電子商務安全
Secure Electronic Commerce

行動運算與行動商務
(Mobile Computing and Commerce)

Min-Yuh Day
戴敏育
Assistant Professor
專任助理教授
Dept. of Information Management, Tamkang University
淡江大學 資訊管理學系
http://mail.im.tku.edu.tw/~myday/

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Syllabus

週次 月／日　內容（Subject/Topics

1　100/02/18　電子商務安全課程簡介
　　　　　　　(Course Orientation for Secure Electronic Commerce)

2　100/02/25　電子商務概論 (Introduction to E-Commerce)

3　100/03/04　電子市集 (E-Marketplaces)

4　100/03/11　電子商務環境下之零售：產品與服務
　　　　　　　(Retailing in Electronic Commerce: Products and Services)

5　100/03/18　網路消費者行為、市場研究與廣告
　　　　　　　(Online Consumer Behavior, Market Research, and
　　　　　　　　Advertisement)

6　100/03/25　電子商務 B2B、B2C、C2C (B2B, B2C, C2C E-Commerce)

7　100/04/01　Web 2.0, Social Network, Social Media

8　100/04/08　教學行政觀摩日

9　100/04/15　行動運算與行動商務 (Mobile Computing and Commerce)

10　100/04/22　期中考試週

Syllabus (cont.)

週次 月／日　內容（Subject/Topics

11　100/04/29　電子商務安全 (E-Commerce Security)

12　100/05/06　數位憑證 (Digital Certificate)

13　100/05/13　網路與網站安全 (Network and Website Security)

14　100/05/20　交易安全、系統安全、IC卡安全、電子付款
　　　　　　　(Transaction Security, System Security, IC Card Security,
　　　　　　　Electronic Commerce Payment Systems)

15　100/05/27　行動商務安全 (Mobile Commerce Security)

16　100/06/03　電子金融安全控管機制
　　　　　　　(E-Finance Security Control Mechanisms)

17　100/06/10　營運安全管理 (Operation Security Management)

18　100/06/17　期末考試週

Chapter 8
Mobile Computing and Commerce

Source: Turban et al.,
Introduction to Electronic Commerce,
Third Edition, 2010, Pearson

LEARNING OBJECTIVES

1. Discuss the value-added attributes, benefits, and fundamental drivers of m-commerce.

2. Describe the mobile computing environment that supports m-commerce (devices, software, services).

3. Describe the four major types of wireless telecommunications networks.

4. Discuss m-commerce applications in finance.
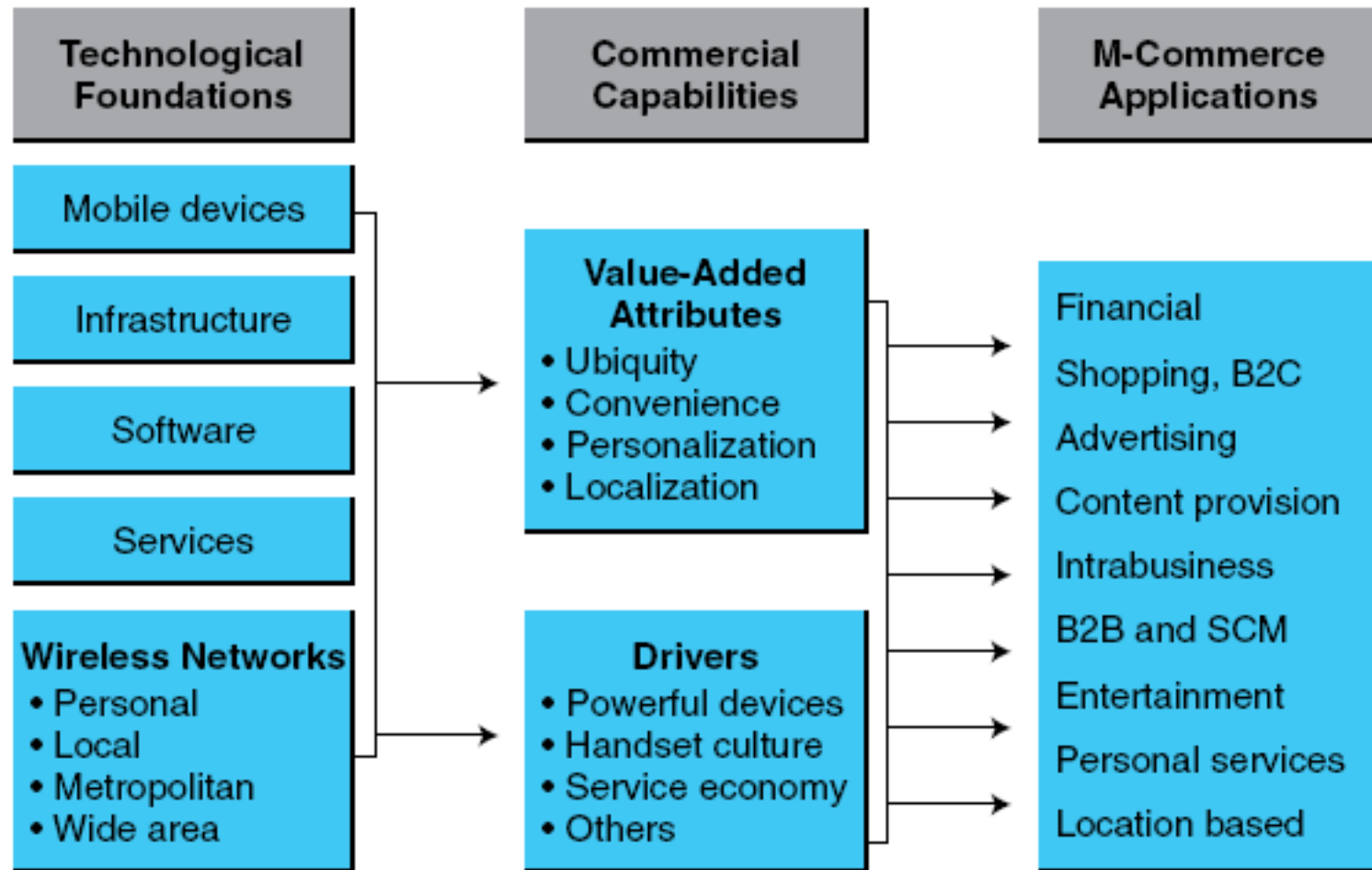
LEARNING OBJECTIVES

5. Describe m-commerce applications in shopping, advertising, and provision of content.

6. Discuss the application of m-commerce within organizations and across the supply chain.

7. Describe consumer and personal applications of m-commerce.

8. Understand the technologies and potential application of location-based m-commerce.

9. Describe the major inhibitors and barriers of m-commerce.

MOBILE COMMERCE:
ATTRIBUTES, BENEFITS, AND DRIVERS

Mobile Commerce (m-commerce or m-business)

Any business activity conducted over a wireless telecommunications network or from mobile devices.

EXHIBIT 8.1   The Mobile Commerce Landscape

Technological Foundations

- Mobile devices
- Infrastructure
- Software
- Services
- **Wireless Networks**
  - Personal
  - Local
  - Metropolitan
  - Wide area

Commercial Capabilities

Value-Added Attributes
- Ubiquity
- Convenience
- Personalization
- Localization

Drivers
- Powerful devices
- Handset culture
- Service economy
- Others

M-Commerce Applications

- Financial
- Shopping, B2C
- Advertising
- Content provision
- Intrabusiness
- B2B and SCM
- Entertainment
- Personal services
- Location based

Management and financial considerations: planning, cost–benefit analysis, security and privacy risk assessment, project management, implementation, etc.

(Source: Turban et al., 2010)

ATTRIBUTES OF M-COMMERCE

- Ubiquity
- Convenience
- Interactivity
- Personalization
- Localization

DRIVERS OF M-COMMERCE

- Widespread availability of more powerful mobile devices
- The handset culture
- The service economy
- Vendor's push
- The mobile workforce
- Increased mobility
- Improved price/performance
- Improving bandwidth

COMPONENTS,
TECHNICAL INFRASTRUCTURE,
AND
SERVICES
OF
MOBILE COMPUTING

Wireless mobile computing (mobile computing)

Computing that connects a mobile device to a network or another computing device, anytime, anywhere.

MOBILE DEVICES

- **personal digital assistant (PDA)**

  A stand-alone handheld computer principally used for personal information management.

- **smart phone**

  A mobile phone with PC-like capabilities.

MOBILE COMPUTING SOFTWARE AND SERVICES

- **Messaging Services**
- **Location-Based Services**
- **Voice-Support Services**

(Source: Turban et al., 2010)   15

Messaging Services

- **short message service (SMS)**

  A service that supports the sending and receiving of short text messages on mobile phones.

- **multimedia messaging service (MMS)**

  The emerging generation of wireless messaging;
  MMS is able to deliver rich media.

Location-Based Services

- Location-based services use the global positioning system (GPS) or other positioning techniques to find where customers and clients are located and deliver products and services to them based on the location in real time.

Voice-Support Services

- **interactive voice response (IVR)**

  A voice system that enables users to request and receive information and to enter and change data through a telephone to a computerized system.

- **voice portal**

  A Web site with an audio interface that can be accessed through a telephone call.

WIRELESS TELECOMMUNICATIONS NETWORKS

- **Personal area network (PAN)**
- **Wireless local area network (WLAN) and Wi-Fi**
- **Municipal Wi-Fi networks**
- **WiMax**
- **Wireless wide area network (WWAN)**

Personal area network (PAN)

- Personal area network (PAN)

  A wireless telecommunications network for device-to-device connections within a very short range.

  – **Bluetooth**

    A set of telecommunications standards that enables wireless devices to communicate with each other over short distances.
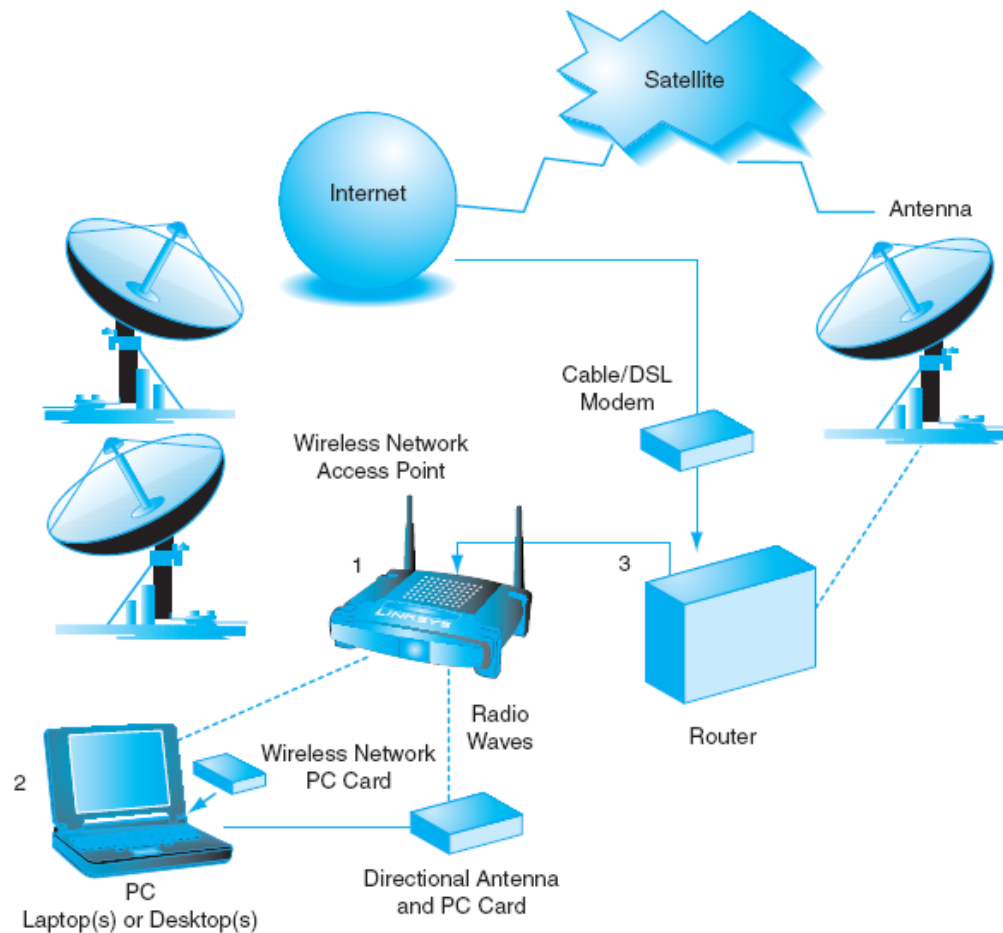
Wireless local area network (WLAN)

- **wireless local area network (WLAN)**

  A telecommunications network that enables users to make short-range wireless connections to the Internet or another network.

  - **Wi-Fi (wireless fidelity)**

    The common name used to describe the IEEE 802.11 standard used on most WLANs.

EXHIBIT 8.2   How Wi-Fi Works

1   Radio-equipped access point connected to the Internet
    (or via a router). It generates and receives radio waves
    (up to 400 feet).

2   Several client devices, equipped with PC cards, generate
    and receive radio waves.

3   Router is connected to the Internet via a cable or
    DSL modem or connected via a satellite.

(Source: Turban et al., 2010)

Municipal Wi-Fi networks

- By using a large number of connected hotspots, one can create a wireless city.

- City-wide or municipal Wi-Fi networks.

WiMax

A wireless standard (IEEE 802.16) for making broadband network connections over a medium-size area such as a city.

Wireless wide area network (WWAN)

A telecommunications network that offers wireless coverage over a large geographical area, typically over a cellular phone network.

EXHIBIT 8.3 — Four Generations of WWAN Technologies

WWAN Generation	Description
1G	This was the first generation of wireless technology. It was an analog-based technology in effect from 1979 to 1992 and was used exclusively for voice.
2G	This second generation of digital wireless technology is in widespread existence today. 2G is based on digital radio technology and is able to accommodate text messages (SMS).
2.5G	An interim technology based on new cell phone protocols such as GPRS (general packet radio service) and CDMA2000 (code division multiple access). This generation can communicate limited graphics, such as in picture text messages.
3G	The third generation of digital wireless technology supports rich media, such as video. 3G utilizes packet switching in the high 15 to 20 MHz range. 3G started in Japan in 2001, reached Europe in 2002, and the United States and much of Asia in 2003. As of 2004, the number of 3G-enabled devices was only a tiny fraction of the cell phone market. However, sales are projected to increase gradually as more 3G networks and applications become available.
3.5G	This generation is expected to be about seven times better than 3G. It promises data download speeds of 14 Mbps and upload speeds of up to 1.8 Mbps. This means major improvements in mobile voice telephony, video telephony, mobile TV, and other media.
4G	The next generation after 3.5G. The arrival of 4G, which will provide faster display of multimedia including video chat and mobile TV, is expected in 2010.

(Source: Turban et al., 2010)

MOBILE FINANCIAL APPLICATIONS

- **MOBILE BANKING**
- **MOBILE PAYMENTS**
  - **Mobile Proximity Payments**
  - **Mobile Remote Payments**
  - **microfinance**

    Refers to the provision of financial services to poor or low-income clients, including consumers and the self-employed.

MOBILE MARKETING AND ADVERTISING

- **MOBILE MARKETING CAMPAIGNS**
  - Four classes of online campaigns:
    1. Information
    2. Entertainment
    3. Raffles
    4. Coupons

The major objectives of mobile marketing campaigns

1. Building brand awareness
2. Changing brand image
3. Promoting sales
4. Enhancing brand loyalty
5. Building customer databases
6. Stimulating mobile word of mouth

(Source: Turban et al., 2010)

MOBILE MARKETING GUIDELINES

- Notice

- Choice and consent

- Customization and constraint

- Security

- Enforcement and accountability

MOBILE WORKFORCE SOLUTIONS

- **mobile worker**

  Any employee who is away from his or her primary work space at least 10 hours a week or 25 percent of the time.

Benefits of Mobile Workforce Support

- Provides mobile workers with real-time access to enterprise data and applications

- Reduces time required in the field to process orders or to service customer requests

- Automates existing paper and pen processes and workflows

- Ensures that processes are completed in a uniform fashion with minimal data entry errors or data loss

(Source: Turban et al., 2010)

Three Segments of Mobile Workers

- Mobile professionals
  (senior executives and consultants)

- Mobile field force
  (field sales and service technicians)

- Mobile specialty workers
  (delivery personnel and construction workers)

Solutions Used by Mobile Workers

- Mobile office applications
- Sales force automation (SFA)
- Field force automation (FFA)
- Mobile CRM (e-CRM)

Challenges of Mobile Workforce Support

- Network coverage gaps and interruptions
- Internetwork roaming
- Mobile network and application performance
- Device and network management
- Bandwidth management

MOBILE ENTERTAINMENT

- **mobile entertainment**

  Any type of leisure activity that utilizes wireless telecommunication networks, interacts with service providers, and incurs a cost upon usage.

EXHIBIT 8.4 — Size and Growth of the Mobile Entertainment Market

Segment	2007 ($Billion)	2012 ($Billion)	Compound Annual Growth Rate
Infotainment	2	6	25 percent
User-Generated Content	0.5	6	64 percent
Mobile TV (broadcast)	2	43	67 percent
Mobile TV (streaming)	5	4.5	−1.7 percent
Music	10	18	12 percent
Games	5	16	26 percent
Adult	1	4	32 percent
Gambling	0.1	3	97 percent
Images	2.7	2.9	1.2 percent
Total	28.3	103	29.5 percent

(Source: Turban et al., 2010)

MOBILE ENTERTAINMENT

- **MOBILE MUSIC AND VIDEO**

- **MOBILE GAMES**
    - Technology
    - Number of players
    - Genre

- **MOBILE GAMBLING**

LOCATION-BASED MOBILE COMMERCE

- **Location-based M-commerce (L-Commerce)**

  Delivery of m-commerce transactions to individuals in a specific location, at a specific time.

Five key factors of location-based m-commerce

1. Location
2. Navigation
3. Tracking
4. Mapping
5. Timing

L-COMMERCE INFRASTRUCTURE

- Mobile devices
- Communication network
- Positioning component
- Service or application provider
- Data or content provider

Positioning Component

- **network-based positioning**

  Relies on base stations to find the location of a mobile device sending a signal or sensed by the network.

- **terminal-based positioning**

  Calculating the location of a mobile device from signals sent by the device to base stations.

Positioning Component

- **global positioning system (GPS)**

  A worldwide satellite-based tracking system that enables users to determine their position anywhere on Earth.

- **real-time location system (RTLS)**

  Systems used to track and identify the location of objects in real time.

Location-Based Data

- Locating
- Navigating
- Searching
- Identifying
- Event checking

Geographical information system (GIS)

A computer system capable of integrating, storing, editing, analyzing, sharing, and displaying geographically referenced (spatial) information.

EXHIBIT 8.5 — Location-Based Applications and Services

Category	Examples
Advertising	Banners, advertising alerts
Billing	Road tolling, location-sensitive billing
Emergency	Emergency calls, automotive assistance
Games	Mobile games, geocaching
Information	Infotainment services, travel guides, travel planner, mobile yellow pages, shopping guides
Leisure	Buddy finder, instant messaging, social networking
Management	Facility, infrastructure, fleet, security, environmental
Navigation	Directions, indoor routing, car park guidance, traffic management
Tracking	People/vehicle tracking, product tracking

(Source: Turban et al., 2010)

BARRIERS TO LOCATION-BASED M-COMMERCE

- Lack of GPS in mobile phones
- Accuracy of devices
- The cost-benefit justification
- Limited network bandwidth
- Invasion of privacy

SECURITY AND OTHER IMPLEMENTATION ISSUES IN MOBILE COMMERCE

- **M-COMMERCE SECURITY ISSUES**
  - The basic security goals of confidentiality, authentication, authorization, and integrity are just as important for m-commerce as they are for e-commerce but are more difficult to ensure
  - An appropriate level of security must be maintained on several networks, both wireless and wired.

- **ETHICAL, LEGAL, AND HEALTH ISSUES IN M-COMMERCE**

EXHIBIT 8.6 Technical Limitations of Mobile Computing

Limitation	Description
Insufficient bandwidth	Sufficient bandwidth is necessary for widespread mobile computing, and it must be inexpensive. It will take a few years until 3G and WiMax are available in many places. Wi-Fi solves some of the problems for short-range connections.
Security standards	Universal standards are still under development. It may take three or more years for sufficient standards to be in place.
Power consumption	Batteries with long life are needed for mobile computing. Color screens and Wi-Fi consume more electricity, but new chips and emerging battery technologies are solving some of the power-consumption problems.
Transmission interferences	Weather and terrain, including tall buildings, can limit reception. Microwave ovens, cordless phones, and other devices on the free, but crowded, 2.4GHz range interfere with Bluetooth and Wi-Fi 802.11b transmissions.
GPS accuracy	GPS may be inaccurate in a city with tall buildings, limiting the use of location-based m-commerce.
Potential health hazards	Potential health damage from cellular radio frequency emission is not known yet. Known health hazards include cell phone addiction, thumb-overuse syndrome, and accidents caused by people using cell phones while driving.
Human–computer interface	Screens and keyboards are too small, making mobile devices uncomfortable and difficult for many people to use.
Complexity	Too many optional add-ons (e.g., battery chargers, external keyboards, headsets, microphones, cradles) are available. Storing and using the optional add-ons can be a problem.

MANAGERIAL ISSUES

1. What is your m-commerce strategy?

2. What is your timetable?

3. Are there clear technical winners?

4. Which applications should be implemented first?

References

- Turban et al., Introduction to Electronic Commerce, Third Edition, 2010, Pearson