**ITM 350 Notes: Concepts of eBusiness**

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Lecture 1: Jan 12

Intro

Business – an entity providing product/service in exchange for money

Ebusiness – utilizing technology to sustain itself

eCommerce – financial transaction (commercial activity)

internet – infrastructure of hardware/software people use to make things happen

wordwideweb – an application

- Factors such as mobility, social media and cloud computing have introduced new ways to conduct business electronically.
- banks and internet banking; airlines and online reservations, Sears, Napster etc

Contributed to growth of internet

- mobility, social media, cloud computing

eBusiness

- any business carried out in electronic form.
- the strategic use of technology, particularly the internet, to integrate and streamline the business processes, enterprise applications and organizational structure of a business to create a high-performance business model.
- creation of new market channels and wider markets forming the foundation for ebusiness.

**electronic data interchange**: This is a form of ebusiness and has been around for a long time.

- (EDI): A structured way of creating electronic "forms" that can be transmitted between trading partners to execute business transactions without the need to generate any paper.

Foundations of eBusiness

- The internet and ebusiness are causing changes to **Business Models**.
- Business models define "how" companies do business and make money.

- Ebusiness models are impacted by
  - Speed
    - The use of technology has changed the expectations of people regarding the time it takes to satisfy their needs.
    - Expect fast turnarounds for requests when technology is involved
  - Convenience
    - Online banking, don't need to go to branch
    - cutting their infrastructure costs, increasing their technology costs, adding new sources of revenue and making old sources of revenue obsolete.
  - Customization
    - Using internet together with integrated systems allows businesses to provide more customized products and services.
    - Ex. Customizable Dell computers
  - Redefinition of product value
    - The ability of the internet to convey a variety of information, services, and other features has led to redefinitions of the "product" and "service".
    - When Amazon offers books online, it includes information about the book, related reviews, sales ranking, related books and other information
  - Media flexibility
    - The incredible capacity of the internet to grow and change and to convey a variety of content (particularly multimedia such as voice, video and music) means that business is continually challenged to offer new features and services to customers before customers demand them.
    - This leads to changing product package content and consequently changing business models.
    - Ebusiness models change constantly and often need review to keep pace with fast-moving times.

eBusiness Strategy

- Changes and pressure on business models led to new ebusiness strategies

- Business strategies define how businesses plan to achieve their desired business model.
- Successful ebusiness strategies require consideration of the **essential structure of ebusiness.**

Structure of eBusiness

Front-office applications

- Customer Relationship Management (CRM)
  - the set of strategies, technologies and processes that enable the business to continuously improve offerings to customers
    - Attracting…and keeping
    - User authentication
    - Catalog display
    - Availability
    - Price comparison
    - Order taking
    - Credit check

Back-office applications

- eProcurement
  - The complete business process of acquiring goods and services through electronic means, from requisition through fulfillment and payment.
    - Sourcing (finding, pricing, ordering, inbound logistics/receiving, paying)
    - Outbound logistics/delivery
    - Billing
    - Collection
    - Post-delivery service

Systems Integration

- To make ebusiness work, it is important to **integrate the systems** of the business and streamline value chains.
- Systems integration is the bringing together of various business systems having different technologies, functions and platforms so they can conduct business processes in such a way that the user does not see that different systems are being used.
- Tools:
    - Intranets: Computer networks within an enterprise that make use of internet technology.
    - Extranets: Computer networks that make use of internet technology and include users from outside the organization as well as inside.
    - Hypertext Markup Language (HTML):The programming language used to create webpages
    - Extensible markup language: A tool that is similar to HTML and is compatible, but does not rely on single pre-set tags to identify information.
    - Firewalls: Separate, highly secure computers, along with related policies and procedures, through which access to the network from the internet is exclusively directed.
    - World Wide Web: The user-friendly, graphics-capable component of the internet.
- The **tools** integrate buy and sell sides and enable business intelligence:
    - Buy side: the purchasing end of the supply chain, which consists of suppliers and the processes that connect them.
    - Sell side: the selling end of the supply chain, which consists of customers and the processes that connect them.
    - Business Intelligence (BI): A powerful application or set of application(s) that allows businesses to capture, analyze, interpret and report on data across an enterprise, thus creating valuable information for the enterprise.

Domains of eBusiness

- Business to Consumer (B2C)

- Examples include Amazon, selling books online; E*TRADE Financial and Charles Schwab selling investments online.
- Banks began to offer Automated Teller Machines (ATMs) in the early 1970s.

- Business to Business (B2B)
  - Relies on streamlining of **supply chains** which is the set of processes that encompasses purchases of raw materials or resources through to final delivery of a product or service to the end consumer.
  - Bank to Bank interactions.

- Government to Business (G2B) and Business to Government (B2G)
  - Electronic filing of taxes online with Canada revenue Agency
  - Canada's federal government's "Government On-Line (GOL) initiative".

Benefits of eBusiness

- Increasing sales
  - The internet represents a sales channel that augments traditional channels.

- Reducing costs
  - Ebusiness has the ability to move input processes from staff to customers and outside users, as well as from the reduced necessity to produce, handle and store paper documents.
  - The internet offers a communications platform that is largely cost-free to all users.

- Improving customer service
  - A company's website is an important vehicle for customers and prospective customers to obtain information about the company, its products and its people.
  - A website can provide information for finding business, including directions or maps to store locations, bank branches, and so on.
  - Product demonstrations, such as those at websites devoted to automobiles that provide details and working demos of particular models.

- Responding to competitive pressure

- Some companies use the internet create to compete, especially the creation of an image.

- Expanding Market Reach
  - The internet offers businesses the opportunity to reach people all around the world.
  - Some companies have used the internet to establish a global market for their products.

The Challenges of eBusiness

- Privacy and Security
  - Canadian Privacy Legislation e.g. PIPEDA
    - Personal information protection and delectronic documents act
- Security and Payment Systems
  - Encryption
    - An algorithm applied to electronic data to render it illegible to anyone w/o the decoding key
  - It was previously very difficult and unsafe to pay for items online
    - PayPal
    - Smart cards

**Lecture 2: Jan 19 – Chapter 2: Internet Business Models and Strategies**

- business model: the manner in which a business organizes itself to achieve its objectives which normally involve the generation of profits
  - general description of how a business structures its activities to earn profits, while term “strategy” focuses on its specific choices in that set of activities that are aimed at giving the entity a unique position in its industry and thereby, a competitive advantage
- internet business model: the manner in which a business uses the internet to support, amplify or develop its overall business model, an integral part of a business’ strategy
- ebusiness strategy: sum of all choices that a business makes to offer unique value to its customers that differentiates its business model from those of its competitors
- Michael porter recommends competing on quality, features, and service

- Changing environments, business focus on service or, hire ppl w/ skills and sold time and skills to clients

Business model

- External forces
  - Political, economic, social, technological factors/pressures/forces
  - Creates opportunities/threaten business objectives
- Markets and forces
  - domains in which entity may choose to operate, design and location of facilities
- Customers
  - Includes individuals and organizations that purchase the entity's output
  - B2C, B2B, B2E, G2C, G2B
- Core business processes
  - Internet presence
  - "bricks vs clicks"
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**Figure 2.2** Continuum of internet business models

Internet business models range from "bricks" to "clicks," with many variations between these two endpoints, even within the same product or service sector.



  - Continuum of internet business models
    - Internet business models range from "bricks" to "clicks," with many variations b/w two endpoints, even w/in same product/service sector
- Core products and services (11 revenue models)
  - Merchant model
    - Sales of non-digital and digital products
    - Could be pure-play e-tailer (apple itunes) or surf-and-turf site (sears)

- Direct sales by manufacturer model
  - Per unit or volume price
  - Product manufacturers sell products online to customers directly
- Manufacturer service model: indirect revenue
  - Use web to provide customer service support for their products
- Subscription model
  - Have users to subscribe to their site, w/ monthly fee
- Utility model: service fee
  - Pay as you go/ on demand
- Infomediary model
  - Sites that build on economic value of information about ppl's purchasing habits are referred to as infomediaries
  - Offer something free to users and in return ask for user information
- Licensing model
  - Often applied to long-lived intellectual property such as software
  - Customer pays one-time licensing fee to use software
- Advertising model
  - Site makes it profit from advertising content or messages
- Affiliate model
  - Payment of commissions to sites hosting banner ads when sales are made to customers using them to enter the site
  - A way of building sales by organizations that own banner ads
- Community model
  - Depend on user loyalty and community identification for their viability
- Brokerage model
  - Brokers bring buyers and sellers together and facilitate transactions

- Alliances
  - Emphasizes importance of various types of relationships, networking benefits or partnerships, alliances, other collaborative associations
  - Leverage their resources and competencies to create competitive advantage

- Relationships established by an entity to attain business objectives, expand business opportunities, and reduce or transfer business risk

- Resource management processes
  - The processes by which resources are acquired, developed, and allocated to the core business activities
- Strategic management process
  - The process by which the entity's mission is developed, its business objectives are defined, business risks that threaten attainment of the business objectvies are identified, bsiness risk management processes are established, and progress toward meeting business objectives is monitored

Internet business models and business strategy

- Business models can be combined in various ways to achieve business goals
- Specific model/combination of models that a business uses helps to define its internet or ebusiness strategy
- Ebusiness strategy defines organization's value proposition which differentiates it's business offerings from those of its competitors
- It is vital that organizations fit their ebusiness strategy into the corporate strategy in order to achieve success

Fitting the ebusiness strategy into the corporate strategy

- Strategic planning exercises involve developing a broad vision, considering constraints and assumptions that guide the vision, and defining strategic objectives for the business
- Strategic plans would often address 5 key areas:
  - Arenas where the entity will be active e.g. markets, products etc.
  - Vehicles for moving towards goal achievement e.g. acquisitions
  - Differentiators that represent competitive advantages e.g. image
  - Staging the speed and sequence of moves e.g. expansion speed
  - Economic logic for obtaining returns on investment e.g. low cost producer.

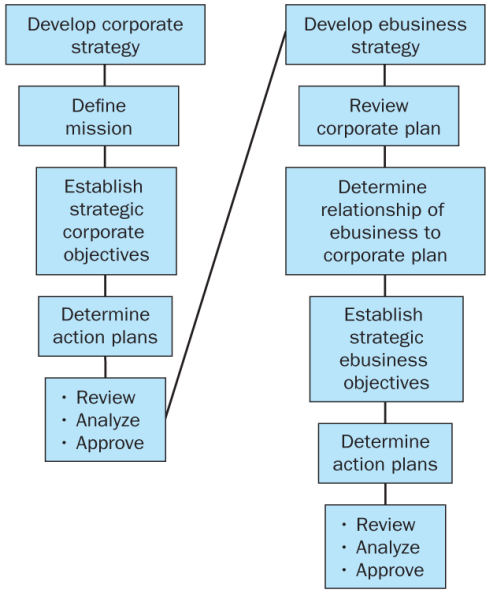


**Figure 2.4** The strategic planning process

Strategic planning for ebusiness must fit with the strategic planning for an enterprise as a whole.



- Ebusiness strategy planning must be consistent with the organization's IT strategy and overall corporate strategy.
- Ebusiness planning involves:
    - Defining how ebusiness can help achieve the firm's overall objectives.
    - Assessing gaps between current IT resources and performance capabilities and desired strategic objectives.
    - Formulating strategies to fill gaps e.g. (1) competitive, (2) defensive and (3) cooperative strategies
    - Performing a risk assessment to identify weaknesses and controls
    - Defining IT policies, infrastructures, applications and processes
    - Defining a tactical plan
    - Measuring ebusiness performance

**Lecture 3: Jan 26**

Chapter 3: Evolution and Applications of the Internet

- The Internet is the world's largest communications network, connecting millions of computers from more than 100 countries.

- The Internet links people and organizations large and small in every corner of the world.
    - It connects uniquely numbered computing devices that relay information from point to point using the **Internet Protocol (IP)**.
    - The **IP** is a protocol that uses a set of rules to send and receive messages at the internet address level.
    - The most common protocol used in addition to **IP** is the **Transmission Control Protocol (TCP)**. TCP is a protocol that uses a set of rules to exchange messages with other internet points at the data packet level. It ensures reliable, flow-controlled data packet delivery.
- The internet reduces barrier to competition created by space, time and information asymmetries
- The Internet has the capacity to bring vast networks of users together and permit interactive communications between senders and receivers, allowing for personalization of communication and marketing of information.
- The Internet has well defined structure and governance process.

Internet Technologies and Applicatins

- Electronic Mail
    - Uses the Simple Mail Transfer Protocol (SMTP), Post Office Protocol version 3 (POP3), IMAP (a superset of POP3) and Multipurpose Internet Mail Extensions (MIME) which supports binary attachments and rich file types.
- World Wide Web
    - A form of a client-server network, connecting web clients to web servers. Versions include web 2.0 and web 3.0.

Client-Server Network

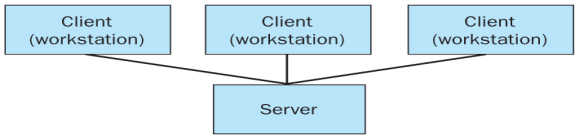


**Figure 3.2** Client-server network
A client-server network can be analysed in terms of clients and servers.


Overview of the World Wide Web Network

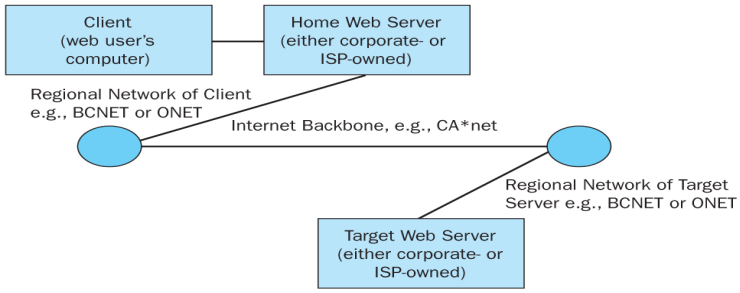


**Figure 3.3** Overview of the World Wide Web network

This figure specifies some of the major characteristics of the World Wide Web as a client-server network.



Internet Technologies and Applications

- Hypertext mark up Language (HTML)
  - A specialized coding language that is used to encode content so it can displayed in a web browser, using a source code, which is a format in which a program is written that can be read by humans and that is then converted into a different format that the computer can recognize.
  - A web browser is a software with a user-friendly, graphics-capable interface that enables users to connect to and navigate websites on the internet.
- Hypertext Transfer Protocol (HTTP)
  - A set of rules used in exchanging files (such as text, graphics, sound and video) for display on the world wide web.
- Extensible Mark up language (XML)
  - A mark up language similar to HTML in that they both contain symbols to describe the contents of a page or file; but while HTML describes the content only in terms of how it is to be displayed and interacted with, XML describes the content in terms of what data is being included.
- Common Gateway Interface
  - This is a method used by a web server to pass a user's request that has come over the internet to an application. It also receives data from the application that can be sent back to the user.
- Website Design
  - The key components of the web are the websites that contain the content that users seek to access.

Key Quality Indicators of a website include:

- Reputation/Recognition

- Access speed
- Content
- Simple page layout
- Navigability
- Ecommerce capabilities
- Shopper friendliness
- Service orientation
- Customization/personalization features
- Connectivity to other users and relevant sites
- Community
- Global perspective
- Effective fulfillment capabilities
- Trust indicators

Intranets

- A network that is internal to an organization and uses internet technology.
- Intranets initially conveyed messages to employees that was otherwise printed.
- Now used by employees to input messages into corporate applications
- Intranets also now support and facilitate ebusiness enabling employees to work from outside their offices, or in client offices and collaborate with management and important constituents.

Extranets

- Networks that are available to users inside and outside of a company and use internet technology.
- Extranets connect outside parties such as suppliers and customers, and are used to streamline supply chains
- Used to place purchase orders by suppliers
- Used to deal with inquiries about product availability, delivery times and customer concerns
- Used to implement vendor managed inventory applications.

- Help to reduce costs, improve timing of business applications and foster key business relationships.

Virtual Private Networks (VPN)

- A VPN is a secure and encrypted connection between two points across the internet.
- VPNs transfer information by encrypting the data in IP packets and sending the packets over the internet by a process called Tunnelling.
    - Tunnelling is a process under which data packets are transmitted over the internet by including an additional header that establishes its route through the internet
- VPNs are used to develop extranets making the internet a more viable business system.
- Evolving technologies and applications.
    - Voice Over Internet protocol (VOIP)
        - A set of protocols for carrying voice signals/telephone calls over the internet
    - Blogs (or web logs)
        - Websites maintained by individuals or a group to provide an ongoing stream of information about personal experiences, opinions, or some specific topic of interest. E.g. www.myblog.com
    - Wikis
        - A group-editable webpage. Can enhance collaboration on projects involving knowledge management.
    - Mashups
        - A website or application that combines content from simple existing web services to create a new service. E.g. www.housingmaps.com
    - Social Networking Services
        - A loosely linked community of individuals with some common interest. E.g. www.facebook.com
    - The Semantic web
        - A version of today's web that will enable the technology to understand and process human language.

**Ch 4: Enterprise-Wide and Inter-Enteprise Systems**

- Enterprise-wide systems
    - Any information systems used throughout an enterprise with the intention of enabling a consistent type of functionality as well as enterprise-wide access to the same data

- Designed to have everyone on the same page in the organization regarding access to information

- Enterprise-wide systems can be purchased as one major piece or by linking together multiple disparate systems using **Middleware** and **XML** tools. Middleware permits ERP systems to share data with **legacy systems**.
- Middleware
  - A general term for any software or programming that serves to link together or communicate between two separate and different programs
- Legacy system
  - An old, usually outdated application that has not yet been replaced or upgraded

ERP Systems

- ERP systems overcome the traditional functional 'silos' that have historically inhibited the free flow of information in enterprises.
- ERP systems are large, have a comprehensive set of functionalities and use centralized databases to hold the data of an organization for personnel access and use

Y2K

- Due to the Y2K bug, many organizations implemented ERP systems which required massive business analysis or **business process reengineering (BPR)**.
  - BPR is a fundamental rethinking and radical redesign of existing business processes to add value or prepare for new technologies
- "atomic bomb"
- ERP vendors include: Oracle, SAP and Microsoft
  - ERP systems are modular in nature e.g. financial accounting, sales and distribution modules etc.

Characteristics of ERP Systems

- ERP systems are client-server systems built on relational database systems
  - Client-server systems
    - A network of configuration that evolved from networks built around central computers (servers) to provide computing power to the users on their own desktop computers (clients).
- Client Server Systems
  - There are various forms of client-server systems differentiated based on strategic objectives.

- Client servers systems are defined based on the three elements of an information system: data, processing (applications) and output (display).
- The strategic forms of client server-systems are derived from the idea that these three system elements can be distributed between the client and the server in several ways.
- The processing element can be distributed to the clients giving rise to a *distributed processing system*.
- If the system simply has servers and clients, then they are referred to as: *two-tier client-server systems*.
- When the applications are distributed to servers dedicated to applications (i.e. when the processing is done), the system is referred to as a *three-tier client-server system*.
- If the data are distributed to the clients, this is called a distributed data client-server system.

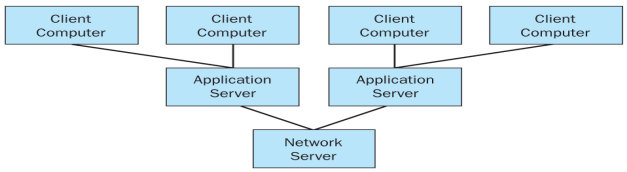


**Figure 4.3** Three-tier client-server system
This graphic shows the basic structure of a three-tier client-server system, with the clients in the top row, the application servers in the middle row, and the network server in the bottom row.



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Characteristics of ERP Systems

- Relational database systems
  - A logical database model that relates data in different tables within the database by sharing a common data element (or field) between them. The common data element can serve as a reference point in the tables to other data elements in a data record.
- Packaged Software
  - Commonly known as COTS (commercial-off-the-shelf software) is bought off the shelf, installed and operated.
  - ERP systems are a form of packaged software which is very different from that developed in-house.
- Business Process Reengineering (BPR)
  - BPR is one of the characteristics of ERP systems in a broad sense, because all ERP systems require so many changes in business processes that BPR is needed to fit the software into the business or, more correctly to fit the business into the software.

- Recently there has been a strong movement to extend the distributed client-server model to the internet through web-enabled applications. E.g. mySAP extends the capabilities of ERP to the internet; Oracle E-Business Suite.
- Due to the relational database model, ERP systems provide massive storage and easy access to information through the internet.

Implementing ERP

- There are so many failure stories associated with ERP implementation e.g. Hershey's SAP implementation: www.hershey.com. Hershey's case was a classic **systems sizing** issue.
  - Systems sizing is the process of ascertaining the volume and processing requirements that will be placed on a new information system, and thereby determining the size of system required, including hardware and software.
- Hershey also has issues with **stress testing**.
  - Stress testing is a process of high-volume entry, processing and output of test data designed to determine whether the system has the capacity to handle the volumes that will be required of it.
- Another issue faced by this company was Training. Hershey presumably underestimated the amount training required and staff were unable to cope. Training is a critical success factor for systems implementation.

Integrating ERP

- can be challenging. A major challenge arises when the enterprise's business processes need to be modified to fit the processes built into the ERP system.
- A "best of breed" approach is a good way to achieve integration.
  - Enhances possibility of attaining a good fit b/w business processes and software, requiring less business process change
  - Choosing the best fit for particular functionality
  - However more time is spent on implementation
- Middleware (and Enterprise Application Integration software) and XML are useful for integration as well.
  - Links applications together
  - But is not software that imports/exports information
    - The use of middleware b/w applications like accounting and spreadsheets is seamless (not seen by user), data moves as though it were still in the same application

Steps in ERP implementation

- Phase 1: Definition

- Set up, organize, plan, document, define, develop

- Phase 2: Operations Analysis
  - Collect information, requirements, develop and refine and prototype processes
- Phase 3: Solution Design
  - Develop detailed documentation, specify config options, custom extensions, address changes
- Phase 4: Build
  - Code, test, create, execute, integrate
- Phase 5: Transition
  - Data conversion, final training, final product readiness check
- Phase 6: Production
  - Fine tune, begin regular maintenance, provide ongoing support

Collaborative and Inter-Enterprise Systems

- Collaborative systems are information systems that interact between enterprises to enable them to work together on common business initiatives and ventures.
- Useful for collaborating with customers, suppliers, personnel and competitors. Examples:
  - Cisco's web tool for collaborating with customers.
  - Ford Motor company's collaborative techniques for product design
  - The use of Lotus Notes to enable personnel on projects by Consultants in Toronto, Halifax and Vancouver
  - Covisint's trading exchanges as a form of collaboration with competitors.

- Managing collaborative systems is through outsourcing arrangements. The management process depends on systems owners, and agreement issues

**Lec 4 (Feb 2)**

**Ch 5: Security and Controls**

- Every information system face risks of error, fraud, malicious acts or disaster.
  - Risk is the probability of an event occurring that leads to undesirable consequences.
  - Error refers to an unintentional act or omission that leads to undesirable consequences

- Fraud refers to an intentional act that relies on deception to misappropriate assets or obtain other benefits
- Malicious acts are intentional acts that lead to the destruction of facilities, hardware, software or data
- Disasters are acts of nature such as floods, tornados, storms etc. that can lead to destruction of assets and disruption of business activities

Key risks faced by eBusiness

- New services
  - Internal risks include lack of standards, regulations and rules and support systems. External risks include natural hazards, legal issues, and environmental issues
- New Business models
  - Revenue leakage, poor image and inability to foster trust and confidence on the part of business partners
- New processes
  - Failure to meet contractual obligations and impairment in the ability to obtain additional business
- New Technology
  - Challenges with integrating with existing systems, and security and privacy issues
- New Fulfillment Processes
  - Instant deliveries leaves no room for errors especially with real-time procurement requirements
- Outsourcing IT Activities
  - Risks of non-performance and insufficient monitoring; and loss of control of business activities
- Other risks are associated with abuses involving malicious acts. In order of frequency, examples include:
  - Infection by malicious pieces of code (virus, Trojan, worm)
  - Installation or use of unauthorized software
  - Use of official computers for illegal or illicit activities
  - Installation of unauthorized hardware
  - Use of official computers for personal profit

- Physical theft, sabotage, or intentional destruction of equipment, especially laptop theft
- Denial of service attacks
- Website or web server attacks
- Abuse of insecure passwords
- Electronic theft, sabotage or intentional destruction or disclosure of proprietary data
- Financial fraud

Controls

- Controls include preventive, detective and corrective measures that are designed to reduce the risk of error, fraud, malicious acts, or disaster to an acceptable level
- All controls are guided by strategy, policy, and implementation procedures which are essential parts of a security system. Strategy guides the knowledge and culture among personnel necessary to achieve effective security.
- General controls
  - Controls that are not unique to a particular application or applications:
    - Security management
      - Policies and procedures
    - Physical access controls, Logical access controls
      - Fences, surveillance equipment, alarms, security guards
      - (passwords, biometrics, firewalls (CAPTCHA), intrusion detection systems)
    - System acquisition or development controls
      - Good control ensure that errors/omissions are not introduced during programming, testing, or implementation phases
    - System maintenance and change controls
      - After programs are developed and implemented, they are contiously subjected to changes to introduce corrections or enhancements
    - Operations controls
      - Operation of servers, scheduling jobs, maintenance of system infrastructure

- Review system logs, monitor system activity, review of exception reports on system activity

- Business continuity controls
  - Ebusiness must always be available, downtime can be costly, disastrous
  - Must be able to restore system to operation and recover data and programs affected by outage in timely manner
  - Business continuity plan
  - Disaster recovery plan

Platform Structure for eBusiness Security System

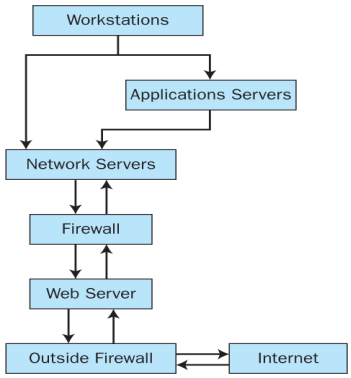


**Figure 5.2** Security software structure
Basic layers at which security is established.


## Intrusion Detection System (IDS)

- **(IDS)**- monitors devices and processes for security threats and can alert security personnel of the occurrence of unusual activity as it occurs.

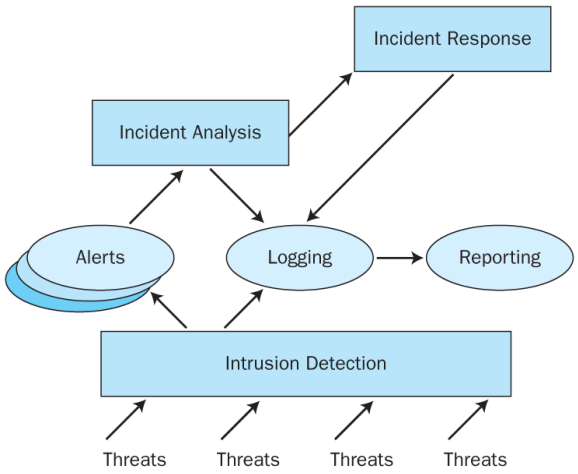


**Figure 5.3** Platform structure for ebusiness security system

The relationship of a network system to its firewalls.



## General Controls

- Controls that are not unique to a particular application or applications:
  - system acquisition or development controls
  - systems maintenance and change controls
  - operations controls
  - business continuity controls: business continuity plan (BCP), disaster recovery plan (DRP)
- Applications controls
  - All business applications consists of three basic areas – input, processing and output. Hence applications control focus on input, processing and output controls.
  - Applications controls also focus on storage controls and communications controls.
  - Input controls:
    - Check digit controls: performs a calculation on set of digits, adds the result of that calc to the number, enables integrity of digits to be checked whenever required
    - Input masks: establish formats for input areas in a screen that allows certain num of characters to be entered
  - Processing controls: Includes Control totals, Hash and Time stamping.

- Control totals are based on counts of records, monetary values or hashes that are used to reconcile inputs and outputs and thereby control completeness and accuracy of processing. Control totals usually maintain hashes and time stamping.
- Hash: A Hash is a total based on a field that is not expected to change (e.g. total of all employee number fields in a file) and is therefore useful for ensuring that no unauthorized additions, changes or deletions have occurred in a file of records containing that field
- Time Stamping: the process of adding a tag containing the time that a record is created, modified, or moved – is used to control the timeliness of data processing and the currency of information.

o Communications controls:

- Through **encryption**, the confidentiality of ebusiness messages are protected.
- Makes use of message digests, digital signatures, public key infrastructure and virtual private networks (VPNs) for effective security of network applications.
  - Message digests are control totals (similar to check digits) that are used to control the completeness, accuracy and validity of data transmissions.
  - Digital signatures on the other hand are encrypted message digests that can be decrypted only with a key that authenticates the sender's identity, combine encryption and message digests to ensure the authenticity of transmitted messages.
- Using wireless encryption protocols (WEP), the confidentiality of messages is achieved where wireless networks are used. This helps to deal with the risk of **drive-by-hacking.**

Encryption Process

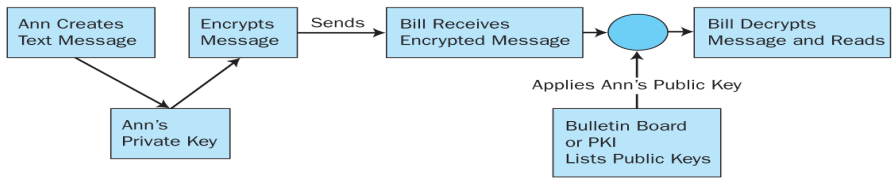


**Figure 5.5** Directories for system development
System development activities progress through three directories.


- PKI – Public Key Infrastructure
  - Non-repudiation: The property that confirms a particular person did indeed send a message and cannot deny that fact

- System that stores and delivers keys as needed, provides privacy, security, integrity, authentication, nonn-reoudiation support for various technologyical and ebusiness appls and transactions

- Security policies
  - They are formal statements of organizational and managerial intent.
  - They define acceptable transactions that can be carried out through internet connections
  - They should be centrally defined and consistent with, or part of, the overall corporate security policies
  - Usually the starting point of an organization's security framework.
  - Business objectives should be the foundation for security aims and initiatives
- Major components of a security policy include:
  1. Security Administration: who is in charge?
  2. Standard Operating Procedures: ISO 17799
  3. Information Management
  4. Privilege Management: principle of least privilege
  5. Physical Security
  6. Logical Access Control: user id/password
  7. End-User Computing Policy
  8. Software Acquisition, Development, Maintenance and Change
  9. Impact of Data Mobility: data transmission can be lost, what is the solution?
  10. Personnel Management: highly qualified IT personnel
  11. Security Monitoring
  12. Disaster recovery, Contingency Planning and Insurance
  13. Periodic Updates of Security Policy

**Ch 6: Billing and Payment Systems**

- Completing payments online is good for business and cost-effective
- In B2C, online payment is known to encourage consumer buying compared to using other payment channels.
- In B2B, there is also an economic incentive to have online billing and payment. There are often savings for both business and customers (procurement costs)

- Credit cards have been the most common payment method. There are now new payment methods.

Characteristics of traditional payment systems

- Electronic Data Interchange (EDI)
  - EDI is a way to conduct transactions, including payment transactions, in electronic form.
  - Based on the use of widely accepted standards for formatting data in EDI transmissions.
  - EDI has made use of **Value Added Networks (VANs)**
    - VANs are privately owned networks that are rented to users, along with a package of related services, to operate their EDI systems by providing an environment within which they can work, and by connecting them to their customers and suppliers
  - EDI is costly and in its traditional form, used mostly by very large companies
- Cash. Most traditional method of payment. Characteristics of this payment method include:
  - Portability
  - Acceptance
  - Anonymity
  - Instant transfer of Value
- Digital Cash (ECash).
  - Developed by DigiCash
  - Closest to approximating the attributes of cash
  - Product did not gain acceptance. Company went bankrupt
  - Built on the basis of public key cryptography
  - Digital cash's encryption provides the advantage of non-repudiation
- Digital cheques.
  - Not anonymous, hence carry greater risks to vendors accepting them.
  - NetCheck was developed as a digital cheque using cryptography as a security technique
  - eCheck was developed by the Financial Services Technology Consortium (FSTC).

- Digital cheques generally have attributes of paper cheques, except are used electronically.

- Echeques.
  - Contain the same information as paper cheques
  - Are based on the same rich legal framework as paper cheques
  - Can be linked with unlimited information and exchanged directly between parties
  - Can be used in any and all remote transactions where paper cheques are used today
  - Enhance the functions and features provided by bank chequing accounts
  - Expand on the usefulness of paper cheques providing value-added information

- Credit Cards.
  - Credit card payments exceed cheque payments and are still growing. Biggest challenge is security.
  - The popular solution to this is encryption using SSL/HTTPS
    - SSL/HTTPs are protocols for sending encrypted data from a web browser to a server
  - Despite the above credit card fraud is still a problem.
    - Although overall credit card fraud has fallen over the last decade, online credit card fraud is triple the rate of bricks and mortar fraud, accounting for average losses of 14 cents of every $100 spent.
  - Secure Electronic Transaction (SET) protocol was developed to combat credit card fraud.
    - SET is a method of securing credit card transactions using encryption and authentication technology.

- Debit cards.
  - Canada has one of the highest rates of use of debit cards in the world.
  - Debit cards are preferred by merchants because they can avoid credit risk and the costs of late payments, postage, employee theft, and cheque-clearing fees.
  - Other benefits include increased customer loyalty and the ability to track spending.
  - Unfortunately debit cards are not immune to fraud.
    - Thieves reportedly use hidden cameras to record victims' PIN numbers are ATMs and obtain copies of their debit cards.

- Smart cards.
  - Smart cards contain chips with memory, software, and their own operating system.
  - One such implementation in North America is the Mondex electronic cash system (www.mondex.com)
  - The idea is that the card would be loaded by the owner at a bank or Mondex-compatible ATM machine and then used at retail and other locations to buy goods.
  - Mondex can be carried around like a credit card and also the signals can be sent over the internet.
  - Smart cards have been widely accepted by financial institutions replacing magnetic strips credit and debit cards
- PayPal.
  - Founded in November 1999 by Max Levhin and Peter Thiel.
  - eBay purchased PayPal for US$1.3 billion in July 2002.
  - eBay's auction process is now linked to PayPal.
  - PayPal offers payment security, fraud protection and data security for online transactions
  - PayPal's databases contain millions of customer data offering potential advantages including the management customer relationships
- Online 'Instant' Credit
  - An online credit system enables customers to go through an online credit screening process that results in them being able to purchase high-priced goods on an installment basis, enabling them to convert a large one-time charge into a series of smaller monthly payments.
- Mobile Payments (m-payments)
  - Wireless smart cards based on radio frequency identification (RFID) technology.
  - RFID is a technology that uses radio waves to transfer data between a reader and a device and an item such as a smart card.
  - RFID works by adding a sophisticated wireless chip to a smart card, which can read by a corresponding reader device.
  - MasterCard is currently testing its own RFI system called PayPass.
- Mobile phones

- Embedded with chips based on **near field communication**; technology that uses magnetic field induction to transfer data between a mobile phone and a reader device.

Electronic Bill Presentment and Payment Systems

- Canada Post
  - Developed ePost – an electronic mailbox that people can use for several mail functions, including the ability to receive and pay bills through the ePost website.
- The Banks
  - Banks offer systems for billing and payment electronically. Online banking has offered their customers the ability to use their credit card number, together with a password, to log in and view their bank account balances and transactions.
  - Banks now offer email payment as well.

**Lec 5 (Feb 9)**

Chapter 7: Supply Chain Management

- Supply chains were originally driven by the need for companies to reduce costs and prices while improving customer service and product quality
- Supply chain is the set of processes that encompasses everything from purchases of raw materials or resources through to final delivery of a product or service to the end consumer. DELL's SCM is an excellent example.
- SCM is the process of coordinating and optimizing the flow of all products or services , information and finances among all players of the supply chain

Traditional Supply Chain

- The traditional supply chain is a **push system** where suppliers produce goods based upon their efficiencies and push them to customers, rather than relying on demand to determine production.
- Early attempts to improve the efficiency of supply chain involved the use of EDI to transmit business documents between supply-chain firms.
- Common attempts at SCM have focused on reducing inventories and achieving greater levels of efficiency within the value chain.

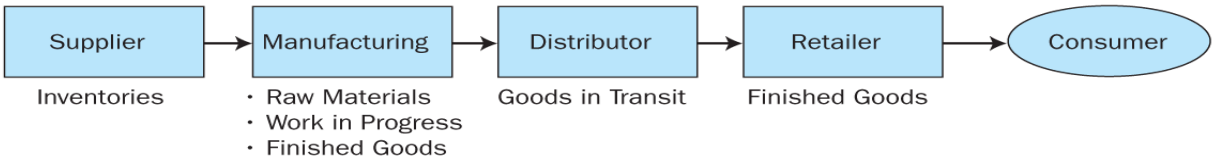


**Figure 7.2** The traditional supply chain

The traditional supply chain was focused on efficiency of production gained through batch manufacturing that often resulted in excess inventories throughout the supply chain.



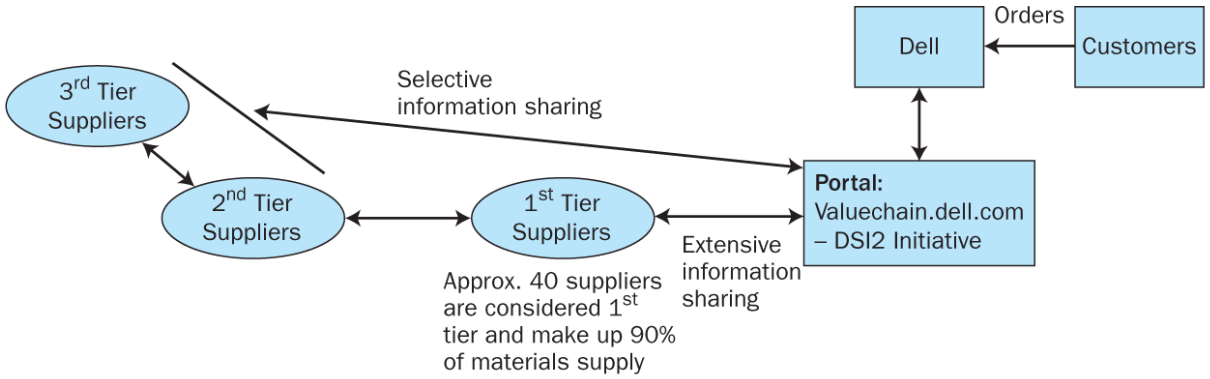


**Figure 7.1** Dell's supply-chain configuration

Dell's supply chain involves information sharing by its members.



## Forces affecting SCM

- Globalization
  - Companies expand their global presence, there are complex challenges to the efficiency of the SC
  - Reliable transportation and delivery system in foreign countries are complicated by domestic policies, tariffs and customs regulations.
  - Slow delivery may lead to disgruntled customers, lost sales and negative publicity.
- Mass Customization
  - Ebusiness has shifted power from companies to consumers who ask for products/services tailored to their specific needs.
  - The Internet and computer technology has enabled businesses to meet customer needs by simplifying the process of customization, data capture and information sharing with partners in the supply chain.

- Price Sensitivity
  - The Internet provides individuals with the ability to easily compare prices and gather product information. Hence customers are more sensitive to price.
  - Companies need to have a good grasp of their customer preferences, competition and supply chains.
- Customer focus and time to market
  - Companies need to have the ability to create and deliver innovative and high quality new products across industries.
  - A combination of research and development, partnerships and SCM allows these companies to continually create high quality products at “internet-speed”.
- Just-in-time inventory and inventory reduction
  - The use of the Internet has improved the ability of firms to share information with other supply chain members, including the sharing of common inventory management systems
- Enterprise resource planning
  - ERP applications help to facilitate SCM.
  - With legacy systems, firms waste time trying to integrate data from sales, inventory and purchasing systems to effectively plan for future production.
  - ERP systems have overcome this lack of data integration, enabling real time decision making from the same data source.
- Outsourcing
  - Outsourcing is an arrangement whereby companies shift facilities and activities (including IT infrastructures, platforms and applications) to outsourcers and then integrate them into their global supply chains.
  - Outsourcing comes with a number of benefits including cost reduction and focus on core competencies.
  - Outsourcing also comes with risks including: loss of control, inability to monitor performance, conflicts of interest, and loss of in-house expertise.

The internet-enabled supply chain

- The Internet economy has resulted in drastic changes to the entire supply chain.

- The Internet-enabled supply chain is a **pull system**, where the production of suppliers is determined by the needs of customers who request or order goods, necessitating production.
- The Internet supply chain has resulted in substantial changes to more than just information flows.
- Major changes in supply chains have resulted in **disintermediation**.
    - Disintermediation is a change in the supply chain where the manufacturer or service provider and consumer interact directly with each other, thereby eliminating the need for an intermediary.
- The Travel industry has seen some level of disintermediation.
    - The two major categories of dis-intermediation are:
        - When the supplier of a good or service circumvents another member of the supply chain such as a distributor, and provides the good or service directly to the end consumer.
        - When a new intermediary enters the market using a new business model (often lower cost) to drive out existing intermediaries.
    - EXAMPLE: in the past, booking of airline /other travel was through travel agents, now the process of booking a trip has been transformed
    - Customers have access to information from variety of sources
- While disintermediation has significantly changed the travel industry, these changes simply force the industry to compete in different ways, leading to a process called **re-intermediation**.
    - Re-intermediation is using the internet to reassemble buyers, sellers and other partners in a traditional supply chain in new ways.
    - Examples include Newview Technologies and ChemConnect Inc.

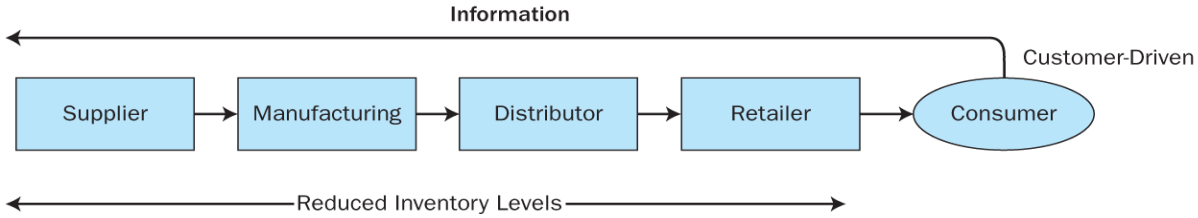


**Figure 7.3** Internet-enabled supply-chain information flows

In the internet-enabled supply chain, the customer drives the process, and information flows primarily upstream.

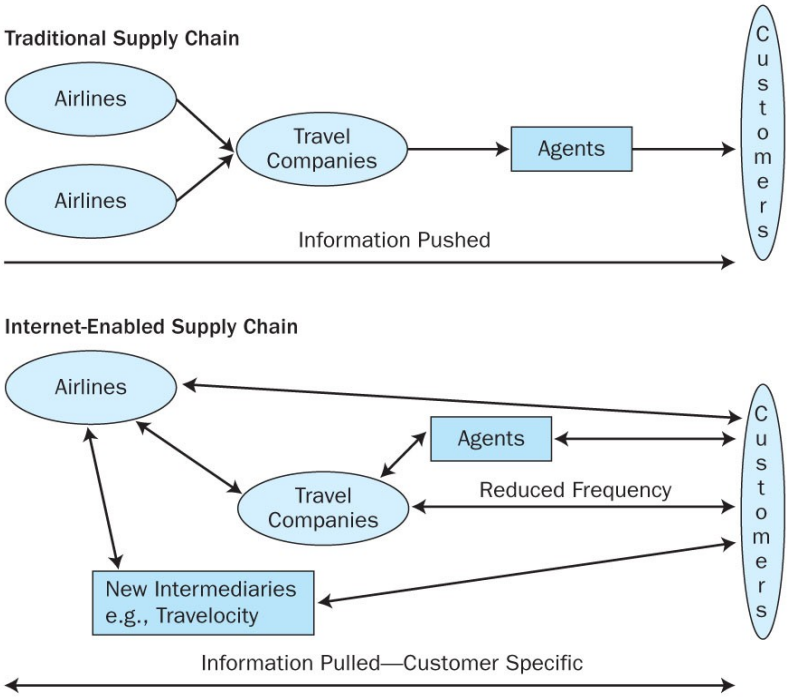


**Figure 7.4** Travel industry information flows

The travel industry supply chain has been drastically changed by ecommerce and the internet.



Integration of Technology

- While SCM has been strongly affected by the growth of the internet, other technologies also contribute to the evolution of SCM: These include
  - Extranets
    - Sharing information b/w SC members
    - Reduce cost, increase efficiency
    - Reduced usage of EDI
    - Allows demand foreceast to be adjusted constantly, giving supplier advance notice and allowing for production planning changes to take place sooner
    - Shortens the production-to-delivery time frame and reduces SC costs
  - enterprise resource planning (ERP) applications
    - essential to have access to up-to-date information
    - allow effective monitoring of entire org. and provide essential information to functions of SCM

- business intelligence software
  - important for companies to have strong data analysis tools to identify critical operating information
  - enables better decisions in merchandising, inventory, and pricing
    - data-mining techniques, decision support systems, business intelligence software
- Cloud Computing
  - Software as a service
    - Deliver specific applications over the internet
      - Email, archiving, CRM, storage
  - Platform as a service
    - Cloud-based development environment, customers can build their own applications
  - Infrastructure as a service
    - Provides customers with complete internet-accessible infrastructure, including processing, storage, network bandwidth etc
- Strategic Supply Chain Management
  - Must employ technology strategically
  - Adoption of leading-edge tech will yield little benefit unless it is used to facilitate corporate goals
  - Boeing provides a good example
    - Establish strategic vision for its SC, adopt technological appls in support of that vision, made process changes internally/externally in support of its strategy
    - Strategy, not technology, must drive the businesss
- Business process Re-engineering (BPR)
  - Reflects requirements of corp. to initiate change to fundamental business processes as a result of the changing business world
  - Occurs at 3 lvls:
    - Streamlining

- Minor changes, tweaking of existing business processes to facilitate changes occurring in the business

- Reengineering
  - Fundamental rethinking and radical redesign of existing processes (large undertaking)
- Organizational change
  - Creation of a process org. by modification of org structure
  - New management lvl positions are created that focus on maximization of process efficiency

- Business processes include procurement processes, interla operations, sales processes, etc
- Adoption of ERP, forecasting tools, SCM and eprocurement are all changes that will require an org. to re-evaluate and often revise its business processes

Trust and Partnerships of the Supply Chain

- Sharing information is a difficult task in a business world where traditionally information has been safeguarded.
- Partnership formation is about managing relationships.
- Forming partnerships is as crucial to supply-chain success as the technology and information systems.
- Establishing strong lines of communication is the first step in ensuring that supply partnerships will succeed.
- The relationship of trust can be created more quickly if discussions centre on:
  - **Realignment**- vendor-managed inventory – perpetual inventory (constantly reviewed by suppliers)
  - **Service level agreement-** documents and defines the parameters of a supplier-customer relationship
  - **Performance measurement-** downstream links need to provide fast response to any market opportunity, while upstream links need to effectively support any sales made
  - **Dispute resolution-** need to document, plan ahead for areas of concern such as security, copyright, asset title
  - **Security**- remote access, etc. ensure no security breach

Order fulfillment/delivery

- Order fulfillment is a set of processes involved in delivering a product to the customer. It consists of procedures grouped into the main areas of **order processing**, **warehousing** and **shipping and transportation planning**.
    - Order processing include activities that take place during the fulfillment of an order. These include credit checks, inventory availability determination, accounting, billing, and replenishment requests.
    - Warehousing includes all tasks involved with handling inventory. These processes include receiving orders of inventory from suppliers, as well as picking, organizing, and packaging goods for delivery.
    - Shipping and transportation planning (STP) is the process of transporting finished goods to the consumer quickly and efficiently.
        - Wal-Mart began using RFID tags in 2003 in order to improve the efficiency of its order fulfillment process.
        - Other companies such as FedEx and UPS have also begun using RFID.

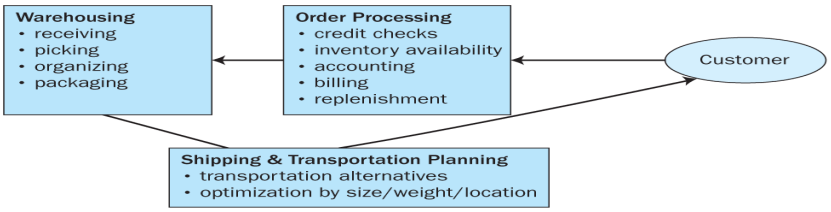


**Figure 7.6** The order fulfillment process
Order fulfillment includes many business processes in areas such as order processing, warehousing, and shipping and transportation planning.



## Reverse Logistics

- Internet research has shown that returning products is both a concern for buyers and an important issue for sellers.
- Reverse logistics is the internal process for handling customer returns, either for a refund or for repair or replacement under warranty.
- Outsourcing has become an important strategy in dealing with reverse logistics.

## C-commerce: The Future (collaborative commerce)

- C-commerce is the application of technologies to allow trading partners to synchronize and optimize their partnerships, and is performed in collaboration.
- Wal-Mart's supply-chain management program, also known as Collaborative Planning, Forecasting, and Replenishment (CPFR), aims "to sell as much product as possible without either the supplier or Wal-Mart having too much inventory."
- Wal-Mart saves 5 to 10 percent in cost of goods through the use of technology in its streamlined supply chain.

- Wal-Mart's SCM practices have benefited not only the retailer but its suppliers as well.

**Chapter 8: Eprocurement, Trading Exchanges, and Auctions**

- Businesses became interested in eprocurement as a means to cutting down costs and improving efficiency in the early 2000s, particularly for B2B ecommerce.
- As companies strive to achieve completely digital, integrated B2B ecommerce, eprocurement will continue to evolve.
- Eprocurement can be defined as the complete business process of acquiring

The Eprocurement Process

- Eprocurement can be defined as the complete business process of acquiring goods through electronic means, from requisition through to fulfillment and payment.
- The traditional eprocurement process comprises the following steps:
    - Requisition
    - Approval
    - Purchase Order
    - Supplier Shipment
    - Transportation
    - Receiving
    - Payment

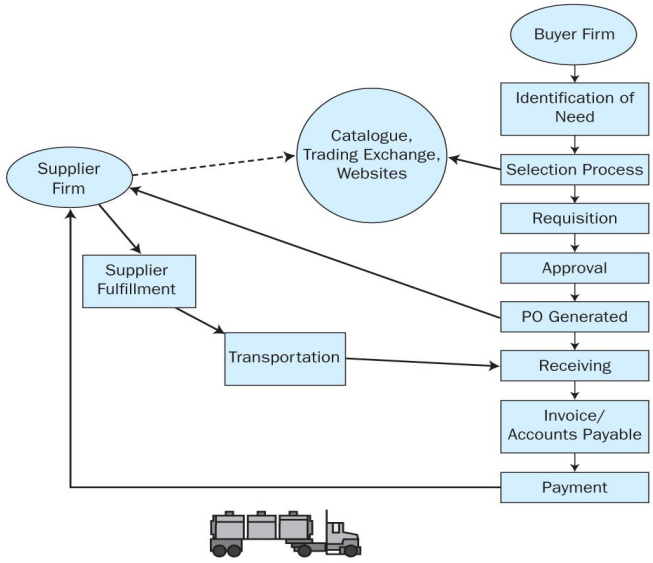


**Figure 8.1** The eprocurement process

Eprocurement encompasses the steps of the procurement process that are carried out in an integrated, electronic form.



- Goods and Services procured generally include:
    - Maintenance, Repair and Operating Expenses (MRO)
        - Automatic approvals are delegated to specific individuals rather than a detailed process of approvals
    - Travel services
        - Employees were able to book own travel for approvaed rates, manage own schedules, flexibility to make changes
    - Computer equipment
        - Able to be purchased with preconfigured systems, w/ little involvement of supervisors and technical support staff
    - Production items
        - Need to be acquired w/in specific time frames to keep manufacturing schedules, maintain inventory lvls, etc
        - Other concerns: customization, product quality, payment terms, delivery arrangements, supplier capabilities
    - Supplier Selection and Approval is critical in managing costs in the procurement process.
    - Usually done through request for quotations (RFQ).

Benefits of Eprocurement

- Cost and Efficiency
  - Price reduction and process efficiencies
- Strategic Procurement
  - Strategic sourcing and supplier relations
  - Better management of procurement processes electronically
- Authorized Suppliers
  - Reduced maverick buying.
    - Maverick buying is the unauthorized purchase of goods by employees through non-routine and poorly controlled means, such as acquiring office supplies with petty cash.

Trading Exchanges

- Trading exchanges reduce reliance on other forms of communication in the procurement/selling process (see fig. 8.3).
- Trading exchanges are also known as: hubs, ehubs, marketplaces, consortiums and combinations of these (sometimes with "B2B" added).

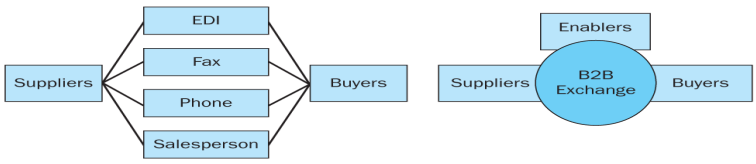


**Figure 8.3** Trading exchanges' facilitating role
Trading exchanges can consolidate numerous forms of communication into one medium.



- Trading exchanges are categorized as: Vertical and Horizontal.
  - Vertical trading exchanges have an industry or specific market focus, such as health care or energy products and services.
  - Horizontal trading exchanges have a product or service focus, such as computers or office equipment, and that do not target any specific industry.
- Trading exchanges are also categorized as: private and public.
  - A private exchange limits participation to specific buyers and sellers – normally related to the exchange provider's supply chain.
  - A public exchange is one in which buyers and sellers register to join, and there are few limitations to joining.
- Some of the most successful trading exchanges have evolved to become SaaS providers.

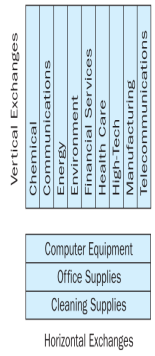


**Figure 8.4** Vertical and horizontal trading exchanges

Trading exchanges are often categorized as either vertical or horizontal, based upon the way they operate.



## Trading Exchange Functions

- Trading exchanges operate with a variety of service levels and allow for varying degrees of integration.
- Trading exchange functions range from simplistic (brochureware) to catalog sites, to fully integrated collaborative environments.
- Covisint is a well known example of a fully functional trading exchange.
- Trading exchanges functions may be looked at from the points of view of buyer and supplier transactions.
    - Buy side transactions
        - Automates selection & purchase from desktop
        - Cuts administrative overhead
        - Integrates sourcing, ordering & payment
        - Sends & receives requisition documents
        - Reports quickly
        - Control number of suppliers
    - Sell (supplier) side transactions
        - From supplier/customer integration to trading communities
        - Wide selection
        - Customer may drive the rollout (pull strategy)

**Table 8.1** Potential Trading Exchange Services

Trading exchanges have the potential to provide numerous value-added services to members on both the buy side and sell side of transactions as they increase in complexity.

- Supplier certification, reputation
- Transportation management
- Product life cycle management
- Warehousing and inspection
- Risk mitigation services
- Catalogue display/maintenance
- Financing
- Product configuration
- Derivative instruments
- Community news, employment, etc.
- Returns processing, repair claims
- Payment processing/order management
- Order explosion/routing
- Workflow and business rules
- Contract administration
- Tariffs and duties assessment
- Planning, scheduling, forecasting
- Promotions/campaign management
- Profiling and personalization
- Authentication/security
- Complex pricing
- Private markets, negotiated terms
- Post-sale support, warranty programs
- Receivables management
- Scrap management/reverse logistics
- Inventory availability
- Partner/team selling and promotions
- Back-order management



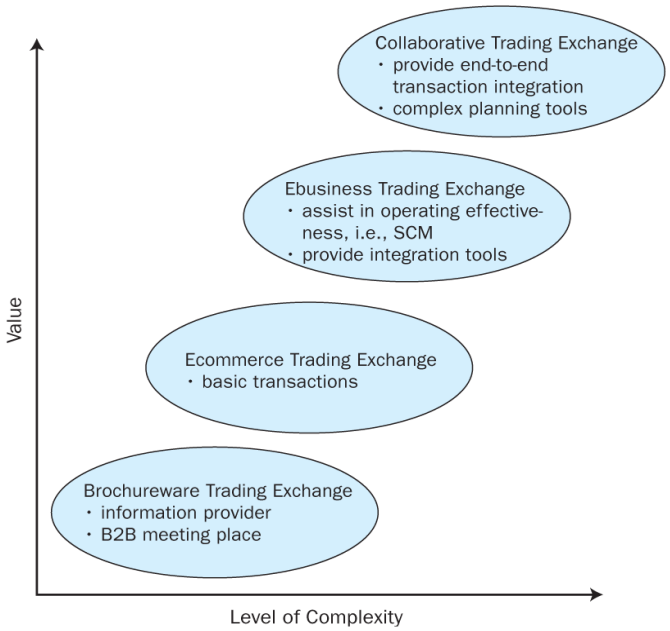


**Figure 8.5** Progression stages for trading exchanges and marketplaces

B2B trading exchanges range from basic brochureware sites to complex collaborative environments.



## Issues for Trading Exchange Providers

- Trading exchange providers face huge challenges in meeting the demand of buyers and suppliers. Some of these are:

- Integration – Making it work.
  - Web services is a relatively new approach to ebusiness, and is changing the way business applications are developed and also interact.
- Profitability.
  - Knowing how to charge for services is still a major issue. Pricing schemes need to provide opportunity to grow and sustain ebusinesses.
- Governance.
  - Establishing the right policies and procedures to govern exchanges is still a challenge.
  - Other issues include how to restrict enforce membership restrictions, data confidentiality regarding member trade information and the rights of members remain unsolved challenges.
- Legal issues.
  - Issues that Covisint went through has exposed some legal issues surrounding B2B exchanges.
  - Issues include competition, antitrust laws and prices.

Auctions

- English
  - Bidding occurs through an ascending price process when buyers gather in a common location (physical or digital) during specified periods of time
- Yankee
  - Similar to the English auction, except that multiple items are sold by price, quantity and earliest bid time. Useful for businesses buying products where price is not the only factor to consider, but quantity may be another consideration.
- Dutch
  - Uses a descending price format, whereby the auctioneer begins with a high price, and buyers can bid on specific quantities of inventory as the price falls.
- Reverse
  - Uses a descending price format, but the buyer creates the auction to receive bids from potential suppliers.
- Sealed-bid

- Often used for products and services where price in only one consideration in the decision. The buyer will consider capabilities, product quality, timelines, and past experience with the seller before awarding the contract.
  - Govt and construction contracts

- Vickrey auction
  - Uses an ascending price format in which the highest bidder wins the auction but must pay the price submitted by the second-place bidder.

E-Auction Requirements

- Successfully online auctions require planning and effective process administration using appropriate technologies. Auctions require fairness and:
  - Full disclosure
    - auctions must provide participants with all relevant information related to the prospective purchase or sale.
  - Integration
    - of the auctioning system with the buyers system. Need to capture pricing and shipping information
  - Notification
    - ensuring that all participants in an auction are up-to-date at all times.
  - Security
    - ensure that the process is executed appropriately and that hackers are unable to sabotage an auction. Also ensure that information that is meant to be confidential is in no way breached.
  - Payment systems
    - ability for auction providers to facilitate payments is becoming increasingly important.

The Auctioning Process

- The auction process varies depending on the type and rules adopted. Generally the basic processes are:
  - Auction Configuration
  - Promotion and Scheduling
  - Buyer and Seller Registration
  - Bidding

- Bid Evaluation
- Settlement

Future of Auctions

- Some have predicted that future auctions will follow **dynamic pricing**.
  - Dynamic pricing is the use of market-based, negotiated prices for transactions
  - To facilitate the improved use of auction models to carry out commerce, the idea of meta-markets and meta-auctions has been discussed.
  - Meta-markets link related auctions and markets together to form a large base of participants with common interests.

**MT: Ch 1-8**