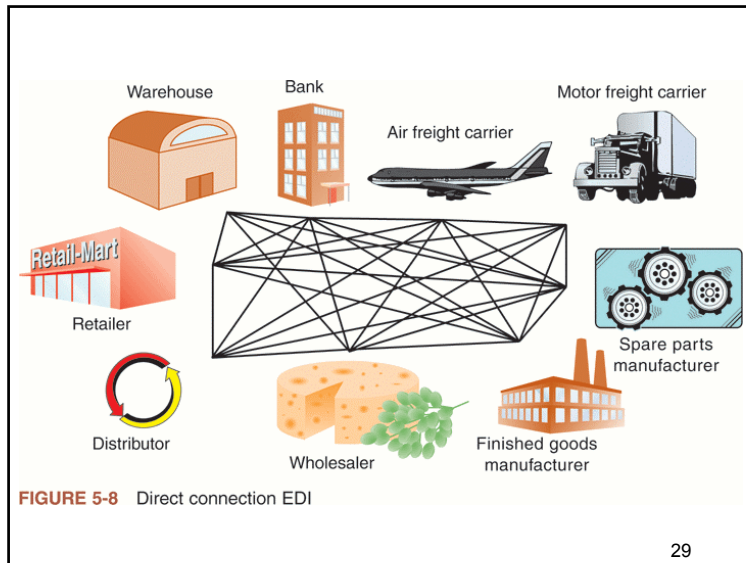
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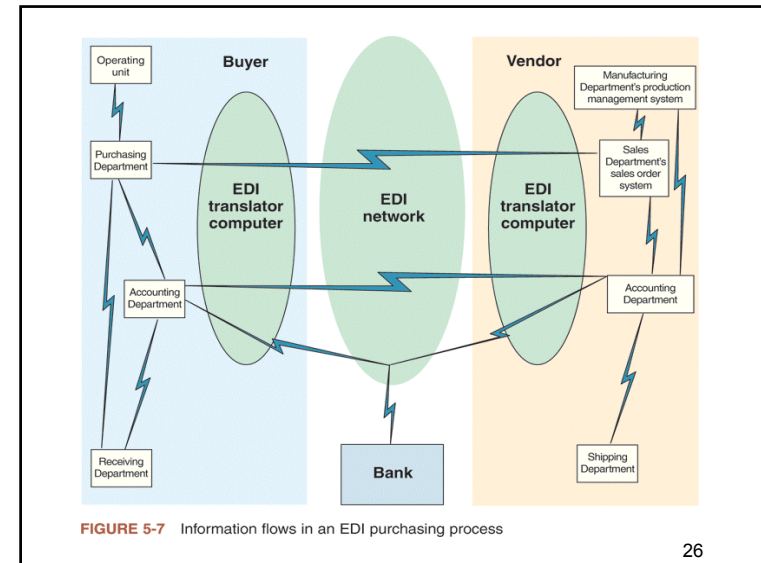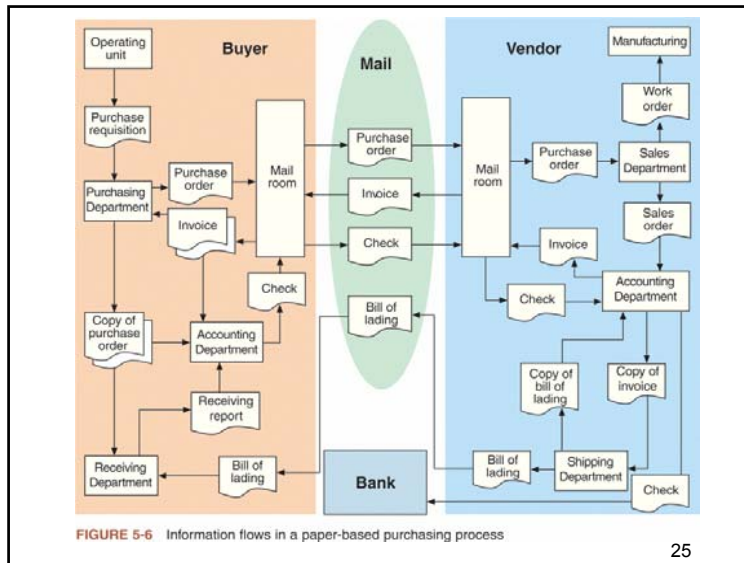
Value-Added Networks

- Business partners can implement their EDI networks using two approaches

- Direct connection EDI
  - Requires each business in the network to operate its own on-site EDI translator computer (Fig. 5-7)
  - EDI translator computers are connected directly to each other using modems and dial-up telephone lines or dedicated leased lines
    - Dial-up connection is cheap but slow
    - Dedicated leased line is expensive but fast
  - Become more expensive and complicated for businesses that must maintain connections with many partners

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Value-Added Networks

- Indirect connection EDI
  - Instead of connecting directly to each of its trading partners, a company can use the services of a value-added network (VAN) which is a company that provide communication capability to receive, store and forward EDI transaction set messages
    - VAN customer connects to the VAN and then forwards an EDI-formatted message to the VAN
    - VAN logs the message and delivers it to the trading partner's mailbox
    - Trading partner then connects to the VAN and retrieves its EDI-formatted messages
  - E.g.: DataTrans   (http://www.datatrans-inc.com)
    EC/EDI   (http://www.ecediinc.com/)

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FIGURE 5-8   Direct connection EDI

FIGURE 5-9   Indirect connection EDI through a VAN

Advantages of Using a VAN

- Users need to support only the VAN's one communications protocol

- The VAN:
  - Records message activity in an audit log which can be used to resolve disputes between trading partners
  - Can provide translation between different transaction sets used by trading partners (e.g. ASC X12 $\leftrightarrow$ UN/EDIFACT)
  - Can perform automatic compliance checking to ensure that data conform to the standards

Disadvantages of Using a VAN

- Cost
  - Besides transaction fees, most VANs require an enrollment fee and a monthly maintenance fee, which are unjustifiable for trading partners with few transactions
  - The up-front cost of implementing EDI, including hardware, software, and VAN enrollment fee, is high (e.g. > $20,000)

- Using VANs can become cumbersome and expensive for companies that want to do business with a number of trading partners, each using different VANs

EDI on the Internet

- Trading partners use Internet, instead of the expensive lease lines and dial-up connections, to exchange data (email, ftp, http, etc.)
- Simple and affordable (Internet is free)
- Initial roadblocks to conducting EDI over the Internet included:
  - Concerns about security
  - The Internet's inability to provide audit logs and third-party verification of message transmission and delivery
- Nonrepudiation
  - Ability to establish that a particular transaction actually occurred
  - It prevents either party from denying the validity of a transaction

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Open Architecture of the Internet

- Internet EDI or Web EDI
  - EDI on the Internet
- Open architecture of the Internet allows trading partners unlimited opportunities for customizing information interchanges (e.g. data encryption , digital signature, return receipt)
- New tools such as XML help trading partners be even more flexible in exchanging detailed information
  - Information on many e-commerce Web sites are represented using XML (eXtensible Markup Language)

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Financial EDI

- Financial EDI (FEDI) is the computer-to-computer exchange of payment and payment-related information between companies using a standard format.
  - It is different from regular EDI in that, to move a payment, one or more banks must be involved
  - E.g. electronic fund transfer (EFT)
- Automated clearing house (ACH) system
  - A secure payment transfer system that connects U.S. financial institutions
  - Handles and processes electronic payment transfers between banks (e.g. automatic payroll deposits, debit card purchases, etc)
- EDI-capable banks
  - Banks that are equipped to exchange payment and remittance data (FEDI) through VANs

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Financial EDI (continued)

- Value-added banks (VABs)

  - EDI-capable banks that also offer VAN services for nonfinancial transactions

- Financial VANs (FVANs)

  - Nonbank VANs that can translate financial transaction sets into ACH formats and transmit them to banks that are not EDI capable

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Supply Chain Management Using Internet Technologies

- Supply chain management
  - Companies form strategic alliances with companies in the supply chains to reduce the costs of products and services
  - Includes the planning and management of all activities involved in supply management (sourcing, procurement, conversion, etc.) and logistics management activities
  - Also includes coordination and collaboration with multiple participants (suppliers, intermediaries, third-party service providers, etc.) in a particular product's supply chain
  - Used to achieve a higher-quality or lower-cost product at the end of the supply chain
- Tier one suppliers
  - A small number of very capable suppliers with which companies have established long-term relationships

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Supply Chain Management Using Internet Technologies (continued)

- Tier two suppliers
  - A large number of suppliers with which tier one suppliers have developed long-term relationship
- Tier three suppliers
  - Next level of suppliers that provide tier two suppliers with components and raw materials
- Supply alliances
  - Long-term relationships created among participants in the supply chain

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Supply Chain Management Using Internet Technologies (continued)

- Key element of successful supply chain management
  - Clear communications up and down the supply chain and quick responses to those communications keep all participants informed and updated
  - Each participant can then plot a strategy to respond to the changes to meet the ultimate consumer demands
  - Internet technologies (EDI & software) enhance the communications and responses effectively (Fig. 5-10)
- Major disadvantage of using Internet technologies in supply chain management is the cost of the technologies
  - The advantages provide value that greatly exceeds the cost

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Suppliers can:

- Share information about customer demand fluctuations
- Receive rapid notification of product design changes and adjustments
- Provide specifications and drawings more efficiently
- Increase the speed of processing transactions
- Reduce the cost of handling transactions
- Reduce errors in entering transaction data
- Share information about defect rates and types

FIGURE 5-10 Advantages of using Internet technologies in supply chain management

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Building and Maintaining Trust in the Supply Chain

- Major issue that most companies must deal with in forming supply chain alliances is developing trust
  - Firms are not used to disclosing operating information to others, because it may place them in a competitive disadvantage
- Key elements for building trust include continual communication and information sharing
  - Doing business with the same vendors over years
  - Send representative to interact with buyers frequently

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Electronic Marketplaces

- Five major forms of B2B electronic marketplaces
- Vertical portals (vortals)
  - B2B Web sites that provide gateways or portals to information related to a particular industry such as health care, insurance, automobiles, food, etc.
  - Offer marketplaces and auctions for companies in the industry to contact each other and transact business
  - A vertical industry is focused on providing goods and services for one industry
  - A term that might also be used is *interest community Web site*

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Independent Industry Marketplaces

- Vertical portals for trading exchanges on a particular industry run by independent operators
  - E.g. http://www.chemconnect.com/ for chemicals market
- Known by various names that highlighted different elements of their collective nature
  - Industry marketplaces
    - Focused on a single industry
  - Independent exchanges
    - Not controlled by a company that was an established buyer or seller in the industry
  - Public marketplaces
    - Open to new buyers and sellers just entering the industry

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FIGURE 5-13 ChemConnect home page

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Private Stores and Customer Portals

- Private store
  - Established companies sell supplies on their own Web sites to compete with independent industry marketplaces
    - E.g. Cisco and Dell offer private stores for their major customers within their selling Web sites
  - Has a password-protected entrance
  - Offers negotiated price reductions on a limited selection of products
- Customer portal sites
  - Offer private stores along with additional services (e.g. part # cross-referencing, safety information, product usage guidelines, …)
  - E.g. Grainger (http://www.grainger.com)

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Private Company Marketplaces

- E-procurement software
  - Allows a company to manage its purchasing function through a Web interface
  - Automates many of the steps of business procurement operations (Fig. 5-1)
  - Recent release include marketplace functions (request for quote postings, auctions, …)
- Private company marketplace
  - Web site that provides auctions, request for quote postings, and other features
  - Requires marketplace software
  - Used by large companies to compete with industry marketplaces
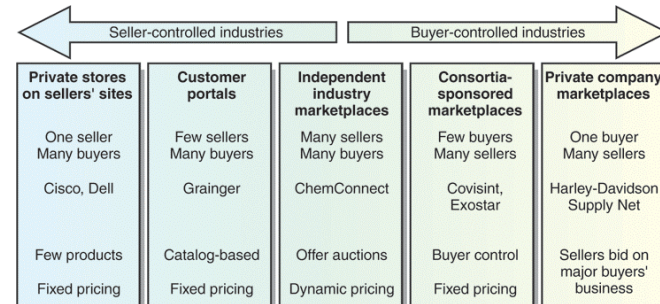 - Large companies usually require their suppliers to bid on their private company marketplaces

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Industry Consortia-Sponsored Marketplaces

- Formed by several large buyers in a particular industry
  - These companies do not have enough power to force suppliers to deal with them through a private company marketplace
- Covisint
  - Created in 2000 by a consortium of DaimlerChrysler, Ford, and General Motors
  - Several thousand auto industry suppliers belong to Covisint
- Avendra
  - Created by a consortium of Marriott, Hyatt, and three other major hotel chains in the hotel industry

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Characteristics of five general forms of marketplaces in B2B e-commerce

	Seller-controlled industries		Buyer-controlled industries	
Private stores on sellers' sites	**Customer portals**	**Independent industry marketplaces**	**Consortia-sponsored marketplaces**	**Private company marketplaces**
One seller Many buyers	Few sellers Many buyers	Many sellers Many buyers	Few buyers Many sellers	One buyer Many sellers
Cisco, Dell	Grainger	ChemConnect	Covisint, Exostar	Harley-Davidson Supply Net
Few products	Catalog-based	Offer auctions	Buyer control	Sellers bid on major buyers' business
Fixed pricing	Fixed pricing	Dynamic pricing	Fixed pricing	

Adapted from: Raisch, W. 2001. *The eMarketplace*, p. 225.

FIGURE 5-14 Characteristics of B2B marketplaces

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Summary

- Companies are using Internet and Web technologies to improve their purchasing and logistics primary activities
- EDI
  - First developed by freight companies to reduce the paperwork burden
- Internet
  - Now providing the inexpensive communications channel that EDI lacked

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Summary (continued)

- Supply chain management
  - Incorporates several elements that can be implemented and enhanced through the use of the Internet and the Web
- Five models for B2B electronic commerce
  - Independent industry marketplaces
  - Private stores, customer portals
  - Private marketplaces
  - Industry consortia-sponsored marketplaces

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