Chapter 7
Doing Business on the Internet

Managing and Using Information Systems: A Strategic Approach
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Introduction
• How has the Internet changed business?
• What is the difference between the Internet and Intranets and Extranets?
• What is EDI and why did it not grow as predicted?
• What is disintermediation and how has it impacted the music industry?
• What are the four key building blocks of e-commerce?
• How can managers assist in the prevention of identify theft?

Real World Examples
• VeriSign, Inc. helps millions of Internet users each day.
• VeriSign makes money by providing security, billing, and payment services to telecommunications and online retail customers.
• They are an example of a completely new business made possible by the Internet.
• They have grown their reputation for “trust” into a business customers are willing to pay a fee.

OVERVIEW OF THE INTERNET
Internet

- The Internet is a global, interconnected network of millions of computers (hosts).
  - Began in 1969 with the US DOD's ARPANET.
  - In 1985 NSF built NSFNET.
- Today no single “owner” owns the Internet but it is shared.
- Relies on the TCP/IP protocol.
  - Figure 7.1 shows an example of a TCP/IP packet.
- Broadband has permitted many to gain fast access to the Internet making it a very useful tool.

World Wide Web

- An increasingly popular method of accessing the Internet.
- Documents transmitted over the “web” are in HTML format (Hypertext Markup Language), or in any number of other compatible languages.
- HTML was created in 1989 by Tim Berners-Lee at CERN.
- Web browsers (Internet Explorer and Netscape) are commonly used tools for accessing the web.

More Nets

- Intranets, extranets, and virtual private networks (VPN’s) are other networks that use web technology.
  - Intranet looks like the Internet but is used only internally by an organization (university, business, etc.).
  - Extranet is similar to an intranet but includes access available to partners, or customers.
  - VPN’s are used to connect private data using the public telecommunications system. VPN’s use tunneling.
Evolution of E-Business

• Conducting business over electronic channels has been a reality for decades.
• EDI (Electronic Data Interchange) is one of the oldest forms of e-business.
  – EDI is the direct computer to computer transfer of business information, using a standard format.
  – Software programs on different systems can exchange information without human intervention.
    • Quote requests, order forms, etc.
  – EDI was never widely used due to substantial setup effort.

• With the growth of the Internet more businesses are using it to transact business between partners (B2B – see Figure 7.2).
• Now, the term e-business refers to business conducted over the Internet.
• Business on the Internet has evolved through a number of stages:
  – Content Provider: Stage I
  – Transaction Forum: Stage II
  – Integrator: Stage III
  – Catalyst for Industry Restructuring: Stage IV

E-channel Patterns

• An e-channel is a chain of electronic “relationships between companies and partners/resellers”
• They can lead to industry restructuring when there are massive changes brought about by:
  – e-channel compression (disintermediation – Figure 7.3), and
  – e-channel expansion (the adding of brokering functionality)
    • These brokers provide information for users (like Edmunds.com, or KBB.com for automobile research).
    • E-channel expansion is also seen in e-marketplaces (special kind of B2B network).
Figure 7.3 Example of Channel Compression

Old Music Industry
- Few Artists
- Record Company: +$1
- Distributor: +$9
- Retailer: +$5
- Customer: +$16/Album

New Music Industry
- Many Artists
- E-Business Website: +$3
- Customer: +$7
- Album: +$10
- Song: +$1.30

FRAMEWORK OF ELECTRONIC COMMERCE

E-Commerce Framework
- Kalakota and Whinston offer a generic framework for e-commerce (see Figure 7.4).
- This framework assumes that new technology will be built on existing technology infrastructure.
- It uses four key building blocks and two supporting pillars.

Four key building blocks:
1. Common business services infrastructure
2. Message and information distribution
3. Multimedia content and network publishing
4. The Internet (infrastructure)

Two supporting pillars:
1. Public policy (“governance”)
2. Technical standards
Common Business Services Infrastructure

• The common business infrastructure for electronic commerce consists of four main elements:
  – Security
  – Authentication
  – Encryption
  – Electronic Payments

Security

• Major concern for doing business on the Internet.
• Businesses feel vulnerable to attack.
• Encryption is used to help secure data.
• HTTPS (HTTP with SSL) is used to encrypt data to ensure its integrity and safety.
  – Secure Sockets Layer (SSL) is a standard for secure interactions use on the Web. SSL, uses a combination of private key encryption (using a one-time session key) and digital signatures to enhance the security of transmission.
• Concerns remain for e-commerce transactions since there are numerous examples of data and privacy issues.

Authentication

• Authentication is the security process of verifying that a user is who he or she says they are.
• Passwords are the most common type of authentication.
  – It is important that users understand strong passwords.
• Digital signatures are now gaining popularity for authenticating transmitted information.

Authentication: Digital Signatures

• Digital signatures take the place of ordinary signatures in online transactions to prove that the sender of a message is who he or she claims to be.
• When received, the digital signature is compared with a known copy of the sender’s digital signature.
• Digital signatures are also sent in encrypted form to ensure they have not been forged.
Encryption

- Encryption systems translate data into a secret code (many types of encryption used).
- Encryption systems include 4 main components:
  - **Plaintext**: the unencrypted message
  - An **encryption algorithm**: that works like the locking mechanism to a safe
  - A **key**: that works like the safe’s combination
  - **Ciphertext** is produced from the plaintext message by the encryption function.
  - **Decryption** is the same process in reverse (like a modulation/demodulation), but it doesn’t always use the same key or algorithm. Plaintext results from decryption.

Encryption Techniques

- The two main encryption techniques now in use (see figure 7.5):
  - **Symmetric** encryption in which both sender and receiver use the same key.
  - **Asymmetric** or public key encryption, which uses two separate keys, called public and private keys.

Symmetric Encryption

- **Symmetric** or **private key encryption**, uses the same algorithm and key to both encrypt and decrypt a message.
- Historically, this is the most common encryption technique.
- Since the key must be distributed, however, it is vulnerable to interception. This is an important weakness of symmetric key encryption.
- DES uses symmetric encryption.

Asymmetric or Public Key Encryption

- A second popular technique is asymmetric or **public key encryption** (PKE).
- PKE is called asymmetric since it uses two different “one way” keys:
  - a **public key** used to encrypt messages, and
  - a **private key** used to decrypt them.
- PKE greatly reduces the key management problem since the private key is never distributed.
- PGP (pretty good privacy) is a popular form of PKE available as shareware.
Electronic Payments

- A number of payment methods are used by businesses to make and receive payments on the Internet.
- These methods are basically the equivalent of off-line payment methods.
- Here are a few of the most popular types:
  - Virtual Terminals.
  - Transaction Processors.
  - Internet Checking.
  - Electronic Funds Transfer (EFT).

Search Engines

- Search engines are used to index the contents of the Internet so that information about a specific topic can be located.
- Managers should pay attention to search engines for two reasons:
  - They provide useful and extensive access to information.
  - And, they can provide the visibility that becoming listed with them provides.
- Google, founded in 1991 by two Stanford Ph.D. students, is the most popular search engine.

Web Services & Personalization

- A web service is a standardized way of integrating web-based applications.
  - Organizations can share data transparently.
  - Web services are the basic building blocks of the SOA (Service Oriented Architecture).
  - They are excellent for integrating systems across organizational boundaries.
- Personalization is the “selective delivery of content and services to customers and prospective customers”.
  - Can offer customized services to meet the past and future interests of customers.
Messaging and Information Distribution Infrastructure

- Second building block of supporting framework for e-commerce.
- Includes email, instant messaging, Voice over IP (VoIP), point-to-point file transfers (FTP), and groupware.
- Email is still largest use in this area.
  - ISP (Internet Service Provider) connects the user to the Internet.

Multimedia Content

- Third building block of supporting framework for e-commerce. Includes standards for various multimedia file types. Examples of materials transported in this way include:
  - Video
  - Audio
  - Text/Electronic documents
  - Graphics & Photos
  - Realtime/Non-realtime applications

Internet Infrastructure

- Fourth building block of supporting framework for e-commerce. Includes data communications circuits over which information travels. Includes:
  - Packet-switched networking (telephony is circuit-switched)
  - Packets contain overhead information including addressing
  - They are also routed, like mail
  - All of this flows across Internet backbones
  - Newer Internet access technologies include wireless access, cable access and DSL.

Figure 7.6 A sample journey of information from one Internet computer to another.
Public Policy

- Public policy is one of two supporting pillars for e-commerce. Public policy issues include:
  - universal access,
  - privacy,
  - information pricing,
  - information access.
- Privacy issues include what information is private and/or who should have the right to use/sell information about Internet users:
  - Requesting personal information on visiting a web site
  - Creating customer profiles
  - Leaving electronic footprints when visiting a web site

Identity Theft

- Managers must be aware of this danger and properly train employees on the proper handling of personal data.
- Identity theft takes place when a thief steals a person’s identity to open a credit card account, or steal funds from their bank.
- It can be categorized in two ways:
  - True name – thief uses personal information to open new accounts.
  - Account takeover – uses personal information to gain access to the person’s existing accounts.
- In 2004 ID theft losses cost over $500 million.
- There were over 388,000 cases reported.
- See figure 7.7 for ways to combat identity theft.

Technical Standards

- Standardization is the second supporting pillar for e-Commerce. Standards are critical for electronic interaction.
- Secure Electronic Transaction (SET) for secure payments of online credit card transactions is one of the most heavily promoted standards
- Other application standards include file transfer protocol (FTP), hypertext transfer protocol (HTTP), simple network management protocol (SNMP), post office protocol (POP), and multimedia internet mail extensions (MIME)

Figure 7.7 Precautions to take to avoid identity theft.
FOOD FOR THOUGHT 1: E-LEARNING

E-Learning
- Businesses do not want their employees to ever stop learning.
- E-Learning is using the Internet to enable learning (eliminates time and distance barriers).
- Include:
  - Computer-based training.
  - Distance learning.
  - Online learning.
  - On-demand learning.
- Embedding learning within the business processes.

FOOD FOR THOUGHT 2: WEB LOGS AND BLOGS

Logs and Blogs
- Online journals that link together into a large network of information sharing.
- Blogs discuss topics from poetry to political opinions.
- In 2005 there were 9 million blogs with an estimated 40,000 new ones generated every day.
- Can take on different forms:
  - Moblogging
  - Vlogging
  - Podcasting
- Make every individual a virtual publisher.
Summary

1. The Internet is an entirely new marketplace that will soon be second nature to consumers.
2. Intranets and Extranets, similar to the Internet, are used for private communications within an organization or between organizations.
3. Managers must understand the elements that comprise e-commerce.
4. Building blocks of e-commerce include:
   - Common business services infrastructure.
   - Messaging and information distribution infrastructure.
   - Multimedia content.
   - Information superhighway infrastructure.
5. Managers can expect a future in which the Internet becomes larger, faster, more powerful and commonplace.