Innovative EC Systems: From E-Government to E-Learning, Collaborative Commerce, and C2C Commerce

5

Contents

Learning Objectives

Upon completion of this chapter, you will be able to:
1. Describe various e-government initiatives.
2. Describe e-government activities and implementation issues including government 2.0 and m-government.
3. Describe e-learning, virtual universities, and e-training.
4. Describe e-books and their readers.
5. Describe knowledge management and dissemination as e-commerce.
6. Describe and discuss online advisory systems.
7. Describe collaborative commerce.
8. Describe C2C activities in e-commerce.

OPENING CASE: COMPASS GROUP TURNS MANAGERS INTO DETECTIVES TO ENHANCE E-TRAINING

Compass Group (**compass-group.com**) is a UK-based major provider of food and support services worldwide. The support services include security, janitorial services, building operations and maintenance, and project management. (See **compass-group.com/Support-Services-wwd. htm** and **compass-group.com/about-us.htm**.) According to their financial statement, the company's annual revenue was £17,557 million (in 2013). (For more on the company's financial

information, see **ar13.compass-group.com/assets/pdfs/Compass-AR-2013-Financial-Statements.pdf**, and **ar13.compass-group.com/our-business/our-regions**.) Their clients include major UK corporations such as Marks & Spencer and Tesco.

The Problem

The company's regional managers used financial performance software to analyze trends and review statistical data available in financial statements related to their functional areas. By defining the causes of problems and explaining unusual financial deviations from budgets, corrections could be planned. However, the company found that the managers had difficulty using the software. Therefore, Compass Group decided to partner with City & Guilds Kineo to train the managers using the financial software from Kineo Learning Solutions (**kineo.com/solutions**). However, some managers were skeptical about e-training (an application of e-learning), so in order to alleviate concerns and secure collaboration and use, it was necessary to convince them of the program's usefulness.

The Solution

To train the regional managers, Compass Group decided to use an attractive approach that would enable rapid mass training at low cost. They decided on e-training.

The implementation team created the "Compass Detective Board Game." The participating managers played the role of "detectives" in the game. Each detective needed to analyze performance and find solutions to problems ("crimes"). Each player had an adaptation to her/his functional area, based on real-life situations. The players received assistance in problem solving so they could gain experience. The players were able to come up with answers to questions such as how to react to a price cut by a competitor or how to determine when a budget deviation is significant. (Read the case study at **kineo.com/case-studies/process-and-technical/compass-group-systems-training**.)

The Results

In the first six months of its existence, the project had some outstanding successes:

- *Improved perceived performance:* Most participants agreed that their performance was likely to improve thanks to the training.
- *Train large numbers of people, quickly:* The e-learning enabled training many more managers rather than using conventional training (at the same cost and time frame).
- *Cost reduction:* The Compass Group saved £495,000 in 6 months, compared with the costs for conventional training.

Sources: Based on City & Guilds Kineo (2011), Training Press Releases (2011), and **compass-group.com** (accessed April 2014).

LESSONS LEARNED FROM THE CASE

E-learning (and e-training) is an EC application that helps organizations electronically teach a large number of students or employees, who are frequently in different locations, to ensure that they can grow and handle their jobs effectively. E-training at Compass Group is based in part on making sure that employees know why training is important to their business, clients, and customers. By creating an e-training program that engaged the trainees, the company not only reduced training costs and successfully trained the employees, it also motivated many employees to embrace e-training. E–learning and e-training are major topics in this chapter. Other innovative systems described in this chapter are e-government, e-books, and consumer-to-consumer EC.

5.1   E-GOVERNMENT: AN OVERVIEW

Electronic government, also known as *e-government* or *digital government* is a growing e-commerce application that encompasses many topics. This section presents the major ones.

Definition and Scope

E-government refers to the use of information technology in general, and e-commerce in particular, to improve the delivery of government services and activities in the public sector, such as: providing citizens with more convenient access to information and services, and providing effective delivery of government services to citizens and businesses as well as improving the performance of government employees. It also is an efficient and effective way for governments to interact with citizens, businesses, and other entities and to improve governmental business transactions (such as buying and selling goods), and to operate effectively within the governments themselves. E-Government includes a large number of activities, as can be seen in the New Zealand case (Online File W5.1) and in **en.wikipedia.org/wiki/E-Government**. For details, see Shark and Toporkoff (2008). For resources, see **w3.org/egov**.

Note that e-government also offers an opportunity to improve the efficiency and effectiveness of the internal operation of a government.

E-government includes the following major categories: government-to-citizens (G2C), government-to-business (G2B), government-to-government (G2G), internal efficiency and effectiveness (IEE), and government-to-employees (G2E). The major activities of the first four categories are provided in Table 5.1 (also see Digital Government Strategy 2012 and Egov 2003). For a description of the range of e-government activities in the United States, see Digital Government Strategy (2012) and **whitehouse.gov/omb/e-gov**. For examples of e-government in Singapore, see **egov.gov.sg**.

Example: The European Commission

The European Commission's Digital Agenda website (**ec.europa.eu/digital-agenda/welcome-digital-agenda**) is an example of a comprehensive e-government system. It is one of the European Union's seven flagships for achieving its 10-year growth strategy. The site is divided into several topics—notably, life and work, public services, ongoing studies, smart cities, and e-health and aging. For details, see **ec.europa.eu/digital-agenda/welcome-digital-agenda**.

The above categories are based on different entities with whom the government is interacting. However, these entities are also interconnected, as shown in the broken lines of Figure 5.1.

The following is a brief description of the major activities conducted between the government and each major entity.

Government-to-Citizens

The **government-to-citizens (G2C)** category includes all the interactions between a government and its citizens that take place electronically. G2C can involve dozens of different initiatives. The basic idea is to enable citizens to interact electronically with the government from anywhere and at any time. G2C applications enable citizens to ask questions of government agencies and receive answers, pay taxes, receive payments and documents, and schedule services, such as employment interviews and medical appointments. For example, in many U.S. states, residents can renew driver's licenses, pay traffic tickets, and make appointments for vehicle emission inspections and driving tests—all online. Governments also can disseminate information on the Web, conduct training, help citizens find employment, administer surveys, and much more. Government services to citizens are provided via citizen portals. The services will vary depending on the country, and on the governmental level (city, county, state country).

The major features of government websites are: information on how to contact the government,

Table 5.1 Representative categories of e-government performance objectives

G2C	G2B
• Reduce the time needed to interact with the government	• Increase the ability for businesses to find, view, and comment on rules and regulations
• Create a friendly single point access to government services for individuals	• Reduce the burden on businesses by enabling online filing of taxes and other documents
• Reduce the time spent in finding federal jobs	• Reduce the time to fill out export forms and locate related information
• Reduce the average time for citizens to find benefits and determine eligibility	• Reduce the time for businesses to comply with government regulations
• Increase the number of citizens who use the Internet to find information on recreational opportunities	
• Meet the high public demand for information	
• Improve the value of government services to its citizens	
• Expand access to information for people with disabilities	
• Make obtaining financial assistance from the government easier, cheaper, quicker, and more comprehensible	
G2G	**IEE**
• Decrease time needed to respond to emergency incidents by government agencies	• Increase availability of training programs for government employees
• Reduce the time to verify public records	• Reduce the average time to process clearance forms
• Increase the number of grant programs available for electronic applications	• Increase use of e-travel services within each agency
• Increase efficiency of communication between federal, state, local, and tribal governments	• Reduce time and overhead costs to purchase goods and services throughout the federal government
• Improve collaboration with foreign partners, including governments and institutions	• Plan IT investments more effectively.
• Automate internal processes to reduce costs within the federal government by disseminating the best practices across agencies	• Secure better services at a lower cost
	• Cut government operating costs

Sources: Based on Egov (2003), InfoDev/World Bank (2009), and the authors' experience

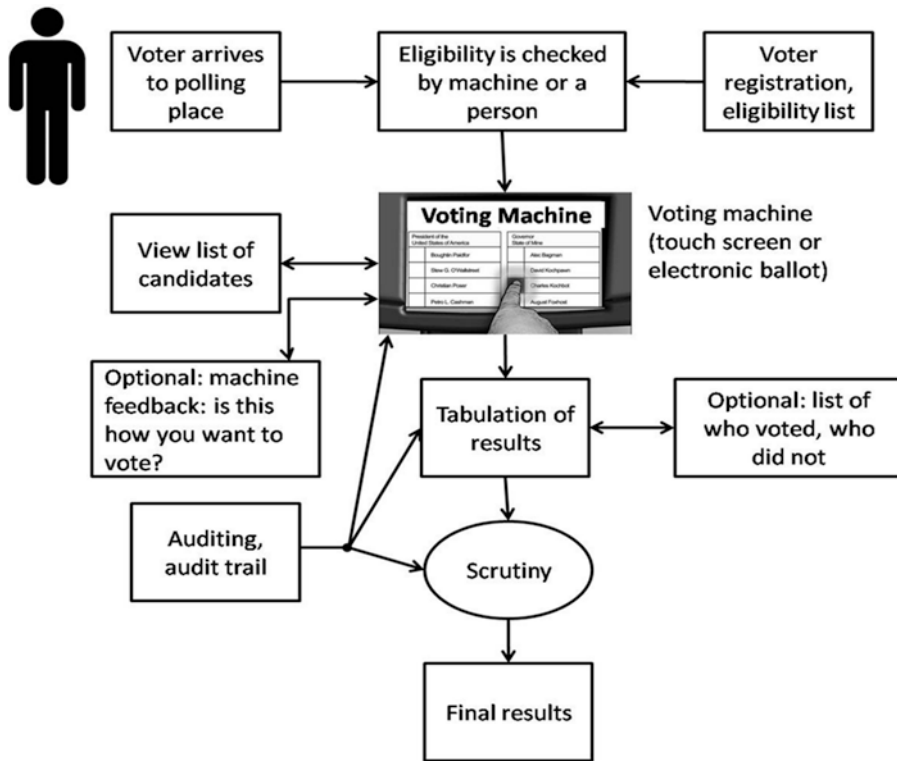**Figure 5.1** E-government categories of activities
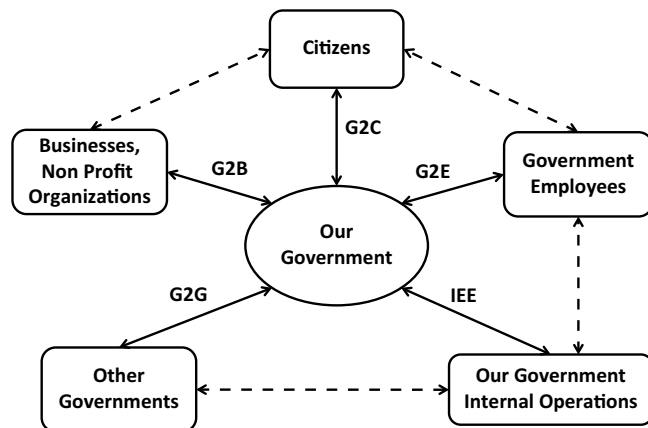
Figure 5.2   The process of using a voting machine

public notices to citizens, links to other sites, educational material, publications, statistics, legal notes, and databases. The major areas of such G2C activities are social services, tourism and recreation, public safety, research and education, downloadable forms, discovery of government services, tax filing, information about public policy, and advice about health and safety issues. G2C is now available on mobile/wireless devices in many countries and local governments.

Another area of G2C activity takes place by solving citizens' problems. The government (or a politician) can use CRM-type software to assign inquiries and problem cases to appropriate staff members (as shown on **ict.govt.nz**). Subsequently, workflow CRM software can be used to track the progress of the problems' resolution.

Note that over 20 countries block some websites for political, social, or other reasons (e.g., China, Iran, Syria). For more on G2C, see **usa.gov/Citizen/Topics/All-Topics.shtml**. For an overview of major citizens' groups and the

services provided to them by the U.S. Department of Labor, see **dol.gov/_sec/e_government_plan/ p41-43_appendixe.htm**.

Two popular examples of G2C are provided next.

Electronic Voting

Voting processes may be subject to errors, manipulation, and fraud. In many countries, there are attempts to "rig" the votes; in others, the losers want a recount. Voting may result in major political crises, as has happened in several countries. Problems with the U.S. 2000 and 2004 presidential elections have accelerated the trend toward electronic voting.

The voting process encompasses a broad spectrum of technological and social activities from voter registration and voter authentication to the casting of ballots and subsequent tallying of results. For an example of this process, see Figure 5.2. Electronic voting automates some or all steps in the process.

Fully electronic voting systems have raised considerable controversy because of a variety of

relevant factors, such as the proprietary nature of the software. Typical issues are the difficulties in selling the systems to voters, complex auditing, and the lack of experience in some steps of the process.

From a technology point of view, election fraud could be committed, for example, by directing a computer program to count votes twice for a specific candidate, or to not count votes for another candidate. Therefore, security and auditing measures are key success factors of e-voting. However, considering the amount of fraud that occurs with traditional, manual voting systems and the fact that e-security is improving, e-voting eventually could be the norm. For more information on e-voting, see **en.wikipedia.org/wiki/Electronic_voting** and the Electronic Frontier Foundation (**eff.org**).

Electronic Benefits Transfer
One e-government application that is not new is the electronic benefits transfer (EBT). It has been available since the early 1990s and is now in use in many countries. The U.S. government transfers billions of dollars in benefits to many of its citizens on a regular basis. Beginning in 1993, an attempt was made to deliver benefits to recipients' bank accounts. However, more than 20% of payments go to citizens who do not have a bank account. To solve this problem, the government initiated the use of smart cards (see Chapter 11). Benefit recipients can load the money they receive onto the cards and use the cards at automated teller machines (ATMs), point-of-sale locations, and grocery and other stores, just like other prepaid value cards. The advantage is not only the reduction in processing costs (from about 50¢ per paper check to 2¢ for electronic payment) but also the reduction of fraud. With biometrics (see Chapter 10) coming to smart cards and PCs, officials expect a substantial reduction in fraud. EBT has been implemented in all states since 2004. For more information on EBT in government, see **fns. usda.gov/apd/electronic-benefits-transfer-ebt** and **fns.usda.gov/ebt/general-electronic-benefit-transfer-ebt-information**.

Government-to-Business

Governments seek to automate their interactions with businesses. Although we call this category **government-to-business (G2B)**, the relationship works two ways: government-to-business and business-to-government. Thus, G2B refers to activities where the government sells products to businesses or provides businesses with services and vice versa. Two key G2B activities are e-procurement and the auctioning of government surpluses. For other U.S. G2B initiatives for businesses and nonprofits, see **usa.gov/Business/Business-Gateway.shtml.**

Government E-Procurement
Governments buy large amounts of MROs (maintenance, repair, and operations; Chapter 4) and other materials directly from suppliers. In many cases, RFQ (or tendering) systems are mandated by law. For years, these RFQs were done manually; the systems are now moving online. These systems utilize reverse (buy-side) auction systems, such as those described in Chapter 4. Governments provide all the support for such tendering systems. For additional information about such reverse auctions, see GSA Auctions (**gsaauctions.gov**). For an overview of and to watch a video about GSA auctions, see **gsa.gov/portal/content/100747?utm_source=FAS&utm_medium=print-radio&utm_term=gsaauctions&utm_campaign=shortcuts**. In the United States, for example, the local housing agencies of HUD (Housing and Urban Development), which provides housing to low-income residents, are moving to e-procurement (see U.S. Department of Housing and Urban Development 2009).

Example 1: Procurement at GSA
The U.S. General Services Administration (**gsa.gov**) uses technologies such as demand aggregation and reverse auctions to buy items for various units of the federal government (see also **government auctions.org** and **liquidation.com**).

Example 2: The U.S. SBA

The Procurement Marketing and Access Network of the Small Business Administration (**sba.gov**) has developed a service called PRO-Net (**pro-net.sba.gov**). It is a searchable database that contracting officers in various U.S. government units can use to find products and services sold by small, disadvantaged businesses, or businesses owned by women.

Group Purchasing

Many government agencies also utilize online group purchasing, which was described in Chapters 1 and 3. A related aspect is *quantity discount*, where suppliers post prices that get lower as quantities of orders increase. A similar method occurs when government buyers initiate group purchasing by posting product requests that other buyers may review and then join the group(s).

Forward E-Auctions

Many governments auction equipment surpluses or other goods, ranging from vehicles to foreclosed real estate. These auctions are now moving to the Internet. Governments can auction from a government website or they can use third-party auction sites such as **ebay.com**, **bid4assets.com**, or **governmentauctions.org**. The U.S. General Services Administration (GSA) in the United States operates a property auction site online (see **gsaauctions.gov**), where real-time auctions for surplus and seized goods are conducted. Some of these auctions are restricted to dealers; others are open to the public (see **governmentauctions.org**).

Government-to-Government

The **government-to-government (G2G)** category consists of EC activities between different units of governments, including those within one governmental body. Many of these are aimed at improving the effectiveness and the efficiency of government operations. Here are a few G2G examples from the United States:

- **Intelink.** Intelink (**intelink.gov**) is an intranet that contains classified information that is shared by the numerous U.S. intelligence

agencies. It is a U.S. Government computer system that is provided only for authorized U.S. government use.

- **Federal Case Registry (Department of Health and Human Services).** This service helps state governments locate information about child support, including data on paternity and enforcement of child-support obligations. See the Office of Child Support Enforcement (**acf.hhs.gov/programs/css**) and the Office of Child Support Enforcement Federal Case Registry Overview (**acf.hhs.gov/programs/css/resource/overview-of-federal-case-registry**). For more examples of G2G services, see **govexec.com**, **socialsecurity.gov**, and the New Zealand e-government case in Online File W5.1).

Government-to-Employees and Internal Efficiency and Effectiveness

Governments are introducing various EC initiatives internally. Two areas are illustrated next.

Government-to-Employees (G2E)

Governments are just as interested, as private-sector organizations are, in providing services and information electronically to their employees. **Government-to-employees (G2E)** applications refers to e-commerce activities between the government and its employees. Such activities may be especially useful in enabling efficient e-training of new employees, e-learning for upgrading skills and communication and collaboration activities. Other typical services are: e-payroll, e-human resources management, and e-recruiting.

Examples of G2E services are provided in Online File W.5.1.

Internal Efficiency and Effectiveness (IEE)

Governments have to improve the efficiency and effectiveness of their operations in order to stay within their budgets and avoid criticism. Unfortunately, not all governments (or units within governments) are efficient or effective. Automation, including e-commerce, provides an opportunity to significantly improve operations.

The following example illustrates some e-commerce applications for improving IEE.

Example

The U.S. Office of Management and Budget (OMB) (**whitehouse.gov/omb**) provides a list of activities related to IEE in their FY 2011 'Report to Congress' (see Office of Management and Budget 2012).

This list includes topics such as:

- Federal Cloud Computing Program Management
- Innovative Wireless and Mobile Apps Platform
- FedSpace (a collaborative platform for Federal employees)
- Federal Data Center Consolidation Initiative
- Small Business Dashboard
- IT Dashboard (also available via mobile devices)
- Performance.gov (website with information about performance improvement activities)

In addition, there are traditional IEE-related initiatives such as: e-payroll, e-record management, e-training, integrated acquisition, and e-HRM.

Implementing E-Government

Like most other organizations, government entities want to become digital. Therefore, one can find a large number of EC applications in government organizations. For many examples, see Foley and Hoover (2011) and the government innovators network at **innovations.harvard.edu**.

This section examines some of the trends and issues involved in implementing e-government (see Chan et al. 2011 for an overview). Note that one of the major implementation inhibitors is the desire of many governments to maintain control over the use and dissemination of data and knowledge.

The Transformation to E-Government

The transformation from traditional delivery of government services to full implementation of e-government may be a lengthy process. The business consulting firm Deloitte & Touche conducted a study that identified six stages in the transformation from traditional to e-government. These stages do not have to be sequential, but frequently are, with a seventh stage added by the authors, as shown in Online File W5.2.

All major software companies provide tools and solutions for conducting e-government. One example is Cognos (an IBM Company; see **ibm.com/software/analytics/cognos**). The company also provides free white papers.

E-Government 2.0 and Social Networking

By employing social media tools, new business models, and embracing social networks and user participation, government agencies can raise the effectiveness of their online activities to meet users' needs at a reasonable cost. Such initiatives are referred to as **Government 2.0**. For extensive coverage of content and applications of this topic, see NIC Inc. (2010), Hartley (2011), and McLoughlin and Wilson (2013). Government agencies around the world are now experimenting with social media tools as well as with their own pages and presence on public social network sites. Governments are using Web 2.0 tools mainly for collaboration, dissemination of information, e-learning, and citizen engagement.

Example

Ali (2010) provides an example of how the U.S. Coast Guard uses YouTube, Twitter, and Flickr to disseminate information and discuss their rescue operations. Notable is FEMA's Twitter feed (previously 'FEMA in Focus'), a channel that provides dissemination of FEMA-related information (see **twitter.com/fema**). Law enforcement agencies use social media (such as Facebook and Twitter) to hunt for criminals. (For some examples, see **digitaltrends.com/social-media/**

the-new-inside-source-for-police-forces-social-networks.) For more on how government agencies are expanding their use of social media, see **federalnewsradio.com/445/3547907/Agencies-open-the-door-to-innovative-uses-of-social-media**.

The Potential of E-Government 2.0
Many governments are embarking on government 2.0 initiatives. Several examples are provided in Online File W.5.1.

For an extensive list of resources on social networks in governments, including reports, applications, and policies see **adobe.com/solutions/government.html?romoid=DJHAZ**. E-government software and solutions are provided by most large software vendors (e.g., see Adobe. com's government white papers; **cisco.com/web/strategy/us_government/index.html**; **ibm.com/software/analytics/government**; and **microsoft.com/government/en-us/Pages/default.aspx**). For extensive coverage of e-government, see **wise-geek.com/what-is-e-government.htm**.

M-Government

Mobile government (m-government) is the implementation of e-government applications using wireless platforms. It is done mostly in G2C (e.g., see Government of Canada Wireless Portal (**mgovworld.org**). M-government uses wireless Internet infrastructure and devices. It is a value-added service, because it enables governments to reach a larger number of citizens (e.g., via smartphone or Twitter) and it can be more cost-effective than wireline-based EC platforms. It is very useful in disasters (e.g., emergency notifications), is fast (e.g., in conducting surveys and polls), and it is convenient for citizens as well. In addition, governments employ large numbers of mobile workers who are supported by wireless devices.

Example: Public Buses in Honolulu
An example of a mobile government project is the city government–run bus location system (an app) in Honolulu, Hawaii called 'DaBus' (**honolulu.gov/mobile**). Using your cell phone, you can find the estimated arrival time of any of the buses at more than 4,000 bus stops. Buses are equipped with GPS devices (Chapter 6) that transmit the bus's location in real time. The system then calculates the estimated arrival time for each stop. Similar systems exist in many other places (e.g., in Singapore 'IRIS'; in the U.S. 'NextBus,' and in the UK 'JourneyPlanner' apps).

M-government can help make public information and government services available anytime and anywhere. See **en.wikipedia.org/wiki/M-government, fiercemobilegovernment.com** and **usa.gov/mobileapps.shtml**. A specific example of e-government would be texting a mass alert to the public in the event of a major disaster.

The Benefits of M-Government
The major benefits of m-government are:

- More citizens and employees can be reached (anyplace, anytime)
- Cost reduction (e.g., by increasing productivity of employees; reduced budgets)
- Modernizing the operations of the government (e.g., employ mobile devices)
- Employees can bring their own mobile devices to work, saving hardware and software costs.
- Providing quality, flexible services to the public.
- Increasing the reach and speed for public dissemination of information.

In addition, many of the generic benefits of m-commerce (Chapter 6) are valid in m-government too.

Some Implementation Issues
Representative issues of implementing m-government are:

- An expensive infrastructure may be needed to supplement the existing traditional infrastructure. More infrastructures are needed for the wireless systems as well as for the increased volume of information flow.
- It may be difficult to maintain security and privacy of information on public mobile networks.

- For many citizens, mobile devices are too small or complex to use.
- In many countries there is a lack of standards and legislation regarding the use of data delivered wirelessly.

Applications

Several wireless applications suitable for e-government are presented in Chapter 6. Notable are G2E applications, especially for field employees, and G2C information discovery, such as the U.S. Department of Transportation's (DOT) 511 (see **fhwa.dot.gov/trafficinfo/511.htm**). Another example is the city of Bergen, Norway, which provides extensive wireless portable tourism services (see **visitnorway.com/us/games-and-more/free-app-from-visit-norway**). For a comprehensive list of emerging applications, see Trimi and Sheng (2008), **howto.gov/mobile**, and **apps.usa.gov**.

For other implementation issues, success stories, applications, benefits, and so forth, see MedLibrary (2010), Mobile Government Consortium International (**mgovernment.org**), and **m-government.info**.

SECTION 5.1 REVIEW QUESTIONS

1. Define e-government.
2. What are the four major categories of e-government services?
3. Describe G2C.
4. Describe how e-voting works.
5. Describe the two main areas of G2B activities.
6. How does government use EC internally and when dealing with other governments?
7. Describe e-government social networking activities. What are some potential benefits?
8. Describe m-government and its implementation issues.

5.2   E-LEARNING, E-TRAINING, AND E-BOOKS

The topic of e-learning is gaining much attention, especially because first-rate universities such as MIT, Harvard, and Stanford in the United States and Oxford in the United Kingdom are implementing it. Figure 5.3 shows the forces that are driving the transition from traditional education to online learning. E-learning also is growing as a method for training and knowledge creation in the business world and is becoming a major e-business activity. In this section, we will discuss several topics related to e-learning.

The Basics of E-Learning: Definitions and Concepts

There are several definitions of e-learning. A working definition of **e-learning** is the use of online delivery of educational materials and methods using information technologies, for the purposes of learning, teaching, training, or gaining knowledge at any time, and at many different locations (see **people.howstuffworks.com/elearning1.htm**, **en.wikipedia.org/wiki/E-learning**, and **webopedia.com/TERM/E/e_learning.html**). For a free comprehensive guide to e-learning, see Naidu (2003).

E-learning is also broader than the term *online learning,* which generally refers exclusively to Web-based learning. E-learning includes *m-learning* (or *mobile learning*) that is used when the material is delivered wirelessly to smartphones, tablets, or other mobile devices (description to follow). E-learning is synonymous with *computer-based instruction*, *computer-based training*, *online education*, and other terms.

E-learning can be useful as both an environment for facilitating learning at schools as well as an environment for efficient and effective corporate training. It appears in a variety of electronically supported learning and teaching activities, ranging from virtual classrooms to mobile conferences. For an overview on how e-learning works, including its major concepts, tools, delivery systems, and benefits, see Garrison (2011). For a theory of e-learning, see Harasim (2011). E-learning includes a variety of methods of computer-facilitated learning ranging from self study with DVDs to online degrees offered by universities. E-learning may also include the use of Web-based teaching materials and hypermedia, multimedia CD-ROMs, learning and teaching portals, discussion boards, collaborative software, e-mail, blogs, wikis, chat rooms, computer-aided assessments, educational animation, simulations, games, learning management software, electronic voting systems, and more (possibly a few of these combined).
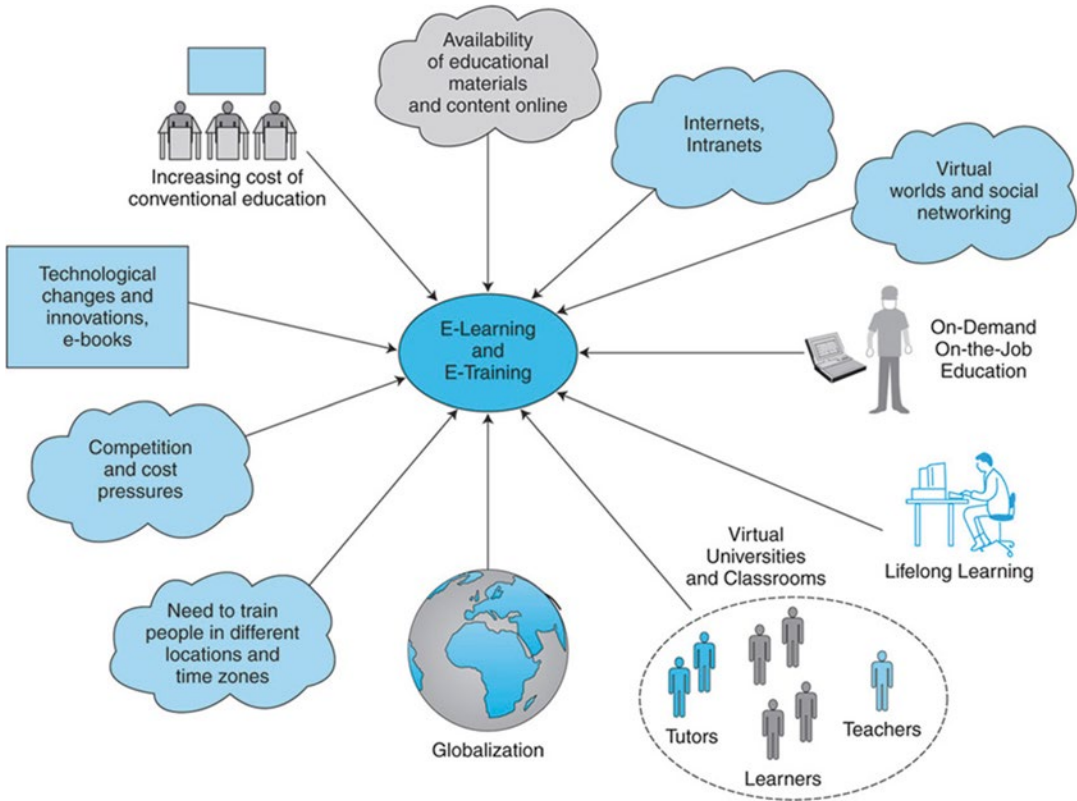
Figure 5.3   The drivers of e-learning

An interesting school without classrooms is the Hellerup School in Denmark. Students there 'learn by doing' and even determine the best way they can learn. For how the school operates, see **theguardian.com/smart-class-2025/denmark-hellerup-schoop-learning-by-doing** and Millar (2013). For details, see **en.wikipedia.org/wiki/E-learning** and Horton (2011). For a community and resources for e-learning professionals, see **elearningguild.com**.

M-Learning

A special category of e-learning is **m-learning**, or mobile learning, which refers to e-learning or other forms of education using mobile devices. Thus, one can learn at any place where a mobile device works. M-learning deals with communication and teaching in wireless environments. Special attention is given to situations where the instructors and the teaching materials are mobile. This technology enables learners to work and collaborate more easily than in offline situations. An example is MobileLearn (**waldenu.edu/about-walden/mobilelearnsm-walden-university-online**), an online learning program offered by Walden University (**waldenu.edu**), an online university that extensively uses m-learning. Some offline universities are using mobile learning as well. One such university is Abilene Christian University (**acu.edu**); faculty are focused on using iPad learning and teaching in their curriculum (see **acu.edu/technology/mobilelearning**). For further details including case studies and resources, see **m-learning.org** and **en.wikipedia.org/wiki/M-learning**. See also a slide presentation titled "What is M-Learning" at **slideshare.net/aurionlearning/what-is-mlearning**.

Benefits and Drawbacks of E-Learning

E-learning has many benefits both to the teaching institutions and to the learners. However, it also has several drawbacks, thus making it a controversial topic.

Benefits of E-Learning

In the Internet age, skills and knowledge need to be *continually updated* and refreshed (lifetime learning) to keep up with today's fast-paced business and technological changes. This means that more people need to learn and frequently do so in non-traditional ways. E-learning supports such learning due to the following capabilities and benefits (based in part on Garrison 2011; Agarwal et al. 2010; and Horton 2011):

- **Education.** Students can learn at home and keep their regular jobs while in school. Busy homemakers can earn degrees.
- **Learning and training time reduction.** E-learning can expedite training time by up to 50%.
- **Cost reduction.** The cost of providing a learning experience can be reduced by 50 to 70% when classroom lectures are replaced by e-learning sessions. This includes reduced faculty cost, no classrooms, less or no travel time.
- **Large number and diversity of learners.** E-learning can provide training to a large number of people from diverse cultural backgrounds and educational levels, even though they are at different locations in different time zones. Large companies such as Cisco Systems, Inc. (**cisco.com**) provide online training courses to a large number of employees, customers and business partners.
- **Innovative teaching.** Ability to provide innovative teaching methods such as special engagements, interaction with experts, interaction with learners in other countries, and so forth.
- **Measurement and assessment of progress.** Ability to assess progress in real time, find areas of difficulties, and design remedial work.
- **Self-paced and motivation learning.** E-learning students usually are self-paced and self-motivated. These charac-

teristics may result in higher content retention (25 to 60% higher than with traditional lecture-based training).
- **Richness and quality.** E-learning enables the use of top instructors as well as employing rich multimedia support. This may make learning more enjoyable. Difficult content can be made interesting and easy to understand. Overall, the quality of learning may increase.
- **Flexibility.** E-learners are able to adjust the time, location, content, and speed of learning according to their own personal schedules.
- **Updated and consistent teaching material.** It is almost impossible to economically update the information in textbooks more frequently than every 2 or 3 years; e-learning can offer real time access to the most updated knowledge. Delivery of e-learning may be more consistent than that of material presented in traditional classroom learning, because variations among teachers and teaching materials are minimized.
- **Ability to learn from mobile devices.** This helps learning in any place and at any time as well as providing support to learners by teachers and peers.
- **Expert knowledge.** In contrast with the knowledge of a single instructor in the classroom, e-learning may include the knowledge of several experts, each of whom prepares a teaching module in his or her area of expertise.
- **Fear-free environment.** E-learning can facilitate learning for students who may not wish to join a face-to-face group discussion to interact with peers or teachers.

E-learning can be very useful in developing countries. For an example of positive results in Jamaica, see Thompson (2014). For the top 10 e-learning statistics in 2014 with an infographic, see **elearningindustry.com/top-10-e-learning-statistics-for-2014-you-need-to-know**.

Drawbacks and Challenges of E-Learning

Despite the numerous benefits for both the learners and the teaching organizations, e-learning does have some drawbacks, such as the following:

- **Need for instructor retraining.** Some instructors do not have the knowledge to teach by electronic means and may require training, which costs money.
- **Equipment needs and support services.** Additional funds are needed (by the teaching institute) to purchase e-learning systems that supplement traditional ones. These are needed for e-learning creation, use, and maintenance.
- **Lack of face-to-face interaction and campus life style.** Many feel that the intellectual stimulation that takes place through interaction in a classroom with "live" instructors and peers cannot fully be replicated with e-learning.
- **Assessments and examinations.** In the higher education environment, one criticism is that professors may not be able to adequately assess student work completed through e-learning. There is no way of knowing, for example, who actually completed the assignments or exams. (Nevertheless, the same is true for any homework done outside the classroom).
- **Maintenance and updating.** Although e-learning materials are easier to update than traditionally published materials, there are practical difficulties (e.g., cost, instructors' time) in keeping e-learning materials current. The content of e-learning material can be difficult to maintain due to the lack of ownership of, and accountability for, website material. The developers of online content might not be those who update it.
- **Protection of intellectual property.** It is difficult and expensive to control the transmission of copyrighted works downloaded from the e-learning platform.
- **Student retention.** Without some human feedback and intervention, it may be difficult to keep certain students engaged and energetic.

According to Rossett and Marshall (2010), the top constraints for corporate e-learning are: (1) too costly to create and maintain; (2) difficulties persuading people to learn in new ways; (3) insufficient technological support; (4) employee hesitation to contribute to social learning; and (5) learners may prefer traditional classroom instruction. For a business case on e-learning, see Agarwal et al. (2010). For a practical guide on how to teach online, see Ko and Rossen (2010).

Advanced technologies can reduce some of the above and other drawbacks and constraints. For example, some online software products have features that help stimulate student thinking. Biometric controls can be used to verify the identity of students who are taking examinations from home. However, these features add to the costs of e-learning.

For more about the disadvantages of e-learning, see **peoplelearn.homestead.com/ELearning/ Introduction/Disadvantages.html**.

Distance Learning and Online Universities

The term **distance learning**, also known as *distance education*, refers to education conducted from home or other place, anytime. In such a case, the student is separated from a classroom by distance and possibly time. Sometimes students meet once or twice at a physical location in order to get to know each other, meet the instructor or coordinator, or take examinations. Distance learning is becoming widely used in universities and learning institutions around the globe. Major universities offer courses and degrees via this mode, which is becoming more recognized and acceptable. For details, see **onlineeducation.org**.

Virtual Universities—Real Degrees

The concept of **virtual universities**, online universities where students take classes from home via the Internet, is expanding rapidly. Hundreds of thousands of students in many countries, from the United Kingdom to Israel to Thailand, are taking online classes. A large number of existing universities, including Stanford University and other top-tier universities, offer online education of some form; for example, MIT offers thousands of their courses online (see courses at **ocw.mit.edu**). Millions of independent learners from all over the world (students, professors, self-learners) log on to the MIT OpenCourseWare site each year (see **ocw.mit.edu/about** and **ocw.mit.edu/about/site-statistics**). Some universities, such as University of Phoenix (**phoenix.edu**), National University (**nu.edu**), and the University of Maryland (**umuc.edu**), offer hundreds of courses and dozens of degrees online to students worldwide. The California Virtual Campus (**cvc.edu**) provides a directory and links to thousands of courses and online degree programs offered by colleges and universities in California (see **cvc.edu/students/courses**). For information about distance learning resources and online universities, see **distancelearn.about.com**. For a list of the top online MBA programs in the world, see **onlinemba.com/rankings**. According to Chubb and Moe (2012), "online technology promises historic improvements in the quality of and access to higher education." For practical advice on taking classes online, see Sparkman (2012).

Innovations in E-Learning

There are many innovations in e-learning, one of which is shown in the following example.

Example: E-Learning Via Robots

In December 2010, the city of Daegu in South Korea, introduced 29 robots into 19 elementary schools. Each robot, about 3.2-feet tall, was designed to teach English to the students. Developed by the Korea Institute of Science and Technology (KIST), the robots roll around on wheels and ask questions in English (see Figure 5.4). (For details see **cnet.com/news/korean-schools-welcome-more-robot-teachers**.)

The robots can be moved around the classroom by the instructor (via remote control), which facilitates the interaction of teachers with students. The robots can read books to the students and even "dance" to music. The robots display the face of a Caucasian "teacher" as an avatar. The tutoring is actually provided by experienced teachers in the Philippines, who are paid much less than Korean teachers. The robots are programed to use the most effective and current teaching methods (e.g., using multimedia games).

Cameras detect the Filipino teachers' facial expressions and instantly reflect them on the robot's avatar face. The students participate more actively, especially the shy ones who are afraid of speaking out loud. The robots are also used in remote rural areas where English teachers are in short supply.

For more examples on educational robotic teachers, see **intorobotics.com/advanced-robots-designed-for-educational-use-in-schools-and-kindergartens**. For more on robotic telepresence for distance education, watch the 2 minute video and see the text at **verizon.com/powerfulanswers/solutions/education**.

Online Corporate Training

Like educational institutions, a large number of business organizations are using e-learning on a large scale. Many companies, such as Cisco Systems (**cisco.com**), offer online training. A 2008 study by the American Society for Training & Development found that nearly one-third of corporate training content was delivered electronically (reported by Rossett and Marshall 2010).

Corporate training is driven by multiple factors and is often done via intranets and corporate portals. However, the students use the Internet as well. It has several variations, one of which is *on-demand online training*, which is offered by software companies such as Citrix Systems (**citrix.com**). However, in large corporations with multiple sites, and for studies from home, the Internet is used to access the online material. Vendors'

Figure 5.4   The Engkey – Robot English teacher (Source: The Korea Advanced Institute of Science and Technology.) Used with permission

success stories of online training and educational materials can be found at **adobe.com/resources/learning** and at **brightwave.co.uk**. For a comprehensive guide to online training, see Kaattari and Trottier (2013). For how e-learning helps in training new employees, see Robb (2012).

Example

Dresser-Rand is a global U.S. corporation that makes compression equipment. It has over 5,500 employees in 50 different locations in 26 countries that speak 14 different languages. The company needs to do extensive training due to growth and employee retirement. Previously, the company used over 600 training vendors to conduct training. A major challenge was the update of the teaching material due to technological changes. Using the learning management system (LMS) from Coastal eLearning (**training.dupont.com**; now a part of DuPont Sustainable Solutions), the company deployed a comprehensive online training program via Dresser-Rand University,

saving over $1 million per year. To read the case study, see **training.dupont.com/pdf/case-study/dresser-rand-v1211.pdf** .

Using Computer Games for Training Current and New Employees

There is an emerging trend to use computer simulation games for recruitment and training.

Example

Marriott International developed a game "My Marriott Hotel," available on Facebook for help in recruiting and training. According to Berzon (2011), the players learn how hotels and their restaurants operate. Initially, Marriott developed a game for the kitchen. The players needed to choose what ingredients to use for different foods (based on price and quality). The players also learned how to select employees from a pool of candidates and make decisions about equipment purchasing. They also learned about food quality.

Social Networks and E-Learning

Since its inception, social networking has been interrelated with learning (e.g., see Mason and Rennie 2008; Kidd and Chen 2009). A new term, **social learning**, also known as *e-learning 2.0*, has been coined to describe the learning, training, and knowledge sharing in social networks and/or facilitated with social software tools (see Bingham and Conner 2010 and Cobb 2011). Social environments facilitate high-tech based training, making it possible for learners to share their experiences with others. Thus, several companies already are using social networking for training and development purposes (e.g., see **advancinginsights.com** and Wang and Ramiller 2009). Social learning is based on *social learning theory,* which was developed by Bandura (1969). For details, see **en.wikipedia.org/wiki/Social_ learning_theory**.

Some students use Facebook, LinkedIn, Pinterest, Twitter, and so forth to connect with other pupils. For example, learners can study together, discuss topics or brainstorm online. Unfortunately, the distractions found on these networks can make it difficult to focus on learning. Some companies use social media to engage employees in group learning via knowledge sharing (see Zielinski 2012).

Several social networks (or communities) are dedicated to learning and training (e.g., see **e-learning.co.uk**). An example of a social network for learning is LearnHub (**learnhub.com**), which is dedicated to international education. Some scholars believe that the future of e-learning is social learning (e.g., see Hart 2009).

According to Derven (2009) and the authors' experiences, social networking technology possesses the following capabilities that may facilitate learning:

- *Connect learners in a learning project.* It enables people to connect in real time for discussion, collaboration, and problem solving.

- *Make 'social' part of the company's learning strategy.*
- *Build the know-how of experts.*
- *Enable learners to engage.* Generation X and Millennial workers use Web 2.0 tools extensively for interacting among themselves and with others. Organizations can reach out to this group and use social networks for training.
- *Use platforms such as Pinterest to develop creativity in design and to use images to sharpen some learning skills.*
- *Provide relevant content prior to offline meetings for voting, or requesting supplements.* This can enrich and facilitate classroom delivery.
- *Link learners to relevant resources and let them rate and share opinions.*
- *Quickly identify the training needs and implementation issues of individuals and groups.*
- *Have learners provide social support to each other.*
- *Improve and expedite learning-related communication (e.g., via Twitter).*

Many universities combine e-learning and social networking; also, numerous professors have blogs and wikis for their classes and encourage communication and collaboration via Facebook.

Bingham and Conner (2010) explain why and how social media can provide solutions to some of the most pressing educational challenges.

For more about the definition of social learning, see Marcia Conner's blog at **marciaconner. com/blog/defining-social-learning**.

Learning in Virtual Worlds and Second Life

A number of interesting learning initiatives have been implemented in virtual worlds, especially in Second Life (SL). Users can participate in simulations, role-plays, construction projects, and

social events. Learners can use virtual worlds to explore places they cannot afford to visit otherwise, as well as fantasy worlds.

Many people see SL and other virtual worlds as an opportunity to carry out learning projects that would be impossible in the real world because of constraints such as geography or cost (e.g., experiment with imaginary environments and processes). Others see virtual worlds as a place and opportunity to engage a younger generation of learners, many of whom are impatient or unsatisfied with traditional forms of education and training. Therefore, many refer to SL as an important classroom of the future. For more about education in Second Life, see **secondlife. com/destinations/learning** and **wiki.secondlife. com/wiki/Second_Life_Education**.

Learning in virtual worlds also offers the possibility of collaboration. For example, managerial training is no longer a matter of listening to lectures in a classroom, or at best, interacting with a learning program. Now learners can interact and collaborate with each other as well with people in social networks around the globe. Learning a foreign language, team building, and leadership all can benefit from online group interaction in virtual worlds.

Learning in virtual worlds in general, and in SL in particular, is growing slowly. Some universities created campuses in SL where instructors meet students, interact with them, and even conduct formal classes. For example, Indiana University conducted a demonstration of the university's Second Life island (see **uits.iu.edu/ page/bbcn** and **world.secondlife.com/place/ ad50ecb7-4f76-091c-3187-7706eb19e0fc**). For a comprehensive list of resources, see **secondlife. com/wiki/Second_Life_Education**.

Visual Interactive Simulation

An effective technology for e-training and e-learning is *visual interactive simulation* (VIS), which uses computer graphic displays to present the impact of evaluating alternative solutions to problems. It differs from regular graphics in that the user can manipulate the decision-making process and see the results of the interventions. Some

learners respond better to graphic displays, especially when they are interactive. For example, VIS was used to examine the operations of a physician clinic environment within a physician network in an effort to provide high-quality medical care. The simulation system identified the most important input factors that significantly affected performance. These inputs, when properly managed, led to lower costs and a higher level of medical care.

VIS systems provide the following major potential benefits:
- Shorten learning time.
- Aid in teaching how to operate complex equipment.
- Enable self-paced learning, any place, any time.
- Aid in memorization.
- Lower overall training costs.
- Record an individual's learning progress and improve on it.

Visual interactive simulation can facilitate learning on-demand.

Learning On Demand

A newly emerging learning trend is **learning on-demand** or "*just-in-time learning.*" The basic idea is that learners can study anywhere whenever they are ready. Several universities already offer such programs (e.g., see Kentucky Community & Technology College System; **learnondemand. kctcs.edu**). In a learning on-demand environment, courses or other learning materials are available whenever and wherever a learner needs them.

For a comprehensive discussion of learning on-demand, see **en.wikipedia.org/wiki/Demand-side_learning** and the survey done by Allen and Seaman (2009). See also **ondemand.blackboard. com** and **strategicmodularity.com/2013/09/ learning-on-demand**. Software for learning on-demand is provided by major vendors such as SAP (SAP Learning Hub; see **sapappsdevelop-mentpartnercenter.com/en/build/sap-learn-ing-hub**), Adobe (**adobe.com**), IBM (**ibm.com**), and Citrix (**citrix.com**). For a virtual training demo and case studies go to **infozone.clomedia. com/unifair**.

Also, see **gotomeetings.com.**

E-Learning Management Systems

A **learning management system** (**LMS**) (also known as a course management system) consists of software applications for managing e-training and e-learning programs including content, scheduling, delivery tips, and so forth. According to Ellis (2009), Dvorak (2011), Capterra Inc. Learning Management System Software (**capterra.com/learning-management-system-software**) and the authors' experiences, a robust LMS should be able to:

- Provide effective student-instructor interactions.
- Centralize and automate program administration.
- Enable the use of self-service and self-guided e-learning services.
- Create and rapidly deliver learning content modules.
- Provide a single point of access to all e-learning online materials.
- Help manage compliance requirements.
- Consolidate training initiatives on a scalable Web-based platform.
- Support the portability of systems.
- Increase the efficiency and effectiveness of e-learning.
- Personalize content and enable knowledge reuse.

Many companies (e.g., Saba Software, Inc.; **saba.com/us/lms**, SumTotal Systems; **sumtotal systems.com**) provide methodologies, software, hardware, and consultation about e-learning and its management. For examples, see Clark and Mayer (2011). For more on LMS, see **en.wikipedia.org/wiki/Learning_management_system** and watch the video titled "What is a Learning Management System?" (2:51 minutes) at **proprofs.com/c/category/lms**.

Note that it is possible to control what the students are doing when they self study. For example, according to Streitfeld (2013), teachers can find out when students are skipping pages, not bothering to take notes, or failing to highlight significant passages.

One of the most effective tools for learning management is Blackboard Inc. (**blackboard.com**; now combined with WebCT). A brief description follows.

Example 1: Blackboard

Blackboard Inc. (**blackboard.com**) is the world's largest supplier of course management system software for educational institutions. How do Blackboard products work? A textbook publisher places a book's content, teaching notes, quizzes, and other materials on a Blackboard in a standardized format. Instructors can access modules and transfer them on to their university's Blackboard sites, which can be accessed by their students.

A professor can easily incorporate a book's content into Blackboard's software. As of 2009, Blackboard also delivers corporate and government employee training programs worldwide which increases productivity and reduces costs. For details, see **blackboard.com** and **en.wikipedia.org/wiki/Blackboard_Inc.**.

Example 2: Moodle

An alternative to Blackboard is a mostly free open source system called Moodle (see **moodle.org** and Dvorak 2011).

Electronic Books (E-Books)

An **electronic book** (**e-book**) is a book in digital format that can be read on a computer screen, mobile device (e.g., a tablet, iPhone), or on a dedicated device known as an *e-reader*. A major event in electronic publishing occurred in 2000, when Stephen King's book *Riding the Bullet* was published exclusively online. For $2.50, readers were able to purchase the e-book on Amazon.com and other e-book providers. Several hundred thousand copies were sold in a few days. However, hackers broke the security protection, copied the book and distributed free copies of the book online. (See **bookbusinessmag.com/article/after-riding-bullet-12555/1#**.)

Publishers of e-books have since become more sophisticated, and online publishing has become more secure. Today there are several types of e-books that can be delivered and read in various ways:

- **Via a dedicated reader.** The book must be downloaded to an e-reader such as Amazon's Kindle.
- **Via Web access.** Readers can locate a book on the publisher's website and read it there. The book cannot be downloaded.
- **Via Web download and smart phones.** Readers can download the book to a PC.
- **Via a general-purpose reader.** The book can be downloaded to a mobile device such as an iPad or iPhone.
- **Via a Web server.** The contents of a book are stored on a Web server and downloaded for print-on-demand (which is discussed later in this book).

Most e-books require some type of payment. Readers either pay before they download a book from a website, such as buying a Kindle copy on Amazon.com, or they pay when they order the special CD-ROM edition of a book. Today, Amazon.com offers hundreds of thousands of e-books, e-newspapers (including international ones), and other digital products. All are cheaper than the hard-copy version (e.g., new release books may cost $10 or less). There are many free e-books as well (e.g., **free-ebooks.net** and **onlinebooks.library.upenn.edu**).

Devices for Reading E-Books

The major device used to read an e-book is an e-reader. Most e-readers are lightweight (about 10 ounces) and are convenient to carry. The major e-readers and tablets are listed and compared at **the-ebook-reader.com**. Between 2010 and 2012 there was a price war among all the main e-reader manufacturers.

Several other aids are available to help readers who want to read a large amount of material online. For example, Microsoft ClearType (**microsoft.com/typography/ClearTypeInfo. mspx**) and CoolType from Adobe (**adobe.com**) can be used to improve screen display, colors, and font sizes. Glowing screens can help you read in the dark (e.g., Kindle Touch and the Kindle Fire have a built-in light).

Combining E-Readers and Tablets

The trend today is to combine e-readers with tablet computers as was initiated with Amazon's Kindle Fire. The 7-inch portable devices allow people to read books, magazines, and documents, and listen to audio books. Users can play games, listen to music, watch movies and TV shows, and much more. Kindle has Internet access via Wi-Fi, so social network access and e-mail is available also. Finally, with Amazon's Kindle Owner's Lending Library, Kindle owners who have Amazon Prime can choose from a selection of more than 500,000 books to borrow, for free with no due dates.

Note: Tablet manufacturers also offer a combination of e-readers and tablets. The difference is that e-reader-based products such as Kindle Fire have less computing capabilities, while tablets such as iPad, have a less capable e-reader and are more expensive (see Falcone 2012 for a comparison).

Advantages and Limitations of E-Books

For e-books to make an impact, they must offer advantages to both readers and publishers. Otherwise, there would be little incentive to change from traditional books. Indeed, e-book sales are exploding due to the following advantages:

- Ability to store hundreds of books on a small mobile device (7″ to 10″). (External storage can hold much more.)
- Lower cost to buyers. The simple e-reader model costs less than $75; the tablet-based less than $200.

- Searchable text—you can show links and connect easily to the Web.
- Instant delivery via downloads from anywhere. The tablet-based models provide you with many of the capabilities of other types of mobile computers.
- Portability—they go where you go.
- Easy integration of content from several sources.
- Durability—they are built stronger than a traditional book (but they can break if you are not careful). Also, readers tend not to lose them (again, you need to be careful).
- Ability to enlarge the font size for easy reading and to add light if needed.
- Media rich (audio, color, video, etc.).
- Minimal cost for printing out a hard copy.
- Good readability in bright sunlight (able to read books outdoors).
- Easy updating of content.
- Almost no wear and tear.
- Easy to find out-of-print books.

The primary advantage that e-books offer publishers is lower production, marketing, and distribution (shipment) costs, which have a significant impact on the price of books (e-textbooks are about 50% cheaper than print versions). Other advantages for publishers are lower updating and reproduction costs, the ability to reach many readers, and the ease of combining chapters from several books to create customized textbooks, so professors can use materials from different books (usually by the same publisher) in one course.

A number of schools are experimenting with eliminating textbooks altogether and using an Internet-based curriculum (they lend iPads to all students). Finally, the light weight of the tablet can eliminate the back pain that people, especially school children, have from carrying backpacks full of heavy books.

Of course, e-books have some limitations: They require hardware and software that may be too expensive for some readers; some people have difficulty reading large amounts of material on a relatively small computer screen; batteries may run out; and there are multiple, competing software and hardware standards to choose from, confusing the buyers. Several of these obstacles may lessen in time.

A Final Note: Is This the End of Printed Books?

According to Amazon.com, in 2011, the sales of e-books on their site considerably exceeded the sales of hardcover and paperback books. (See **nytimes.com/2011/05/20/technology/20amazon.html** and Leggatt 2012).

Despite the limitations, e-books have become very popular, especially due to sophisticated e-readers. For example, even the Harry Potter books are now available in electronic format and they are not encrypted, so that readers can move the books between mobile devices and even to a PC. For a comparison between e-books and printed books, see **thrall.org/docs/ebooksand-books.pdf** and **en.wikipedia.org/wiki/E-book** .

The question is: Will most printed books be eliminated? The trend is very clear. Sales of printed books are on the decline, while e-books are up. With Amazon's free loan of Kindle books to their Prime members, we expect even more people reading e-books. Are paper books going to disappear? (See discussion by Vaughan-Nichols 2012). For the advantages of e-books versus traditional books, see **online-bookstores-review.toptenreviews.com/the-advantages-of-ebooks-versus-traditional-books.html**.

SECTION 5.2 REVIEW QUESTIONS

1. Define e-learning and describe its drivers and benefits.
2. List some of the major drawbacks of e-learning and describe how they can be prevented.
3. Describe virtual universities and distance learning.
4. Define e-training and describe how it is done.

5. Describe the connection between e-learning and social networking.
6. Describe learning in virtual worlds.
7. List some e-learning tools, and describe Blackboard and visual interactive simulation (VIS).
8. Describe e-books.
9. What is an e-reader? What are its major capabilities?
10. List the major advantages and limitations of e-books to their users.

5.3   KNOWLEDGE MANAGEMENT, ADVISORY SYSTEMS, AND ELECTRONIC COMMERCE

The term *knowledge management* is frequently mentioned in discussions about e-learning. Why is this? To answer this question, you first need to understand what knowledge management is.

An Overview of Knowledge Management

Knowledge management and e-learning are both centered on knowledge. Whereas e-learning uses knowledge to enhance individual learning, knowledge management is essential for improving the operation of individuals' organizations, or teams. Knowledge is one of the most important assets in any organization, and thus it is important to capture, store, secure, and reuse (share) it. These are the major purposes of knowledge management. Thus, **knowledge management (KM)** refers to the process of capturing or creating knowledge, storing and protecting it, updating it constantly, disseminating it, and using it whenever necessary (see **en.wikipedia.org/wiki/Knowledge_management** and Bahal 2011).

Knowledge in organizations is collected from both external and internal sources. It is then examined, interpreted, refined, and stored in what is called an *organizational knowledge base,* the repository for the enterprise's knowledge. A major purpose of an organizational knowledge base is to allow for *knowledge sharing*.

Knowledge Management Types and Activities

Organizational knowledge is embedded in the following key resources: (1) human capital, which includes employee knowledge, competencies, intelligence, and creativity; (2) organizational capital, which includes stored organizational experiences (e.g., best practices, patents, manuals, teaching materials); and (3) customer and partner capital, which includes the experience of working with customers and business partners.

This organizational knowledge must be managed properly and leveraged through sharing and dissemination. This is the major purpose of KM, which has the following major tasks:

- **Create knowledge.** Knowledge is created as people gain more experience (e.g., trial-and-error) and education. Sometimes, external knowledge is brought in (e.g., provided by vendors and consultants).
- **Capture knowledge.** Existing knowledge must be identified and assembled. Remember that, a considerable amount of knowledge is not documented, and just dwells in people's memory.
- **Refine knowledge.** New knowledge must be placed in context so that it is actionable. This is why human insights (tacit qualities) must be captured along with explicit facts.
- **Store knowledge.** Useful knowledge must be stored into an easily retrievable format in a secured knowledge repository.
- **Update knowledge.** The knowledge must be kept current. It must be reviewed to verify that it is relevant and accurate; if not, it must be updated.
- **Disseminate knowledge.** Knowledge must be made available in a useful format to anyone in the organization who needs it, and who is authorized to access it.
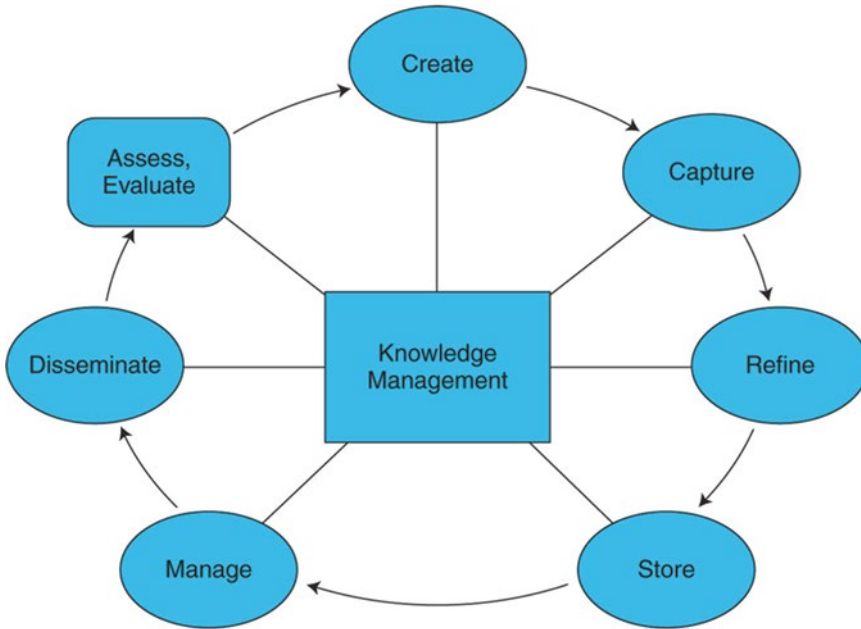
Figure 5.5 The knowledge management system cycle

These tasks can be viewed as a cyclical process, as shown in Figure 5.5. The objective of e-commerce is to automate KM activities as well as help in using the stored knowledge.

For a comprehensive list of KM activities and tools, see **en.wikipedia.org/wiki/Knowledge_management**, **kmworld.com**, FinRM Financial Risk Management (**riskmanagement.finrm.com**), and Awad and Ghaziri (2010).

Knowledge Sharing

Knowledge is of limited value if not updated and shared. The ability to share and then distribute knowledge decreases its cost per user and increases its effectiveness. Shared knowledge can also decrease risk and uncertainty and facilitate problem solving. An example of a knowledge-sharing system at Infosys Technologies is provided in Case 5.2.

CASE 5.1: EC APPLICATION: KNOWLEDGE MANAGEMENT AT INFOSYS TECHNOLOGIES

The Problem

Infosys Technologies (**infosys.com**), a software services company based in India (with over 158,000 employees as of December 2013), provides outsourcing and consulting services worldwide. Infosys develops IT solutions for some of the largest corporations in the world. Between 1997 and 2010, Infosys had experienced an annual growth rate of 30%. Therefore, the company faced a challenge of keeping its large employee base up-to-date, and staying ahead of its competitors by ensuring that the best practices were available to its employees anytime from anywhere, so that employees could reuse the accumulated knowledge. The company

uses mottos like "Learn once, use anywhere." However, how does such a large organization do this?

The Solution

Infosys started its KM in the early 1990s and it continues to this day. The initial KM initiative, known as '*bodies of knowledge (BOK)*,' encouraged employees to document their best practices by cataloging them according to subjects. These best practices were then shared companywide (by hard copy and later via the intranet). This early effort turned into the formal KM program. In 1999, Infosys began to consolidate the various knowledge initiatives. A central *knowledge portal* was created, called KShop, and the corporate KM group updated and expanded the KM infrastructure, while the local KM groups were directed to manage their own content on KShop. According to the company's 2012–2013 Sustainability Report, 2.5 million activities were recorded from 100,000 employees in FY 2013 (see **infosys.com/sustainability/Documents/info-sys-sustainability-report-2012-13.pdf**). For a presentation on Infosys and KShop, watch the video titled 'Infosys KShop" (4:29 minutes) at **youtube.com/watch?v=Z7WzJjKyBeE**.

To encourage usage and contribution by employees, a reward program was initiated that in the beginning, included prizes and cash.

In 2007, the company introduced an automated tool called Infosys KMail; employees can send queries to KMail and a search engine tries to match responses from the knowledge base (reported by Mehta et al. 2007). According to the company's 2012–2013 Sustainability Report, over 800,000 activities were recorded from 18,000 employees in FY 2013 (see **infosys.com/sustainability/Documents/infosys-sustainability-report-2012-13.pdf**).

The Results

As the volume of content increased, so did the difficulty finding and reviewing the needed content for quality control. The KM group therefore developed a new and more lucrative incentive program that includes the need for justification content (e.g., usefulness to users). By 2014 there were 75,000 knowledge assets stored in the central knowledge repository.

The company has filed a patent for its KM mechanism called *Knowledge Currency Unit*. The KM project has enabled the company to sustain its competitiveness and market leadership (see Suresh and Mehesh 2008).

For more on the Global Delivery Model of KM, see **infosys.com/global-sourcing/global-delivery-model/Pages/knowledge-management.aspx**.

Sources: Based on **infosys.com** (accessed April 2014), Mehta et al. (2007), Bahal (2011), Suresh and Mehesh (2008), Tariq (2011), and Rao (2010).

Questions

1. Why are consulting organizations such as Infosys interested in KM?
2. Identify the benefits of KM to the company.
3. Identify the KM cycle and activities in this case.
4. Why is a reward system beneficial? Compare the old and new reward systems.

Software Tools for Knowledge Sharing

There are many software knowledge-sharing tools. Some call these "knowledge-sharing technologies." In this chapter and book, we cover the following:

- Expert and expertise location systems (Section 5.3)
- Knowledge management systems (Section 5.3)
- Social networks and Web 2.0 tools (Chapters 2 and 7)
- Collaborative commerce tools (Section 5.4)

How Is Knowledge Management Related to E-Commerce?

Organizations need knowledge, which is provided by KM, in order to better perform their tasks.

Core KM activities for companies engaging in EC should include the following: creation, capture and codification, classification, distribution, and utilization. *Knowledge creation* involves using various computer-based tools and techniques to analyze transaction data and generate new ideas (e.g., Group Support Systems [GSS], crowdsourcing, and blogs). *Knowledge capture and codification* includes gathering new knowledge and storing it in a machine-readable format. *Knowledge classification* organizes knowledge using the appropriate classification related to its use. *Knowledge distribution* is sharing relevant information with other employees, suppliers, and consumers, and other internal and external stakeholders through electronic networks—both public and private. *Knowledge utilization* involves the appropriate application of knowledge to problem solving by exploiting opportunities and improving employees' skills. Intuitively, KM is related to e-learning (e.g., see Lytras et al. 2013). Finally, *knowledge evolution* entails updating knowledge as time progresses.

In the past KM and EC initiatives were dealt with independently; however, they can be used together for mutual benefit.

Examples

According to Britt (2013), "E-commerce retailers are using knowledge management solutions to pull together order, inventory, sales and other transaction information, as well as to improve customer feedback and to enhance the overall e-commerce experience." Britt provides the following examples:

- Dog is Good Inc. (a merchant of "'canine-themed apparel'") is using KM to help in the integration of EC subsystems (ordering, inventory, order fulfillment, accounting, and EC stores) using the offerings from NetSuite.
- Ideeli, Inc., an online daily flash retailer, uses KM analytics (ForeSee Satisfaction Analytics) to learn about customer experiences from collected feedback.
- Ideeli, Inc. also uses KM analytics (ForeSee's mobile analytics solution) to identify the needs of frequent visitors (by segments on mobile devices). As a result, the company modified its e-commerce strategies.

- Retina-X Studios provides tracking and monitoring of activities on mobile phones, computing devices, etc. The KM system is used to improve the handling of EC chargebacks due to cancellation. The company turned to Avangate's e-commerce solution that cut costs and improved customer service.

Some managers believe that a major EC-related role of KM is linking EC and business processes. Specifically, knowledge generated in EC contributes to the enhancement of three core processes: CRM, SCM, and product development management. For more on KM-enabling technologies and how they can be applied to business unit initiatives, see **kmworld.com**, **riskmanagement.finrm.com**, and **knowledgestorm.com**.

KM and Social Networks

A major place of knowledge creation is in online communities, including social networks. This is done by *crowdsourcing* and customer and employee discussions and feedback. This area has several variations. One variety is limited within a single company (see the Knowledge Network in the Caterpillar Online File W5.3). Knowledge can also be created in *user-generated content* (see Chapter 7) and in the "answer" function of some social networks, or KMail at Infosys.

Web 2.0 applications help aggregate corporate knowledge, facilitate communication and collaboration, and simplify the building of repositories of best practices, as demonstrated by the following example.

Example: IBM Jam Events

Since 2001, IBM has been using communities for online brainstorming sessions, idea generation, and problem solving. These sessions are called "Jam Events." According to their page, "IBM's Jams and other Web 2.0 collaborative mediums are opening up tremendous possibilities for collaborative innovation…" (**collaborationjam. com**). Each Jam has a different topic. In 2006 the largest IBM online brainstorming session ever held, called the *Innovation Jam*, brought a community of over 150,000 employees from 104 countries and 67 companies to launch new IBM

businesses (see Bjelland and Wood 2008 and collaborationjam.com/).

Virtual meetings where IBM employees can participate in Innovation Jam launches were conducted in SL. IBM's former CEO even created an avatar to represent himself. Besides business, recent topics that have been explored by IBM Jams include social issues. See **collaboration jam.com/IBM.Jam**. Other topics that have been explored are new technologies for water filtration, 3-D Internet, and branchless banking. For more on IBM's Jams—the process, examples of topics, and results, as well as the use of virtual worlds, see Bjelland and Wood (2008), **ibm.com/ ibm/jam/index3.shtml**, **blogs.hbr.org/2013/01/ learning-how-to-jam**, **en.wikipedia.org/wiki/ Knowledge_management**, and **ibm.com/ developerworks/webservices/library/ws- virtualspaces**. For the history of IBM Jams, see **collaborationjam.com/IBM.Jam**.

Deploying KM Technologies

Knowledge management as it relates to EC and IT is not easy to implement. Bahal (2011) lists 8 critical success factors for KM including strategy, leadership, integration, and technical infrastructure. Currier (2010) lists the following reasons by declining order of importance: ROI difficult to measure; difficulties in training end-users; insufficient budget; poorly defined or executed strategies; employee resistance; difficulty in finding the right KM software and vendors; need to ensure security; customization is too difficult; maintaining quality of output can be costly; lack of upper management commitment; implementation is disruptive; lack of IT commitment; and employee privacy protection issues.

Finding Expertise and/or Experts Electronically and the Use of Expert Location Systems

Expert advice can be provided within an organization in a variety of ways. Human expertise is rare; therefore, companies attempt to preserve it electronically, *as expert systems*, in corporate knowledge bases. Users may look for human experts to answer their questions or they may search the knowledge bases for expertise.

People who need help may post their inquiries internally on corporate intranets (e.g., using special Q&A platforms, like KMail of Infosys, or discuss their issue in forums or blogs), or on public social networks such as Yahoo! Answers (**answers.yahoo.com**), that have a "search answers" feature. Similarly, companies may ask for advice on how to solve problems or exploit an opportunity and offer incentives to participate. Answers may generate hundreds of useful ideas within a few days. This is a kind of brainstorming.

Answers Provided by People on Social Networks or Portals

Several social networks (e.g., **linkedin.com**), or Internet portals (e.g., **answers.yahoo.com**) offer free Q&A capabilities.

Example

Yahoo! Answers (**answers.yahoo.com**) allows you to post a question, for free.

One of the authors of this book posted the following question on Yahoo! Answers.

Question: "My Yahoo! e-mail has been hijacked. The spammer sends requests for money in my name to all the people on my contact list. What should I do?" Answer (Anonymous): (Best answer-chosen by voters): "The spammer could have obtained your password with phishing spam. Change your password. While you are in your account settings, check for tampering with your alternate e-mail contact address. That could be used to obtain new passwords. Also, abstain from clicking on links within your spam. That spammer's webpage can run a malicious script. This runs within your browser and can tell webmail currently logged in within that browser to send spam."

The answers provided by Yahoo! are usually generated manually by volunteers for free. Sometimes the answers are generated automatically, as described in the next section.

Automated Question-Answer Systems

In addition to advice provided by humans, an increasing number of applications attempt to

provide automated answers to users' questions. The expert finding system described in the following section is an example of such a system. The user asks a question and the computer tries to find an answer that best matches the question. The goal of an **automated question-answer (Q&A) system** is to find answers that match questions asked in a natural language (e.g., English, Chinese).

Example: Search Engine Advice

Answers.com and Ask.com belong to a special category of search engines containing a massive collection of questions, each with pre-generated answers. The engine tries to match a question asked in a natural language with a standard question within its matched answer.

A *Q&A system* differs from *frequently asked questions (FAQ)* in that the content of an FAQ is fairly structured and limited in its size, concentrating on "frequently asked questions." In addition, an FAQ posts questions to choose from while in a Q&A forum, users ask unstructured questions in a natural language.

To begin, the computer needs to understand the questions (e.g., by using natural language understanding software); then, the computer can search for matching answers. There are several methods for computers to find the answers to such questions. One method is based on the use of Artificial Intelligence (AI) by using intelligent agents such as expert systems. Trying to reason automatically from historical cases is another popular approach. Note that automated Q&A concentrates mostly on automated problem solving and is not related to Web search.

Example: IBM PureSystems

IBM PureSystems are an Expert Integrated System family of intelligent computer systems designed to help companies solve IT challenges. They are based on Cloud Computing. For details, see **ibm.com/ibm/puresystems/us/en/index.html**.

Live Chat with Experts

Live chats with experts are becoming popular. For example, you can chat with physicians practicing different specialties. You can do the same with many other professionals. Many companies provide live chat (similar to Yahoo Messenger or AOL IM). The waiting time for replies is usually short.

Chat with Avatars

You can chat with avatars that use a collection of preprogrammed Q&A. Such a service is very inexpensive (but may be not too accurate). The quality of the answers is increasing as the knowledge base increases and as the ability of the computer to understand natural language improves. For example, see Ted, the Virtual Investment Consultant at TD Ameritrade (**tdameritrade.com/virtualclient/about.html**). More discussion is provided in Chapter 2.

Expert Location Systems

Expert/expertise location systems (ELS) are interactive computerized systems that help employees locate experts within their organization in order to get help in solving specific, critical business or technical problems in a short time. Expertise location systems are designed to:

- Identify experts in specific domain areas inside organizations.
- Link people to information about such experts and enable contacts with them.
- Assist employees with advice on career development.
- Provide support for teamwork and groups in social networks.

Software for such systems is made by companies such as IBM and RightNow Technologies (now an Oracle company). For benefits, features, and demonstrations, see Hivemine AskMe (**hivemine.com/products/askme_difference.html**) and AskMe's Product Data Sheet (**hivemine.com/realcom/whse/Hivemine_AskMe_Datasheet.pdf**). Most expert location systems work in a similar manner, exploring knowledge bases for either an answer to the problem (if it exists there) or for locating qualified experts. The general process is shown in Figure 5.6.

The four steps of the process are:

1. An employee submits a question to the ELS.
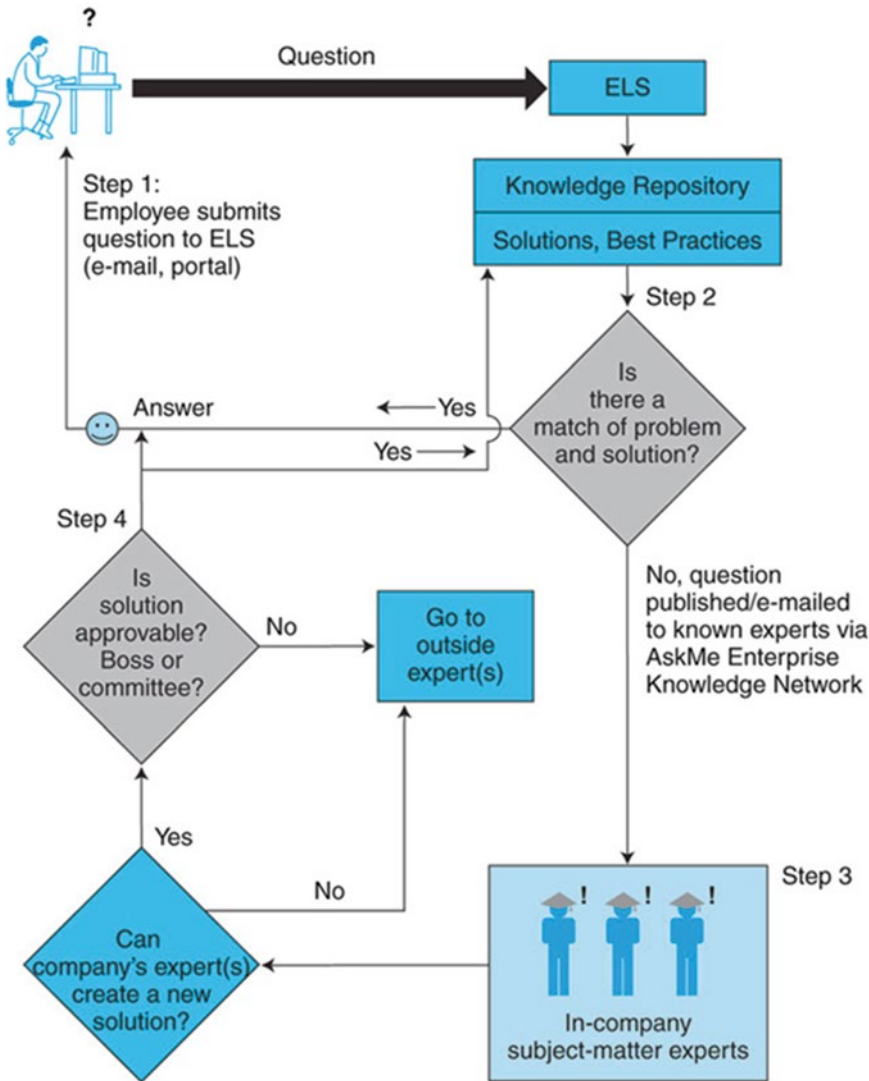2. The software searches its database to see if an answer to the question already exists.

Figure 5.6 AskMe's expert location system

If it exists, the information (research reports, spreadsheets, etc.) is returned to the employee. If not, the software searches documents and archived communications for an expert in the domain area.

3. Once an expert candidate is located, the system asks if he or she is able to answer the question. If so, the expert submits a response. If the expert is unable to respond, he or she can elect to reroute the question to the next appropriate expert until one responds.

4. After an answer to the question is found, it is reviewed for accuracy by a corporate advisor and sent to the person who made the query. At the same time, the question and its response are added to the knowledge repository to be used in future similar situations.

Example: How the U.S. Department of Commerce Uses Expert Location Systems

The U.S. Commercial Service Division at the Department of Commerce (DOC) conducts

approximately 200,000 counseling sessions a year involving close to $40 billion in trade. The division employs many specialists who frequently need to do research or call on experts to answer a complex question posed by a U.S. corporation.

For example, according to D'Agostino (2004), a DOC specialist was approached for advice regarding the tax legitimacy of a U.S. transaction with a Polish company. The employee did not know the answer, so he looked for an expert within the agency using an expert location system (from India's AskMe). In a short time, he found 80 experts and transferred the query to six of them. In one day, he had enough information to formulate the answer. Previously, it would have taken up to three days to obtain the information needed for a similar answer by phone.

The employee estimates that he now uses the system for roughly 40% of the work he does.

For details, see D'Agostino (2004).

Seeking Expertise in Social Networks

Seeking expertise (and experts) is becoming a very popular social activity. People post their queries on bulletin boards, forums, and blogs and wait for responses. One of the features of LinkedIn is the free "Help Forum," where users can post questions to get help from forum members or start a discussion.

SECTION 5.3 REVIEW QUESTIONS
1. Define knowledge management.
2. Discuss the relationship between KM and EC.
3. Describe online advisory services.
4. Describe expert location systems and their benefits.
5. Relate social networks to providing advice.

5.4 COLLABORATIVE COMMERCE

Collaborative commerce is an e-commerce technology that can be used to improve collaboration within and among organizations, frequently in supply chain relationships.

Essentials of Collaborative Commerce

Collaborative commerce (c-commerce) refers to electronic support for business collaboration. It enables companies to collaboratively plan, design, develop, manage, and research products, services, and innovative business processes, including EC applications. An example would be a manufacturer who is collaborating electronically with an engineering company that designs a product or a part for the manufacturer. C-commerce implies communication, information sharing, and collaborative planning done online by using tools such as groupware, blogs, wikis, and specially designed EC collaboration tools. Many collaboration efforts are done along the supply chain where the major benefits are cost reduction, increased revenue, fewer delays, faster movement of goods, fewer rush orders, fewer stockouts, and better inventory management. C-commerce is strongly related to **e-collaboration**, which is collaboration using digital technologies among people for accomplishing a common task.

The Elements and Processes of C-Commerce

The elements of the processes of c-commerce vary according to situations. For example, in many cases, c-commerce involves a manufacturer (or an assembler) who collaborates with its suppliers, designers, and other business partners, as well as with its customers and possibly the government. The major elements of the collaboration process are illustrated in Figure 5.7. Notice that the collaboration process is based on the analysis of internal and external data that are made visible via a visualization portal. On the lower left side of the figure, we show the cyclical process of c-commerce. The people involved in this cycle use the information in the displays as well as the interactions among the major groups of participants (shown on the right side of the figure).
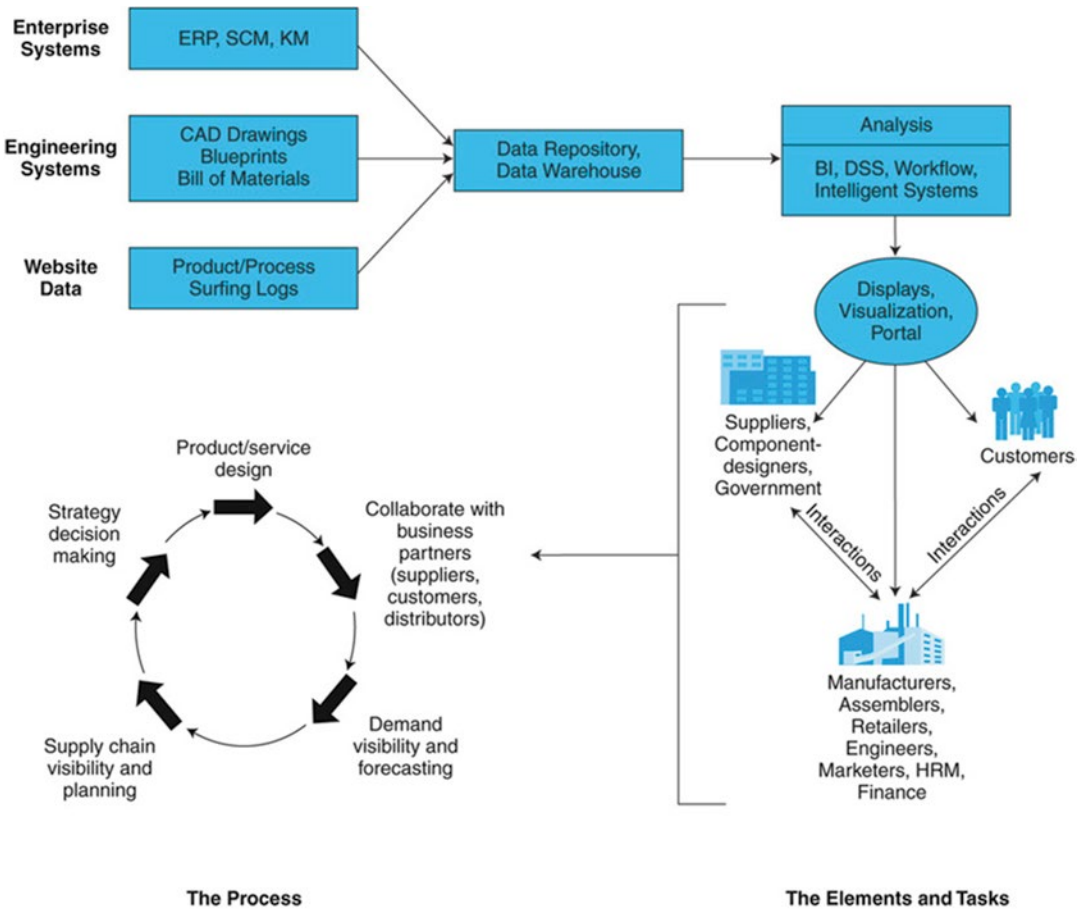
Figure 5.7 Elements and process of c-commerce systems

The elements of c-commerce can be arranged in different configurations, one of which is a hub.

Collaboration Hubs

A popular form of c-commerce is the *collaboration hub*, which is often used by the members of a supply chain. A **collaboration hub (c-hub)** is the central point of interaction and of a company's supply chain (see Figure 12.4, pg. 582). A single e-hub can host multiple *collaboration spaces* in which trading partners transact, collaborate, communicate, and share information. For the collaboration life-cycle, see Wishom (2012).

Improving Collaborative Commerce

C-commerce can be divided into two major categories: internal and external. *Internal collaboration* refers to inter-departmental collaboration such as collaboration among organizational employees and collaboration of departments with their mobile employees. It also refers to collaboration among teams and individual employees who are off premises. *External collaboration* refers to any collaboration between an organization and others in the external environment.

A large number of electronic tools is available to improve collaboration, starting with e-mail and wikis and ending with collaborative spaces

and comprehensive tools such as Microsoft SharePoint (**office.microsoft.com/en-us/share-point**), Salesforce Chatter (**salesforce.com/ap/chatter/overview**), and Jive Software (**jivesoftware.com**). For example, Fox (2012) points to SAP Inc., which provides a social-based layer of software products that optimizes collaboration.

A large number of publications is available on how to improve c-collaboration. Examples are Siebdrat et al. (2009), who provide a comprehensive coverage of managing virtual teams, McCafferty (2011), who suggests eight improvement methods, and Strom (2011) who compares collaboration tools from Cisco (WebEx), Citrix (Go To tools), DokuWiki (wiki software), Google Apps and more. Note that collaboration tools can be either same time (synchronous) or different times (a-synchronous).

Representative Examples of Collaborative Commerce

Leading technology companies such as Dell, Cisco, and HP use collaborative commerce mostly for supply chain improvement such as e-procurement. Other collaboration EC initiatives are used to increase efficiency and effectiveness of operation as can be seen in the following examples.

Vendor-Managed Inventory Systems
Vendor-managed inventory (VMI) refers to a process in which retailers make their suppliers responsible for monitoring the inventory of each item they supply, and determining when to order each item, and how much to order each time. Then the orders are generated electronically and fulfilled by the vendors. (A third-party logistics provider (3PL) can also be involved in VMI by organizing the shipments as needed.) The retailer provides the supplier with real-time usage (depletion) information (e.g., point-of-sale data), inventory levels, and the threshold below which orders need to be replenished. With this approach, the retailer is no longer involved with inventory management, and the demand forecasting becomes the responsibility of the supplier who can calcu-

late the need for an item before the item is depleted. In addition, instead of sending purchase orders, customers electronically send daily information to the supplier, who generates the replenishment orders for the customer based on this demand information (see **datalliance.com/whatisvmi.html**). Thus, administrative costs are reduced, inventories are kept low, and stock-outs become rare. A VMI also can be conducted between a supplier and its sub suppliers. For more information, see **en.wikipedia.org/wiki/Vendor-managed_inventory**, **vendormanagedinventory.com**, and Spychalska (2010). Representative VMI software solutions are provided by Vecco International (**veccoint.com**) and JDA Software Group, Inc. (**jda.com**).

Example: VMI and Information Sharing Between a Retailer (Walmart) and a Supplier (P&G)
Walmart provides P&G access to sales information on every item P&G sells to Walmart. The sales information is collected electronically by P&G on a daily basis from every Walmart store. By monitoring the inventory level of its items, P&G knows when the inventories fall below the threshold that triggers an automatic order fulfillment and a shipment. Everything is done electronically. The benefit for P&G is accurate demand information; the benefit for Walmart is adequate inventory, and both enjoy reduced administrative costs (minimum paper orders and manual work). P&G has similar agreements with other major retailers; Walmart has similar agreements with other major suppliers.

Retailer-Supplier Collaboration
In addition to VMI, retailers and the suppliers can collaborate in other areas as illustrated in the following example.

Example: Target Corporation
Target Corporation (**corporate.target.com**) is a large retail conglomerate. It conducts EC activities with tens of thousands of trading partners. The company has an extranet-based system for those partners who are not connected to its value-added network (VAN)–based EDI
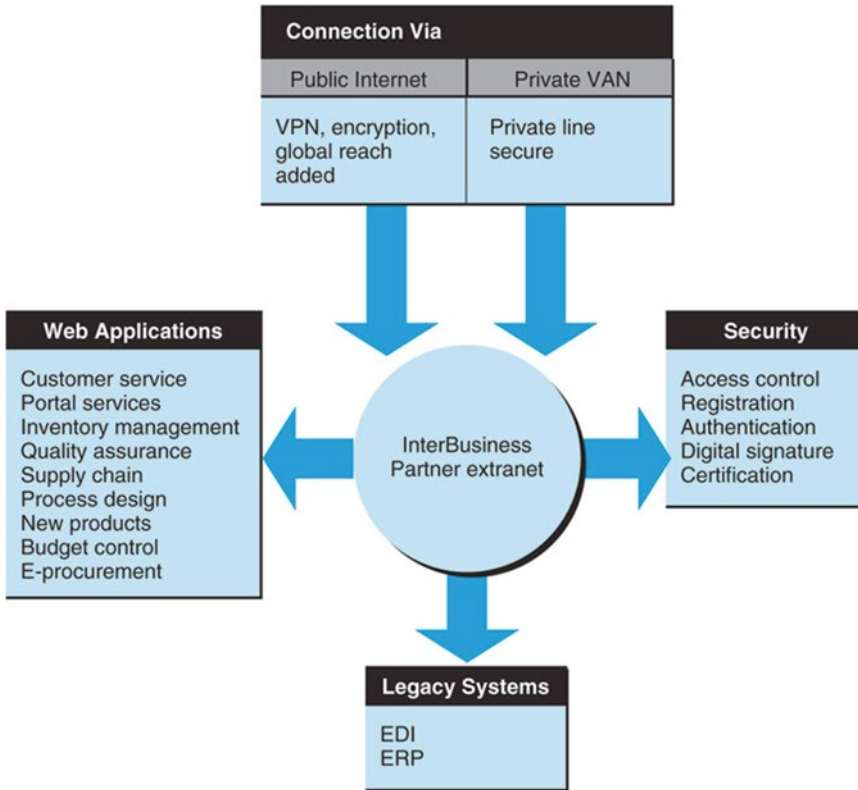
Figure 5.8   Target's extranet

(see Online Tutorial T2). The extranet enables the company not only to reach many more partners but also to use many applications not available on the traditional EDI. The system enables the company to streamline its communication and collaboration with suppliers. It also allows the company's business customers to create personalized Web pages, as shown in Figure 5.8. Target now has a business website called Partners Online (**partnersonline.com**), which it uses to communicate with business partners, providing them with valuable information.

Reducing Transportation and Inventory Costs
Cost reduction in shipping and inventory can be achieved through collaboration. An example is the collaboration between Amazon.com (**amazon. com**) and shippers such as UPS (**ups.com**).

Amazon.com delivers millions of items every week from its distribution centers. Rapid delivery is critical and collaboration with the shippers is essential.

Reduction of Design Cycle Time
The following examples demonstrate cycle time reduction through c-collaboration.

Example 1: Clarion Malaysia
Clarion Malaysia (**clarion.com/my/en/top.html**), a subsidiary of the global car-audio electronics company Clarion Group, manufactures audio electronic systems for cars.

Using computerized technologies provided by IBM, such as computer aided design (CAD) and product cycle management, the two companies reduced the time-to-market by about 40%, while at the same time improving the design of the products

because engineers were able to spend more time creating innovative designs. In addition, closer interaction with Clarion's customers is easier now throughout the design process. Finally, there is also a reduction in tooling preparation time.

Example 2: Caterpillar, Inc

Caterpillar, Inc. (**caterpillar.com**) is a multinational, heavy-machinery manufacturer. In the traditional mode of operation, cycle time along the supply chain was lengthy because the process involved the distribution of paper documents among managers, salespeople, and technical staff. To solve the problem, Caterpillar connected its engineering and manufacturing divisions with its suppliers, dealers, distributors, overseas factories, and customers through an extranet-based global e-collaboration hub. By using the collaboration system, a customer can order a specialized part from any place in the world by transmitting the order electronically to a local Caterpillar dealer. The order quickly gets to the appropriate designers or engineers. Customers also can use an extranet (accessible with wireless devices) to track the order status (see details in Online File W5.3).

Elimination of Channel Conflict: Collaboration with Dealers and Retailers

As discussed in Chapters 3 and 4, a conflict between manufacturers and their distributors, including retailers and/or dealers, may arise when customers order online directly from the manufacturer. One solution mentioned earlier is to order from the manufacturer and pick up the merchandise from a local retailer or dealer instead. This requires collaboration between the manufacturer and the local vendor. One company that provides the support for such collaborative EC is JG Sullivan Interactive, Inc. (see **jgsullivan.com/our-platform**). Their product allows manufacturers to sell online with minimal channel conflict. Another example is Cisco Systems (see **cisco.com/c/en/us/solutions/collaboration/index.html**).

Companies such as Commerce Guys (**commerceguys.com**) offer a socially-oriented collaboration platform (e.g., see **drupalcommerce.org**).

Example: Whirlpool Corp

Whirlpool (**whirlpool.com**) is another company that experienced the problem of channel conflict. Consumers prefer to buy appliances (sometimes customized) online, directly from Whirlpool. Whirlpool's nationwide network of dealers was not happy with the direct ordering. Note that, some appliances (e.g., a dishwasher, a washing machine) need to be installed, a job usually organized by the dealers.

JG Sullivan's system for Whirlpool was then used globally. The system was designed to enable direct online ordering, and at the same time manage the delivery, installation, warranty, and services by the local dealers. This made customers as well as dealers happy, since marketing and sales expenses decreased significantly. Also, the direct contact with customers allowed Whirlpool to know their customers better.

Barriers to C-Commerce

Despite the many potential benefits, and with the exception of some very large companies, c-commerce adaptation is moving ahead slowly. Reasons cited in various studies include technical factors involving a lack of internal integration and standards. Other reasons include network security and privacy concerns, and some distrust over who has access to and control of information stored in a partner's database. Internal resistance to information sharing and to new approaches and lack of company skills to conduct c-commerce are also possible factors. Gaining agreement on how to share costs and benefits can also prove problematic.

Finally, global collaboration may be complicated by additional barriers ranging from language and cultural misunderstandings to insufficient budgeting. For a detailed list and discussion see Currier (2010).

Overcoming Barriers to C-Collaboration

Specialized c-commerce software tools may lessen some of the barriers to c-commerce. In addition, as companies learn more about the major benefits of c-commerce—such as smooth-

ing the supply chain, reducing inventories and operating costs, and increasing customer satisfaction--it is expected that more companies will implement c-commerce. New approaches, such as the use of cloud computing and its variants and the use of Web Services could significantly lessen the implementation problem. The use of collaborative Web 2.0 tools based on open source, could help as well. Finally, it is essential to have a collaborative culture within and among organizations. One area related to c-commerce is consumer-to-consumer (C2C) e-commerce, which is presented in the next section.

Collaboration Processes and Software

A large number of proprietary methods and supportive communication and collaborative software are available to support c-commerce.

SECTION 5.4 REVIEW QUESTIONS
1. Define c-commerce.
2. List the major types and characteristics of c-commerce.
3. Describe some examples of c-commerce.
4. Describe the elements and processes of c-commerce.
5. List some major barriers to c-commerce. How can a company overcome these limitations?

5.5 CONSUMER-TO-CONSUMER ELECTRONIC COMMERCE

Consumer-to-consumer (C2C) EC, which is sometimes called *peer-to-peer (P2P)* e-commerce, refers to electronic transactions completed between and among individuals. These transactions can also include intermediaries, such as eBay (**ebay. com**) or social network sites that organize, manage, and facilitate the C2C networks. C2C activities may include transactions resulting from classified ads, music and file sharing, career and job matching (e.g., at **linkedin.com** and **careerone. com.au**), and personal matchmaking services (e.g., **match.com**).

C2C EC has given online shopping and trading a new dimension. Although this sort of trading is prevalent in the offline world

(classified newspaper ads, garage sales, etc.), it was not expected to succeed online because of problems regarding trust due to the anonymity of the traders, especially those who are in different locations. This problem was solved by using a third-party payment provider (e.g., **paypal.com**) and escrow or insurance services provided by eBay and others. One advantage of C2C EC is that it reduces the administrative and commission costs for both buyers and sellers. It also gives many individuals and small business owners a low-cost way to sell their goods and services.

Social networks have become a popular place for C2C activities such as selling products and services via classified ads at **craigslist.org** or **facebook.com** and other social networks. People are sharing or selling music, bartering, selling virtual properties, and providing personal services.

E-Commerce: C2C Applications

Many websites facilitate C2C activities between individuals. We cover several representative applications next.

C2C Auctions
A very successful example of a C2C application is participation in auctions. In dozens of countries, selling and buying on auction sites is growing rapidly. Most auctions are managed by intermediaries (the most well-known intermediary is eBay). Consumers can visit auctions at general sites such as **ebay.com** or **auctionany-thing.com**; or they can use specialized sites. In addition, many individuals conduct their own auctions with the use of special software. For example, ProcurePort.com (see **procureport. com/reverse-auction-services.html**) provides software to create C2C reverse auction communities online.

Selling and Buying in C2C
In addition to auctions, eBay enables individuals to sell goods to other individuals at fixed prices. Amazon.com and Etsy (Chapter 3) do the same. Hundreds of other sites facilitate C2C trading including those that use classified ads.

Person-to-Person Money Lending

As described in Chapters 3 and 7, people use the Internet for direct person-to-person money lending. For an overview, see Dachille (2014).

Classified Ads

Internet-based classified ads have several advantages over newspaper classified ads. They cover a national, rather than a local, audience, and can be updated quickly and easily. Most of them are free or charge very little. This greatly increases the supply of goods and services available and the number of potential buyers. One of the most successful sites of C2C classified ads is **craigslist.org** as seen in Chapter 2. Classified ads also include apartments for rent and corporate housing across the U.S. (powered by **forrent.com**). **Freeclassifieds.com** allows you to buy or sell anything for free. Many newspapers also offer their classified ads online. In some cases, placing an ad in the classified section of one website automatically directs it into the classified sections of numerous partners (known as cross-posting). This increases ad exposure at no additional cost. To help narrow the search for a particular item, some sites offer shoppers search engines.

Classified ads appear on thousands of websites including popular social networks such as **facebook.com/free.classified** and **linkedin.com**.

Personal Services

Numerous personal services are available on the Internet (lawyers, handy helpers, tax preparers, investment clubs, dating services). Some are located in the classified ad section, but others are listed on specialized websites (e.g., **hireahelper.com**) and directories. Some are offered free; others charge a fee.

Note: Be very careful before looking for any personal services online. Fraud or crime could be involved (e.g., a lawyer online may not be an expert in the area professed or may not even be a lawyer at all).

File-Sharing Utilities: Napster and Others

It all started in 1999. By logging onto services such as Napster, people were able to download files that others were willing to share for free. Such *P2P networks* enabled users to search other members' hard drives for a particular file, including data files created by users or copied from elsewhere. Digital music and games were the most popular files accessed. Movies, TV shows, and videos followed shortly thereafter. Napster had over 60 million members in 2002 before it was forced to stop its service due to copyright violations.

The Napster server, and others that followed, functioned as a directory that listed the files being shared by other users. Once logged onto the server, users could search the directory for specific songs and locate the file owner. They could then directly access the owner's computer and download the songs they had chosen. Napster also included chat rooms to connect its millions of users.

However, a U.S. federal court found Napster to be in violation of copyright laws because it enabled people to obtain music files without paying royalties to the creators of the music. Following this ruling, in March 2002, Napster was forced to shut down and filed for Chapter 11 bankruptcy. In 2011, Napster was acquired by Rhapsody (**rhapsody.com**), a subscription-based music downloading site. For a history of Napster, see **theguardian.com/music/2013/feb/24/napster-music-free-file-sharing**.

A number of free file-sharing programs still exist. For example, an even purer version of P2P is BitTorrent (**bittorrent.com**), software that makes downloading files fast. To access games over P2P networks, try TrustyFiles (**trustyfiles.com**). See also the Pirate Bay case in Chapter 15. Despite the temptation to get "something for nothing," remember that downloading copyrighted materials for free is usually against the law.

C2C Activities in Social Networks and Trading Virtual Properties

C2C activities in social networks include the sharing of photos, videos, music, and other files; trading of virtual properties; and conducting other activities. Trading virtual properties is very popular in virtual worlds, especially in Second Life (**secondlife.com**).

SECTION 5.5 REVIEW QUESTIONS

1. Define C2C e-commerce.
2. Describe the benefits of C2C e-commerce.

3. Describe the major e-commerce applications.
4. Define file sharing.
5. How is C2C practiced in social networking?
6. Describe file sharing and the legal issues involved (see the Pirate Bay case in Chapter 15).

MANAGERIAL ISSUES

Some managerial issues related to this chapter are as follows.

1. **How do we design the most cost-efficient government e-procurement system?** Several issues are involved and questions may be raised in planning e-government: How much can the governmental e-procurement system save on procurement costs? How can the system be used for procuring small quantities? How do you deal with bidders from outside your country? How can illegal bribery be prevented? What criteria besides cost need to be considered? How should the online and offline procurement systems be designed? How do you advertise RFQs online? How should the portfolio of auctions and desktop purchasing be constructed? Can the government use commercial B2B sites for procurement? Can businesses use the government procurement system for their own procurement? All these must be considered in an effective design.

2. **How do we design the portfolio of e-learning knowledge sources?** There are many sources of e-learning services. The e-learning management team needs to design the portfolio of the online and offline training applications, and the internal and external knowledge sources, (paid and nonpaid sources). The internal knowledge management system is an important source of training materials for large corporations, whereas external sources could be more cost-effective for small organizations. Obviously, justification of each item in the portfolio is needed, which is related to vendor selection. For illustrative case studies, see **brightwave.co.uk**.

3. **How do we incorporate social networking-based learning and services in our organization?** With the proliferation of social networking initiatives in the enterprise comes the issue of how to integrate these with the enterprise system, including CRM, KM, training, and other applications and business processes. One issue is how to balance the quality of knowledge with the scope of knowledge in e-learning and training programs.

4. **What will be the impact of the e-book platform?** If the e-book is widely adopted by readers, the distribution channel of online book sales may be disruptive. This new platform may cannibalize the offline book retail business. Additionally, there is the need for the protection of intellectual property of digital contents since it is easy to copy and distribute electronic files (see Chapter 15). In general, more e-books will be published and read.

5. **How difficult is it to introduce e-collaboration?** Dealing with the technological aspects of e-collaboration may be the easy part. Tackling the behavioral changes needed within an organization and its interactions with the trading partners may be the greater challenge. Change management may be needed for the newly created collaborations, to deal with issues such as the resistance to change. In addition, the responsibilities of the collaborative partners must be articulated with the business partners. Finally, e-collaboration costs money and needs to be economically and organizationally justified; however, justification may not be an easy task due to the intangible risks and benefits involved.

6. **How much can be shared with business partners? Can they be trusted?** Many companies are sharing forecast data and actual sales data. However, when it comes to allowing real-time access to product design, inventory, and interface to ERP systems, there may be some hesitation. It is basically a question of security and trust. The more information that is shared, the better the collaboration. However, sharing information can lead to accidently giving away some trade secrets. In some cases, there is an organizational cultural resistance against sharing (some employees do not like to share information, even within their own organization). The business value of sharing needs to be assessed carefully against its risks.

7. **Who benefits from vendor-managed inventory?** When VMI systems are deployed, both sellers and retailers reap benefits. However, small suppliers may not have the ability to systematically monitor and manage inventory of their business customers. In this case, the large buyer will need to support the inventory management system on behalf of its suppliers. Sensitive issues must be agreed upon when initiating VMI. One such issue is how to deal with item shortages created in the system.

SUMMARY

In this chapter, you learned about the following EC issues as they relate to the chapter's learning objectives.

1. **E-government activities.** Governments, like any other organization, can use EC applications for great savings and increased effectiveness. Notable applications are e-procurement using reverse auctions, e-payments to and from citizens and businesses, auctioning of surplus goods, and electronic travel and expense management systems. Governments also conduct electronic business with other governments. As a result, governments can do a better job with less money.

2. **Implementing e-government to citizens, businesses, and its own operations.** Governments worldwide are providing a variety of services to citizens over the Internet. Such initiatives increase citizen satisfaction and decrease government expenses for providing citizens' service applications, including electronic voting. Governments also are active in electronic trading with businesses. Finally, EC can be conducted within and between governments. E-government's growth can be strengthened by the use of wireless systems in what is described as mobile or m-government. Also, e-government 2.0 is becoming increasingly popular with tools such as wikis, blogs, social networks and Twitter.

3. **E-learning and training.** E-learning is the delivery of educational content through electronic media via the Internet and intranets. Degree programs, lifelong learning topics, and corporate training are delivered online by thousands of organizations worldwide. A growing area is distance learning via online university offerings; and virtual universities are becoming quite popular. Some are virtual; others are delivered as a combination of online and offline offerings. Online corporate training is increasing also, and is sometimes conducted at formal corporate learning centers. Implementation is done in steps starting with just an online presence and ending with activities on social networks. New e-readers contain easy-to-read text, search capabilities, rich media as well as other functions. Add to this the low cost of e-books and the capability of storing hundreds of books on a single e-reader, and you can understand the increased popularity of these devices.

4. **E-books and their readers.** There is an increased interest in e-books due to their many benefits (Amazon.com sells more e-books than hardcover ones). There is intense competition among e-reader and tablet manufacturers, and the products' capabilities are increasing while their prices are declining. E-books are used both for pleasure reading and for studying. E-books can be read on several portable devices including tablets.

5. **Knowledge management and dissemination.** Knowledge has been recognized as an important organizational asset. It needs to be properly captured, stored, updated, and shared. Knowledge is critical for many e-commerce tasks. Knowledge can be shared in different ways; experts can provide knowledge to non-experts (for a fee or free) via a knowledge portal, e-mail, or chatting and discussion tools, and through social networks (e.g., via user generated videos or text).

6. **Online advisory systems.** Online advisory systems of all kinds are becoming popular. Some are free although most charge fees. Users must be careful about the quality of the advice they receive. Social networks and portals provide a variety of advisory services of different qualities.

7. **C-commerce.** Collaborative commerce (c-commerce) refers to a planned use of digital technology by business partners. It includes

planning, designing, researching, managing, and servicing various partners and tasks, frequently along the supply chain. C-commerce can be conducted between different pairs of business partners or among many partners participating in a collaborative network. Collaboration with Web 2.0 tools and in social networks adds a social dimension that could improve communication, participation, and trust. There are many new tools, some of which are being added to traditional collaboration tools. Better collaboration may improve supply chain operation, knowledge management, and individual and organizational performance.

8. **C2C activities.** C2C consists of individual consumers conducting e-commerce with other individual consumers, mainly in auctions (such as at eBay), classified ads, matching services, specialty webstores at Amazon.com, and file sharing.

KEY TERMS

Automated question-answer (QA) system
Collaboration hub (c-hub)
Collaborative commerce (c-commerce)
Consumer-to-consumer (C2C) EC
Distance learning
E-collaboration
E-government
E-learning
Electronic book (e-book)
Expert/expertise location systems (ELS)
Government 2.0
Government-to-business (G2B)
Government-to-citizens (G2C)
Government-to-employees (G2E)
Government-to-government (G2G)
Knowledge management (KM)
Learning management system (LMS)
Learning on-demand
Mobile government (m-government)
M-learning
Social learning (e-learning 2.0)
Vendor-managed inventory (VMI)
Virtual universities

DISCUSSION QUESTIONS

1. Discuss the advantages and disadvantages of e-government using social networking versus the traditional e-government portal.
2. Discuss the advantages and shortcomings of e-voting.
3. Discuss the advantages and disadvantages of e-books.
4. Discuss the advantages of e-learning in the corporate training environment.
5. In what ways does KM support e-commerce?
6. Some say that B2G is simply B2B. Explain.
7. Compare and contrast B2E with G2E.
8. Which e-government EC activities are intrabusiness activities? Explain why they are categorized as intrabusiness.
9. Identify the benefits of G2C to citizens and to governments.
10. Relate IBM's Jams to KM and social networks.
11. Relate KM to learning, to e-publishing, and to C2C.
12. It is said that c-commerce signifies a move from a transaction focus to a relationship focus among supply chain members. Discuss.

TOPICS FOR CLASS DISCUSSION AND DEBATES

1. Discuss the advantages and disadvantages of e-learning for an undergraduate student and for an MBA student.
2. Discuss the advantages of expert/expertise location systems over corporate databases that contain experts' information and knowledge. What are the disadvantages? Can expert location systems and corporate databases be combined? How?
3. Discuss the benefits of using virtual worlds to facilitate learning. What are the limitations? The disadvantages?
4. One of the major initiatives of many governments (e.g., European Commission) is Smart Cities (see Chapter 6 for the technology).

Discuss the content of such initiatives and explain why they are a part of e-government.

5. Debate: E-books will replace traditional books.

6. Debate: Why aren't all firms embracing KM?

7. Debate: Analyze the pros and cons of electronic voting.

8. Enter **en.wikipedia.org/wiki/E-Government** and find the 'controversies of e-Government' section. Discuss the advantages and disadvantages. Write a report.

9. Differentiate between e-learning and m-learning.

10. Discuss the content and benefits of the UN E-Government Development Database (**unpan3.un.org/egovkb**).

11. Angry Birds of Rovio Entertainment became a very popular mobile game. Read about its success and find some educational and learning aspects. Write a report.

INTERNET EXERCISES

1. Enter **e-learningcentre.co.uk**, **elearnmag.acm.org**, and **elearningpost.com**. Identify current discussion issues and find two articles related to the effectiveness of e-training. Write a report. Also prepare a list of the resources available on these sites.

2. Enter **adobe.com** and find the tutorials and tools it offers for e-learning, knowledge management, and online publishing. Prepare and give a presentation on your findings.

3. Identify a difficult business problem in your or another organization. Post the problem on **elance.com**, **linkedin.com**, **answers.yahoo.com**, and **answers.com**. Summarize the information you received to solve the problem.

4. Enter **blackboard.com** and also view **en.wikipedia.org/wiki/Blackboard_Inc.**. Find the major services provided by the company, including its community system. Write a report.

5. Enter **fcw.com** and read the latest news on e-government. Identify initiatives not covered in this chapter. Then enter **gcn.com**. Finally, enter **egovstrategies.com**. Compare the information presented on the three websites.

6. Enter **procurement.org** and **govexec.com**. Identify recent e-government procurement initiatives and summarize their unique aspects.

7. Enter **hivemine.com** and look at their products, solutions, news, and blogs. Do you agree with the company's motto: "Socialize your knowledge and thrive?" Explain your answer.

8. Enter **amazon.com**, **barnesandnoble.com**, and **sony.com** and find the latest information about their e-readers. Compare their capabilities and write a report. (Consult **ebook-reader.com**.)

9. Enter **kolabora.com** or **mindjet.com**. Find out how collaboration is supported there. Summarize the benefits of the site to the participants.

10. Enter **opentext.com** or **kintone.cybozu.com/us**. Read the company vision for collaborative commerce and view the demo. Explain in a report how the company facilitates c-commerce.

11. Enter **guru.com** and **elance.com** and compare their offerings. Which one would you prefer to post your skills on and why?

12. Find two companies that enable C2C (or P2P) e-commerce (such as **egrovesys.com**). Comment on their capabilities.

13. Enter **collaborativeshift.com** or other c-collaborative sites, and read about recent issues related to e-collaboration. Prepare a report.

14. The U.S. government opened a virtual embassy in Iran. Find information about the service and the reaction of the Iranian government. Write a report.

TEAM ASSIGNMENTS AND PROJECTS

1. **Assignment for the Opening Case**
   Read the opening case and answer the following questions.

(a) What were the primary and secondary problems that Compass Group faced with training its managers?

(b) How did the company overcome the skeptics of e-training?

(c) How did the company approach the complexity of systems training?

(d) What were the outcomes of the new e-training?

(e) In your opinion, what are the most important aspects in e-training implementation?

2. New York City is known for its extensive e-government initiatives that were sponsored by Mayor Bloomberg between 2002 and 2013. Find information about these initiatives, their benefits to the public, and their fate after Bloomberg completed his term. Each team will concentrate on one area. Write a report.

3. Create four teams, each representing one of the following: G2C, G2B, G2E, and G2G. Each team will prepare a description of the activities in the assigned area (e.g., G2C) in a small country, such as Holland, Denmark, Finland, or Singapore. A fifth team will deal with the coordination and collaboration of all e-government activities in each of the four countries chosen. Prepare a report.

4. View the video "Panel Discussion on Collaborative Commerce (Pt.1) @ Ariba LIVE 2011" (12:36 minutes) at **youtube.com/watch?v=bucxXpDvWDI**. (Part 2 (11:11 minutes) at **youtube.com/watch?v=dV_KUJ0eVuE** is optional.) Answer the following questions:

(a) What benefits do the buyers see? Relate these benefits to collaborative commerce.

(b) How is EC used to support c-commerce?

(c) How can buyer/supplier relationships be fostered with c-commerce?

(d) Run a similar panel discussion in class. If possible, ask large buyers to attend and take part.

(e) How is bringing business partners online accomplished?

(f) What role does Ariba play? (Check its website **ariba.com**.)

(g) What have you learned from this video about the benefits of c-commerce and e-commerce?

5. View the video "E-Learning Debate 2010 - Highlights" (4:51 minutes) at **youtube.com/watch?v=Q42f1blFnck**. Debate the pros and cons regarding the value of e-learning.

(a) List all the pro and con statements from the video.

(b) For each statement, have two teams (or individuals) explain why each agrees or disagrees with the statement.

(c) Add several pro and con statements from what you learned in class or discovered on the Web.

(d) For each added statement, have two teams (or individuals) explain why each agrees or disagrees with the statement.

(e) Jointly prepare a summary. The use of a wiki is advisable.

6. Have each team represent one of the following sites: **netlibrary.net**, and **ebooks.com**. Each team will examine the technology, legal issues, prices, and business alliances associated with its site. Each team will then prepare a report answering the question, "Will e-books succeed?"

7. Each team is assigned a question-and-answer company (e.g., **answers.com**, **ask.com**). Check the company's offerings, including social networking/games. Present your findings.

CLOSING CASE: FROM LOCAL SDI TO E-GOVERNMENT

Case Study in Municipalities in the South of Hesse (Germany)

Introduction

The increase of e-government solutions associated with spatial data is one of the main goals of the European Union. The citizens should gain access to spatially related services provided by all administrative levels. This poses a substantial challenge, especially for small municipalities

that are some of the main producers and owners of spatial data. The process of capacity building even in the superordinate administrative levels has to be established first to launch the use of geospatial data online. Based on a project of the German federal state Hesse, the cooperation between administrative bodies has been found with a high degree of financial self-sufficiency.T extension from desktop computer his case presents the technical requirements as well as the concept and implementation of Spatial Data Infrastructures (SDI) by means of the service chain to discover a land-use plan as the first step to a Service Oriented Architecture (SOA) for geospatial data in a municipality. The existing project guides to the exploration of related projects in municipalities using SDI to develop user-oriented offers in planning and administrative processes. The capabilities of Web 2.0 enable the move from traditional publishing in the Web to social collaboration, in combination with SDI which causes participation to become a common option in the communication between citizens and governments.

Based on the latest geostandards and map viewers out of the Web 2.0 sphere, user-friendly SDI-applications can be developed. A case in point is a service for citizens in the city of Wiesbaden. This example also demonstrates the potentialities in extending services and the access via mobile interfaces.

Local SDI in Hesse

Hesse, whose state capital is Wiesbaden, is one of the 16 federal states of Germany. The SDI activities in the state are initiated and supported by the network of "GDI-Hessen" as part of the federal administration for Land Management and Geoinformation (HVBG). Based on this framework, the pilot project "GDI-Südhessen" (GDI-Südhessen 2014) has been deployed to build the foundation for a local SDI in the south of Hesse. The aim of the project is the collaborative use of geospatial data by creating a network based on the idea of the European INSPIRE directive (Directive 2007/2/EC).

In this context, the cooperation focused on the organizational and technical structures and capacity building to encourage the cost-efficient integration and use of SDI-based services in the administrative daily work. To increase the technical knowledge in terms of SDI, the workflow to discover a binding land-use plan was chosen (see Figure 5.9). The implemented service chain combines SDI components like Web Feature Services (WFS), metadata search via Catalogue Services (CSW), Web Map Services (WMS), and Map Viewer following the standards of the OGC (cf. OGC 2014). For further details see (Hickel and Blankenbach 2012).

SDI-Based Citizen Service for Improved Participation

In cooperation with the city of Wiesbaden, the project began with the development of prototyped applications using a local SDI as part of the future municipal e-government portal.As a first application, an e-participation service had been implemented to enable Wiesbaden´s citizens to inform the city administration about infrastructural problems (e.g., with lamps, roads, and trees).

Unlike existing applications with similar functionalities (e.g. see Mängelmelder 2014), the idea was to incorporate Web 2.0 concepts with the local SDI to optimize citizen services (Blankenbach and Schaffert 2010). As result, a citizen service, called "Bürgerservice," became an integral part of the municipal SDI within the city's e-government structures by the use of OGC geo standards (OGC 2014). Figure 5.10 shows the architecture of the citizen's service as an application of the local SDI.

The idea is to enable citizens to report infrastructural problems online using a Web application. Besides the descriptive report information, an integrated map viewer is used to show the exact geolocalization and provide a pictorial view. The OGC interface of the local SDI enables submitting and storage of the reported data as well as direct access to the report database from the city´s GIS applications (see Figure 5.10). By merging the report with specific municipal geospatial data, the reported problems can be solved faster and more efficiently by the administrative staff.
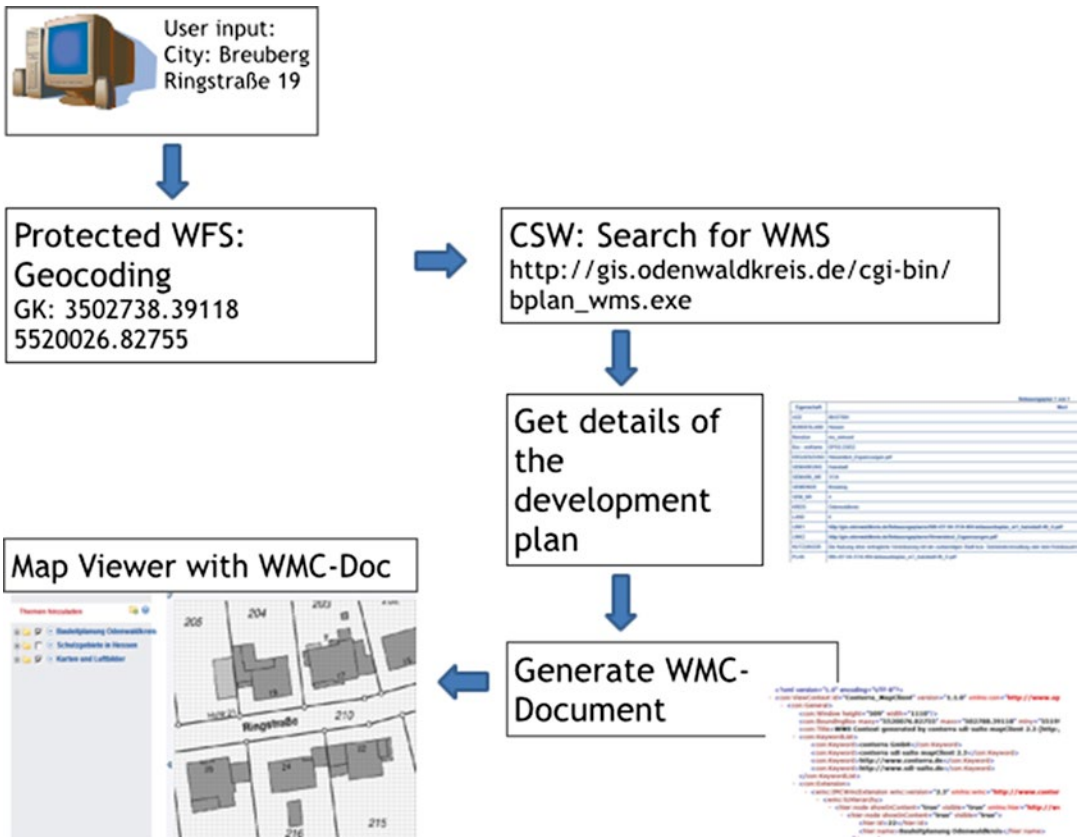
Figure 5.9 Technical workflow: discover a land-use plan (Source: Hickel and Blankenbach 2012.) Used with permission

A standardized OGC-interface enables the extension from desktop and laptop computers to mobile access. Thus, the citizens are able to report the problem directly on-site using a smartphone. For further details, see Hickel and Blankenbach (2012). The users are provided with mobile access to the platform. This enables them to use a mobile phone to bring a malfunction in the street to the municipality´s attention. Currently, the mobile interface is implemented through a client application running on almost every smartphone. Similar to the "stationary" desktop version, the users can select a topical category and enter free text. The reported geocoding and its picture documentation is aimed to be done seamlessly using the smartphone´s embedded sensors, in this case, a GPS-receiver with its camera. For further details, see Blankenbach and Hickel (2013).

Conclusion

To achieve a high acceptance of SDI-supported applications in e-government, it is essential to consider several aspects during the development and use of the applications. The nature of SDI results in several different players encountering the SDI components. This includes the IT department for the technical provisioning of applications, the experts for legal issues and the political decision-makers. The collaboration between all departments involved is an essential aspect to success. The users want applications with high usability, especially in terms of ease of use. In this case, the usability is provided by other Web 2.0 applications like Google Maps for handling spatial information or by using Twitter to send short messages from any device and from any
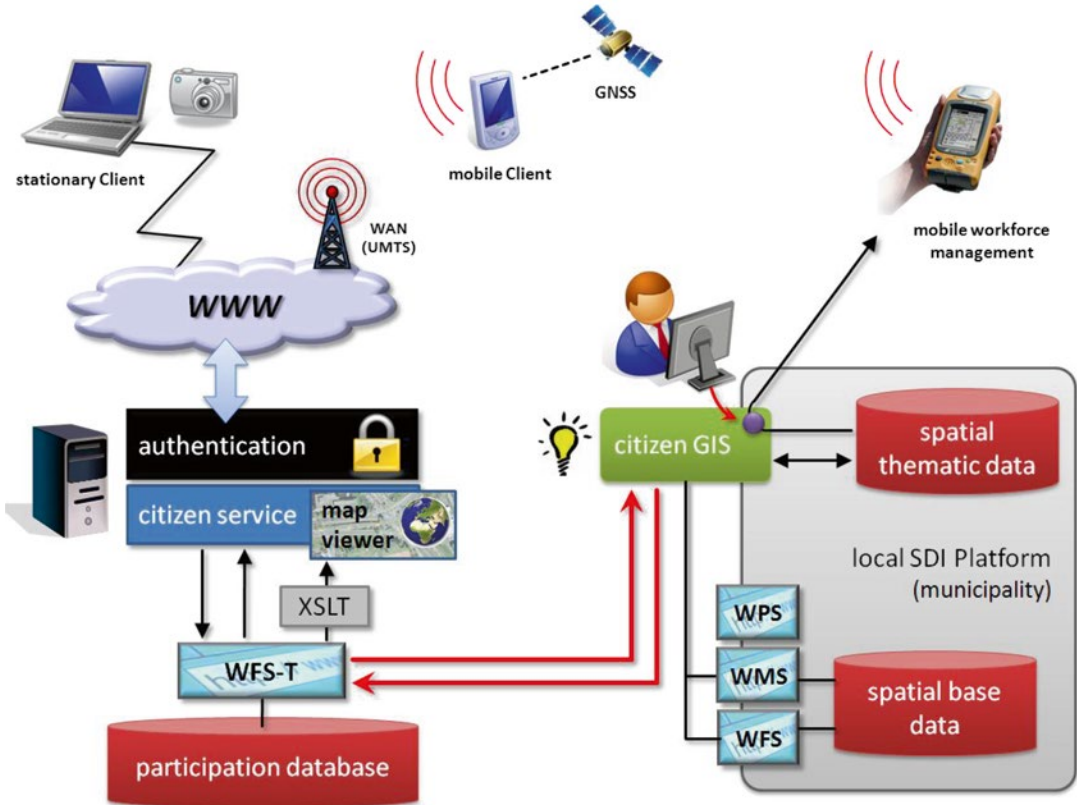
Figure 5.10 Ideal architecture of the citizen service as an application of a local SDI (Source: Blankenbach and Schaffert 2010.) Used with permission

location. To meet these requirements, the socio-technical criteria in terms of social acceptability, usefulness, and usability have to be considered (Macintosh and Whyte 2008).

Throughout the project, several problems and challenges were discovered and pointed out, and based on this experience, several independent new services have been installed and are offered to the citizens.

This citizen service represents an example of value-added applications of local SDI for municipalities. Several other areas of applications (e.g., in municipal planning tasks) are also possible. The system is currently (April 2014) being eval-uated by the city's personnel and is going to be used first for internal municipal tasks. The citizens as well as the administration can benefit from the SDI based applications.

Sources: Blankenbach and Hickel (2013), Blankenbach and Schaffert (2010), Directive 2007/2/EC (2007), GDI-Südhessen (2014), Hickel and Blankenbach (2012), Macintosh and Whyte (2008), OGC (2014), and Mängelmelder (2014).

Review Questions
1. What are the key features of such successful e-government solutions?
2. What are the main challenges for the SDI?

3. Describe how an administration could provide other SDI-based e-government solutions for citizens.
4. What are the essential features that enable parallel mobile access to the e-government infrastructure?

ONLINE FILES
available at **affordable-ecommerce-textbook.com/turban**

W5.1 E-Government Social Media Activities in New Zealand
W5.2 The Stages of E-Government Transformation
W5.3 Application Case: Knowledge Sharing as a Strategic Asset at Caterpillar Inc.

COMPREHENSIVE EDUCATIONAL WEBSITES

e-learningcentre.co.uk: A vast collection of selected and reviewed links to e-learning resources.

mgovernment.org: A mobile government consortium.

tools.kmnetwork.com: A portal for KM tools and techniques.

astd.org: American Society for Training and Development: "The world's largest professional association dedicated to the training and development field."

portal.brint.com: A portal for KM.

kmworld.com: A collection of KM solutions.

vic.gov.au: The official Victorian Government website (Australia).

zdnet.com: Search site for 'e-government' in white papers, case studies, technical articles, and blog posts.

forums.e-democracy.org: A portal focused on e-democracy.

whitehouse.gov/omb/e-gov: The official e-government and information technology site of the U.S. government.

knowledgemanagement.wordpress.com: A comprehensive source of KM-related material (2006–2008).

icl-conference.org: Annual conferences on e-learning.

the-ebook-reader.com: All about e-readers (e.g., comparisons, software, free e-books).

igi-global.com/journal/international-journal-collaboration-ijec/1090: *The International Journal of E-Collaboration*

ec.europa.eu/digital-agenda/egovernment-going-studies: Digital agenda for Europe. Information on current studies, publications, and news.

GLOSSARY

Automated question-answer (Q&A) System used to find answers that match questions asked in a natural language (e.g., English, Chinese).

Collaborative commerce (c-commerce) Electronic support for business collaboration. It enables companies to collaboratively plan, design, develop, manage, and research products, services, and innovative business processes, including EC applications.

Collaboration hub (c-hub) The central point of interaction and of a company's supply chain. A single e-hub can host multiple *collaboration spaces* in which trading partners trade, collaborate, communicate, and share information.

Consumer-to-consumer (C2C) EC Electronic transactions completed between and among individuals.

Distance learning Education conducted from home or other place, anytime.

E-collaboration The use of digital technologies among people for accomplishing a common task.

E-government The use of information technology in general, and e-commerce in particular, to improve the delivery of government services and activities in the public sector, such as: providing citizens and

organizations with more convenient access to government information and services, and to providing effective delivery of public services to engage citizens and businesses partners, as well as improving the performance of government employees.

E-learning The online delivery of educational materials and methods using information technologies, for the purposes of learning, teaching, training, or gaining knowledge at any time, and at many different locations.

Electronic book (e-book) A book in digital format that can be read on a computer screen, including mobile devices (e.g., a tablet, iPhone), or on a dedicated device known as an *e-reader*.

Expert/expertise location systems (ELS) Interactive computerized systems that help employees locate experts within their organization in order to get help in solving specific, critical business or technical problems in a short time.

Government 2.0 The employment of social media tools, new business models, and embracing social networks and user participation, government agencies can raise the effectiveness of their online activities to meet users' needs at a reasonable cost.

Government-to-business (G2B) E-government category that works both ways: government-to-business and business-to-government. Thus, G2B refers to activities where the government sells products to businesses or provides businesses with services and vice versa.

Government-to-citizens (G2C) E-government category that includes all the interactions between a government and its citizens that take place electronically.

Government-to employees (G2E) E-government category that includes activities between the government and their employees.

Government-to government (G2G) E-government category that includes EC activities between different units of governments, including those within one governmental body. Many of these are aimed at improving the effectiveness and the efficiency of the government operation.

Knowledge management (KM) The process of capturing or creating knowledge, storing it, updating it constantly, disseminating it, and using it whenever necessary.

Learning on-demand The trend where learners can study anywhere whenever they are ready.

Learning management system (LMS) Software applications for managing e-training and e-learning programs including content, scheduling, delivery tips, and so forth.

M-learning (mobile learning) Refers to e-learning or other forms of education using mobile devices.

Mobile government (m-government) The implementation of e-government applications using wireless platforms.

Social learning Learning, training, and knowledge sharing in social networks and/or facilitated by social software tools.

Vendor-managed inventory (VMI) A process in which retailers make their suppliers responsible for monitoring the inventory of each item they supply, and determining when to order each item.

Virtual university Online universities where students take classes from home via the Internet.

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