Implementing EC Systems: From Justification to Successful Performance

14

Contents

Learning Objectives

Upon completion of this chapter, you will be able to:

1. Describe the major components of EC implementation.
2. Describe the need for justifying EC investments.
3. Understand the difficulties in measuring and justifying EC investments.
4. Recognize the difficulties in establishing intangible metrics.
5. List and describe traditional and advanced methods of justifying EC investments.
6. Describe some examples of EC justification.
7. Describe the role of economics in EC evaluation.
8. Discuss the steps in developing an EC system.
9. Describe the major EC development strategies.
10. List the various EC development methods along with their benefits and limitations.
11. Discuss the major outsourcing strategies.
12. Describe EC organizational structure and change management.
13. Understand how product, industry, seller, and buyer characteristics influence the success of EC.

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OPENING CASE: TELSTRA CORPORATION HELPS ITS CORPORATE CUSTOMERS JUSTIFY EC INITIATIVES

Telstra Corp. is Australia's major telecommunication company, which provides fixed line and mobile communications as well as digital TV and Internet access services. The company operates in a competitive market (e.g., against Vodafone and Optus Corp.). Telstra has expanded its services to several countries in Asia and Europe.

The Problem

The company is very active in the e-commerce and social media markets, mainly through Telstra Digital and its wireless units. For example, it provided its corporate customers with Facebook apps so they can manage their Telstra accounts. One area where the company saw an opportunity but had some marketing difficulties was m-commerce. In particular, the company offered its corporate customers applications that had many intangible benefits. The customers had difficulty getting approval from their own top management for paying for Telstra's services without detailed justification.

Telstra was interested in promoting the following four lines of applications:

1. **Fleet and field service management.** This topic, involving enterprise mobility applications, was described in Chapter 6.
2. **Video conferencing.** This application uses video conferencing in order to save on travel expenses to meeting places, and helps expedite decision making. Both fixed line and mobile services can support this initiative.
3. **Web contact centers.** This application is designed to improve CRM as described in Chapter 8 and in Online Tutorial T1.
4. **Teleworking.** Allows employees to work offsite. *Teleworking* (also known as telecommuting) requires sophisticated technology to enable effective communication, collaboration, and collaborative commerce activities (Chapters. 5, 8, and Online Tutorial T5).

Both the infrastructure and the software for the above applications is expensive. Many Telstra customers were interested in learning about to justify the investment, but they did not know how to go about it.

The Solution

Telstra developed a white paper to illustrate the use of ROI calculators in each of the above four lines of applications. The unique property of the calculators is that they compute benefits to the users' organizations, to the employees, and to society. Examples of some calculators are available in Saddington and Toni (2009). Here, we provide some of the highlights.

Justifying Video Conferencing

Benefits include reduction in travel expenses, work time lost by employees, and so forth. This calculator uses the Net Present Value (NVP) approach.

The cost-benefit analysis calculates the savings to a company (seven variables), some of which are intangible (such as faster decision making). The benefits are compared with both the fixed and variable costs. The benefits to employees are measured by five variables, some of which are intangible (e.g., better job satisfaction). Finally, benefits to society include variables such as reduced car emissions and traffic congestion.

Justifying Teleworking

The benefits to the companies range from reduced office footprints to higher employee retention. Again, some benefits are intangible. The costs are detailed (e.g., cost of equipment). Employees save travel time when they work at home but they need to pay for the energy used at home. Society enjoys reduced vehicle emissions when people telecommute.

Justifying Web Contact Centers

The above approach is used here, too: The calculator includes savings, benefits, and costs to the company, employees, and society. Both tangible and intangible variables are considered in the calculations.

Justifying Fleet and Field Force Management

The structure of this calculator is similar to those above: Savings, benefits, and costs to the company, employees, and society.

The white paper provides comprehensive calculations with sample data for a hypothetical company.

Telstra offers other calculators including one for data usage for mobile devices.

The Results

Telstra believes that Australian companies have an opportunity to develop a sustainability strategy using the above technologies that need to be justified. Telstra provides proof of substantial cost-benefits. While the savings to companies are substantial in many cases, the benefits to employees and society should not be ignored.

As far as Telstra itself, the introduction of the calculators in 2009 helped the company increase its market share and profitability between 2011 and 2013. Also the market value of Telstra almost doubled from 2010 to 2014.

LESSONS LEARNED FROM THE CASE

The Telstra case demonstrates the need for organizations to justify EC-related projects and the fact that this may not be easy to do. Telstra provided calculators to their clients to help them with the justification of IT and EC investments. The case points to intangible benefits, which are difficult to measure and quantify. It also raises the issue of sharing costs among several projects, and the need to consider the benefits to employees and to society. These are only some of the topics presented in this chapter. Other topics deal with traditional and advanced methods of cost-benefit analysis, use of EC metrics, economic theories of EC, and methods for developing or acquiring EC systems. This chapter also describes some organizational issues of implementation and it ends with a discussion of successes and failures in e-commerce.

Sources: Based on Saddington and Toni (2009) and AIIA Report (2009).

14.1 THE IMPLEMENTATION LANDSCAPE

Now that you know about e-commerce benefits and applications, you may wonder what to do next. First you need to ask questions such as: "Do I need EC?" and then "How am I going to do it?" The answers to these two and other questions can be very complex since they depend on many factors that we will discuss in this chapter. We refer to these factors as *implementation factors*.

The Major Implementation Factors

Many factors can determine the need and success of e-commerce projects. We organize them in the following categories.

Justification/Economics

The first issue is to find out if you need to get involved in an EC project(s). This issue can be very complex for large-scale projects. We call it EC project justification. This issue is covered in Sections 14.2, 14.3, 14.4, 14.5, and 14.6.

Acquire or Self Develop Your E-Commerce System

This issue is not simple either, especially when medium- and large-scale projects are involved. We cover this issue in Sections 14.7, 14.8, and 14.9.

Organizational Readiness and Impacts of E-Commerce

How to organize your EC unit within the organization and how to deal with changing business processes and other changes brought by e-commerce are all part of the implementation considerations. In addition, potential impacts on marketing, manufacturing, and people need to be addressed. Finally, some technical issues such as

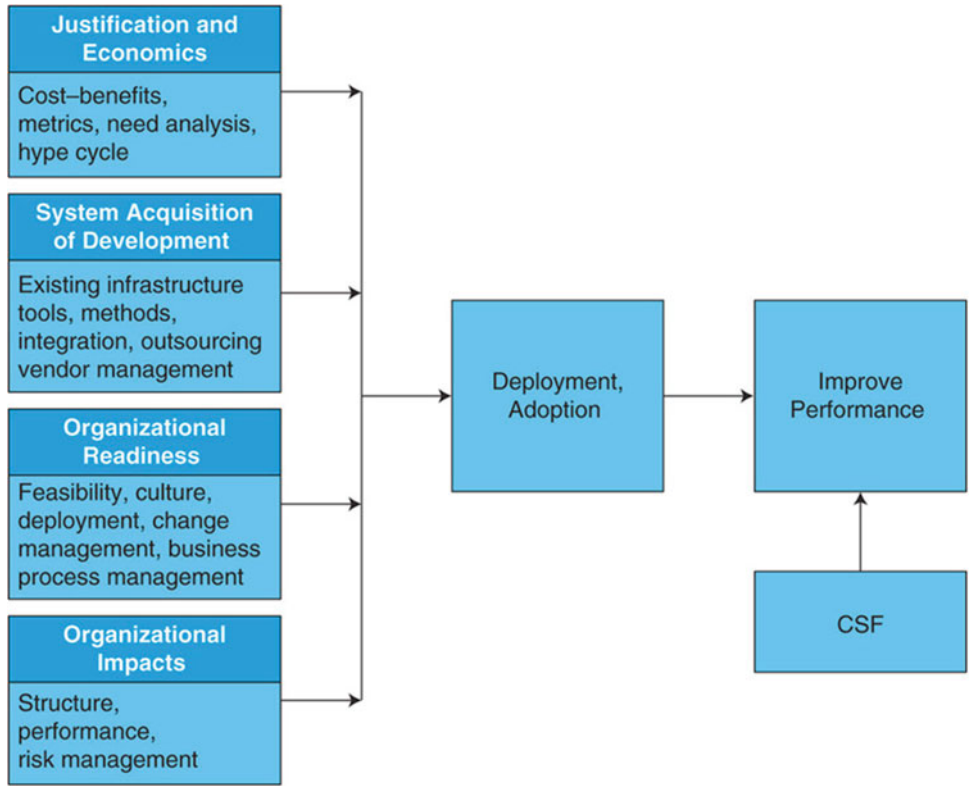

Figure 14.1 The elements in EC implementation

connecting to other information systems need to be considered. These are all described briefly in Section 14.10.

How to Succeed

The last part of this chapter (Section 14.10) addresses some of the critical success factors of implementing EC projects.

We have organized the above factors into a framework, which is shown in Figure 14.1.

On the left side of the figure, we placed the major factors that impact implementation. They all may affect the adoption and deployment of the EC projects. A successful deployment and adoption will lead to improved performance.

SECTION 14.1 REVIEW QUESTIONS

1. Why is the implementation of EC so complex?
2. What are the major elements of EC implementation (see Figure 14.1)?
3. What factors determine deployment and adoption (see Figure 14.1)?

14.2 WHY JUSTIFY E-COMMERCE INVESTMENTS? HOW CAN THEY BE JUSTIFIED?

Companies need to justify their EC investments for a number of different reasons.

Increased Pressure for Financial Justification

Once upon a time, or so the story goes, the beggars of New York City decided to conduct a competition to find out who could collect the most money in one day. Many innovative ideas were employed, and several beggars collected almost $1,000 each. The winner, however, collected $5 million. When asked how he did it, the beggar replied, "I made a sign that said 'EC experts need funding for an innovative electronic marketplace' and put the sign in front of the New York Stock Exchange."

This story symbolizes what happened from 1995 through 2000, when EC projects and start-up companies were funded with little or no analysis of their business viability or finances. The result of the rush to invest without analysis was the 2001 to 2003 "dot-com bust," when hundreds of EC start-ups went out of business and the stock market crashed. Some companies and individual investors lost more than 90–100% of their investments. Furthermore, many companies, even large ones such as Disney, Merrill Lynch, and Sears, terminated some EC projects after losing considerable amounts of money and realizing few benefits from huge investments. The positive result of the crash was the "back-to-basics" movement, namely, a return to carefully checking and scrutinizing any request for EC funding.

Today, companies are more careful with EC expenses and budgets. Technology executives feel the pressure for financial justification and planning from top executives. However, there is still a long way to go as demonstrated by the following data:

- Most companies lack the knowledge or tools to do ROI calculations for EC projects.
- The vast majority of companies have no formal processes or metrics in place for measuring ROI for EC projects.
- Many companies do not measure how completed EC projects compare with their promised benefits.

At the same time, the demand for expanding or initiating e-business projects is high. Therefore, it is recommended to calculate the projected value of proposed EC projects in order to gain approval for them. For further discussion, see Keen and Joshi (2011) and TeamQuest (2014).

Note that in some cases, following the competitors is the major reason to embark on EC projects. In such cases, you still need to do a formal justification, but it may be more of a qualitative in nature.

Other Reasons Why EC Justification Is Needed

The following are some additional reasons for conducting EC justification:

- Companies now realize that EC is not necessarily the solution to all problems. Therefore, EC projects must compete with other internal and external projects for funding and resources. The answer usually is provided by ROI, which we discuss in Section 14.4.
- Some large companies and many public organizations mandate a formal evaluation of requests for funding.
- Companies are required to assess the success of EC projects after their completion.
- The pressure by top management for better alignment of EC strategy with the business strategy.
- The success of EC projects may be assessed in order to pay bonuses to those involved with the projects.

EC Investment Categories and Benefits

Before we look at how to justify EC investments, let us examine the nature of such investments. One basic way to categorize different EC investments is to distinguish between investments in infrastructure and investments in specific EC applications.

IT infrastructure provides the foundation for EC applications in the enterprise. IT infrastructure includes servers, intranets, extranets, data centers, data warehouses, knowledge bases, and so forth. In addition, it is necessary to integrate the EC applications with other applications throughout the enterprise that share the infrastructure. Infrastructure investments are made for the long term.

EC applications are specific projects and programs for achieving certain objectives. The number of EC applications can be large. They may be in one functional department, or several departments may share them, which makes the assessment of their costs and benefits more complex.

Note: Cloud computing may provide a low cost IT infrastructure and EC applications and must be considered.

The major reasons that companies invest in IT and EC are to improve business processes, lower costs, increase productivity, increase customer satisfaction and retention, increase revenue and market share, reduce time-to-market, and gain a competitive advantage.

How Is An EC Investment Justified?

Justifying an EC investment means comparing the costs of each project against its benefits in what is known as a **cost–benefit analysis**. To conduct such an analysis, it is necessary to define and measure the relevant EC benefits and costs. Cost–benefit analysis is frequently assessed by *return on investment (ROI)*, which is also the name of a specific method for evaluating investments.

A number of different methods are available to measure the *business value* of EC and IT investments. Traditional methods that support such analyses are *net present value (NPV)* and ROI (see **nucleusresearch.com/research**).

Cost–Benefit Analysis and the Business Case

The cost–benefit analysis and the business value are part of a *business case*. The business case's cost benefit includes three major components: *Benefits* (e.g., revenue increase, cost reduction, customer satisfaction), *costs* (investment and fixed variables) and *risks* (e.g., obsolescence, employee resistance). Several vendors provide templates, tools, guidelines, and other aids for preparing the business case in specific areas. For example, IT Business Edge (**itbusinessedge.com**) provides a Business Case Resource Kit (see **itbusinessedge.com/downloads**).

What Needs to Be Justified? When Should Justification Take Place?

Not all EC investments need to be justified formally. In some cases, a simple one-page qualitative justification is sufficient. The following are cases where formal evaluation may not be needed:

- When the value of the investment is relatively small for the organization.
- When the relevant data are not available, are inaccurate, or are too volatile.

When the EC project is mandated – *it must* be done regardless of the costs involved (e.g., when mandated by the government, or when it is necessary to match the competition).

However, even when formal analysis is not required, an organization should conduct at least some qualitative analysis to explain the logic of investing in the EC project.

Using Metrics in EC Justification

EC metrics were described in Chapter 13. Metrics can be used to designate the ratio between costs and benefits or the total costs themselves. They are used not only for justification but also for other economic activities (e.g., to compare employee performance in order to reward those who do the best job). Metrics can produce very positive results in organizations by driving behavior in a number of ways. Metrics can:

- Be the basis for setting up specific goals and plans.
- Describe and measure the value proposition of business models (Chapter 1).
- Align the goals of individuals to teams, departments, and other organizational units to the enterprise's objectives.
- Track the performance of EC systems, including usage, types of visitors, page visits, conversion rate, and so forth.
- Assess the health of companies by using tools such as *balanced scorecards* and *performance dashboards*.

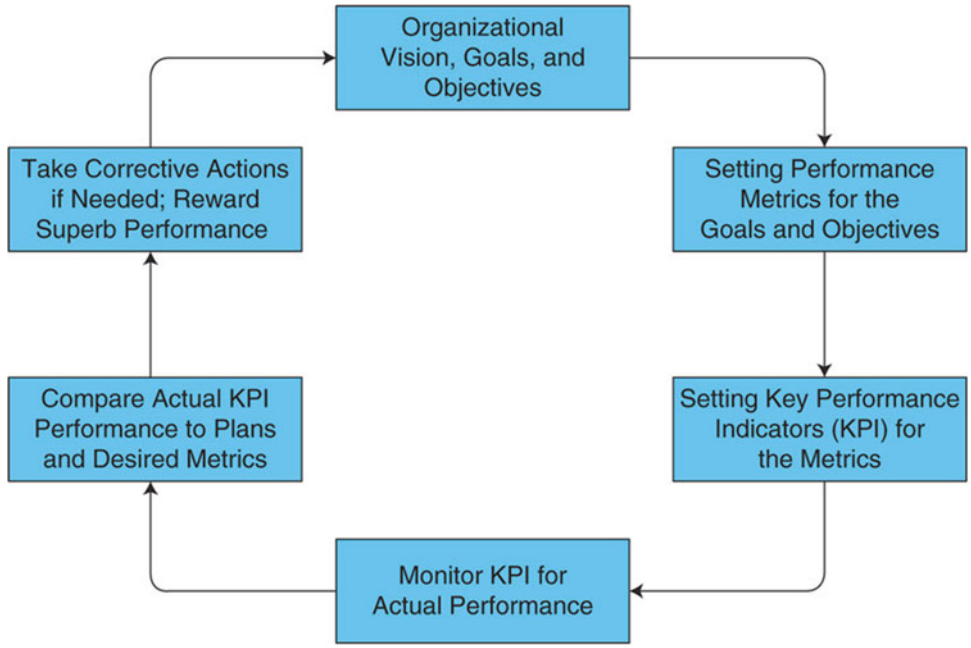

Figure 14.2 How metrics are used in performance management

Metrics, Measurements, and Key Performance Indicators

Metrics need to be defined properly with a clear way to measure them. Figure 14.2 shows the process of using metrics. The cyclical process begins with setting up goals and objectives for organizational and EC performance, which is then expressed by a set of metrics. The metrics are expressed by a set of **key performance indicators (KPIs)**, which are the quantitative expressions of critically important metrics. Often one metric has several KPIs.

The KPIs are continuously monitored by the organization, (e.g., via Web analytics, financial reports, marketing data, and so forth). As shown in Figure 14.2, the KPIs that reflect actual performance are compared to the desired KPIs and planned metrics. If a gap exists, corrective actions take place and then goals, objectives, and metrics are adjusted if necessary.

Another example of metrics is shown in the *balanced scorecard method* (see Chapter 13). This method uses four types of metrics: *customer*, *financial*, *internal businesses processes*, and *learning growth*.

We limit our discussion here mainly to individual EC projects or initiatives. EC projects deal most often with the automation of business processes, and as such, they can be viewed as capital investment decisions. Many tools help in the performance monitoring and measurement of e-commerce and the application of metrics (as shown in Figure 14.2). One of the most useful tools for EC is Web analytics, which was briefly introduced in Chapter 13. Web analytics are closely related to metrics (e.g., via Google Analytics; see Clifton 2012).

Web Analytics

Web analytics refers to tools and methods that are used to measure, analyze, and optimize Web usage and other Internet activities. A common usage of Web analytics is to evaluate website traffic, but it can also be used as a tool for EC market research. The outcomes of advertising campaigns can also be assessed with Web analytics. For additional information, see Kaushik (2010) and Beasley (2013).

Now that we understand the need for conducting EC justification and the use of metrics, let us see why EC justification is difficult to accomplish.

SECTION 14.2 REVIEW QUESTIONS

1. List some of the reasons for justifying an EC investment.
2. Describe the risks of not conducting an EC justification study.
3. Describe how an EC investment is justified.
4. List the major EC investment categories.
5. When is it unnecessary to formally justify EC investments?
6. What are metrics? What benefits do they offer?
7. Describe KPI.
8. Describe the cyclical use of metrics as it relates to organizational performance.
9. What is Web analytics, and what role does it play in the justification of EC projects?

14.3 DIFFICULTIES IN MEASURING AND JUSTIFYING E-COMMERCE INVESTMENTS

Justifying EC (and IT) projects can be complex, and therefore, difficult to justify. Let us see why.

The EC Justification Process

The EC justification process varies depending on the situation and the methods used. However, in its extreme, it can be very complex. As shown

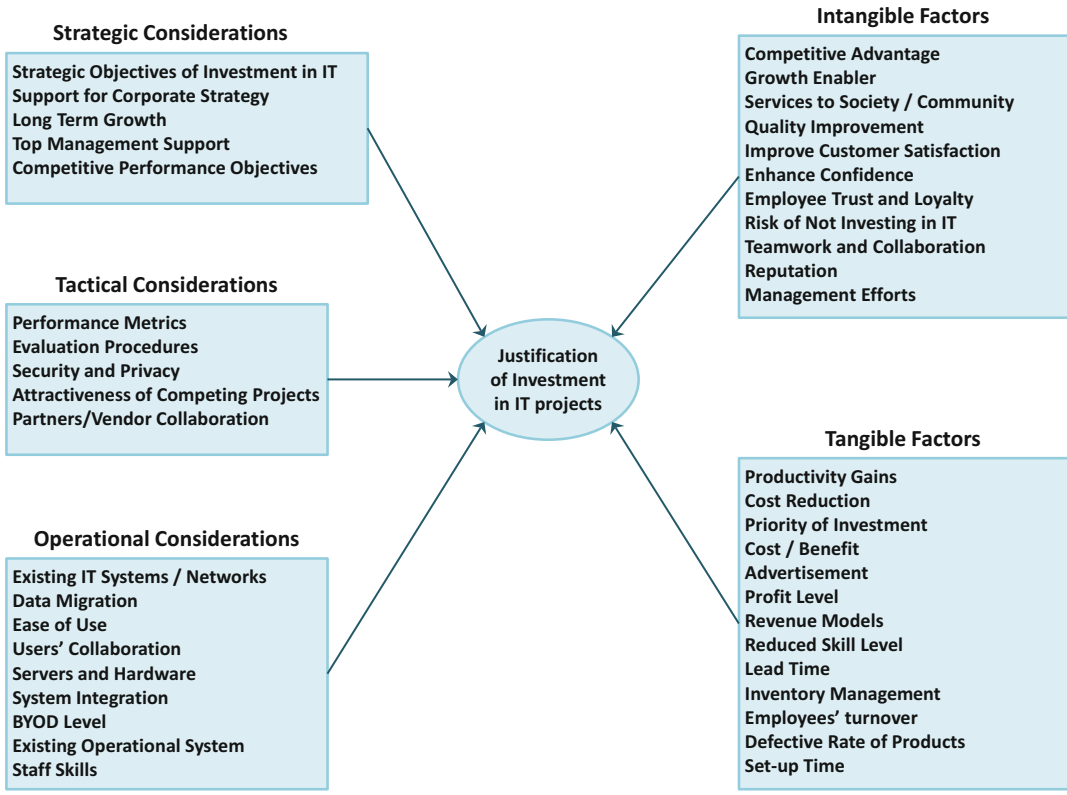

Figure 14.3 A model for IT project justification (Sources: Based on Gunasekaran et al. (2001) and Misra (2006); and the authors' experience.)

in Figure 14.3, five areas must be considered in the justification of IT projects. In this section, we discuss the intangible and tangible areas. In Chapter 13, we discussed some strategic and tactical considerations.

In addition to the complex process, one may face other difficulties in conducting justification.

Difficulties in Measuring Productivity and Performance Gains

One of the major benefits of using EC is increased productivity. However, productivity increases may be difficult to measure for a number of reasons.

Data and Analysis Issues

Data, or the analysis of data, may hide productivity gains. Why is this so? In manufacturing, it is easy to measure outputs and inputs. For example, Toyota produces motor vehicles – a relatively well-defined product that shows gradual quality changes over time. It is not difficult to identify the resources used to produce these vehicles with reasonable accuracy. However, in service industries, such as education, social services, or health care delivery, it is more difficult to define what the products are, how they differ in quality, and how they may be related to corresponding benefits and costs.

Other generic factors are:

- EC productivity gains in one area may be offset by losses in other areas
- Hidden costs and benefits
- Incorrectly defining what is measured

Relating EC and Its Expenditures to Organizational Performance

It may be difficult to find the relationship between EC investment and organizational performance. The reason is that the relationship between investment and performance may be indirect; factors such as shared EC and IT assets and how they are used can impact organizational performance and make it difficult to assess the value of an investment.

Other Difficulties

The long time lags between investment and profit realization may throw off productivity measurements.

Intangible Costs and Benefits

In many cases EC projects generate intangible benefits, such as faster time-to-market, and increased employee and customer satisfaction. These are very desirable benefits, but it may be difficult to place an accurate monetary value on them. For example, it is generally known that e-mail improves communications, but it is difficult to measure the value of this improvement.

Tangible Costs and Benefits

The costs involved in purchasing hardware, software, consulting, and support services usually are tangible, as are the costs of telecommunication services, maintenance, and direct labor. These costs can be measured through accounting information systems (e.g., from the general ledger). Similarly, tangible benefits, including increased profitability, improved productivity, and greater market share can be measured with relative ease.

Intangible Costs and Benefits

When it comes to *intangible* costs and benefits, organizations must develop innovative metrics to track these as accurately as possible. Intangible costs may range from the inclusion of some vague costs, such as those resulting from the learning curve during of the incorporation of an EC system, to better respond to customer inquiries. Another intangible cost may result from the need to change or adapt to certain business processes such as building and operating an inventory tracking system. An additional difficulty is separating EC costs from the costs of routine maintenance of inventory and other relevant IT systems.

Managing Intangible Benefits

The first step in managing intangible benefits is to define them (see the opening case of Telstra), and if possible, specify how they are going to be measured.

A simple solution is to make *rough estimates* of the monetary values of all the intangible benefits and then conduct an ROI or similar financial analysis. The simplicity of this approach is appealing, but in many cases, the simplification assumptions used in these estimates are questionable. If the estimates were too high, a wrong investment may have been made. An estimate that is too low may result in disregarding a good investment and potentially losing a competitive advantage. Intangible costs and benefits may be approached in a number of different ways. Several of the methods presented in Section 14.4 also can be used to evaluate intangible benefits. For more on intangible costs and benefits, see Ritter and Röttgers (2008).

One way to deal with intangible benefits is to develop a balanced scorecard (Chapter 13) for the proposed investments. This approach requires listing both tangible and intangible goals and their measurements. For an example of how this works, see Asefeso (2014).

These difficulties can cause many companies not to measure the value of IT and EC projects, which can be a risky approach. For those companies that conduct a formal justification, we present a number of methods in Sections 14.4 and 14.5.

The Process of Justifying EC and IT Projects

Justifying large-scale investments is not only about selecting a method; it is also about executing it. The appropriate process is not simple. The major steps of this process, according to *Baseline* (2006) and the authors' experience are:

1. Establish an appropriate basis for analysis with your vendor, and then conduct your ROI.
2. Investigate what metrics to use (including internal and external metrics) and be sure about their accuracy.
3. Justify the cost-benefit under appropriate assumptions. (See the references provided in the opening case.)
4. Verify all data used in the calculation.
5. Include strategic benefits, including long-term ones. Find contributions to competitive advantage. Make sure not to underestimate costs and overestimate benefits (a tendency of many managers).
6. Make data as realistic as possible, and include cost avoidance and risk analysis.
7. Commit all business partners, as well as suppliers and major customers.

The Use of Gartner's Hype Cycle

Before we introduce the specific methods used in justification, we present briefly the concept of the *hype cycle*. Organizations can use this tool to assess the maturity level of specific EC technologies so they can develop a strategy before they invest efforts and money in conducting cost–benefit and justification analysis.

What Is Gartner's Hype Cycle?

A **hype cycle** is a graphic representation of the life cycle of specific IT and EC technologies (e.g., cloud computing, 3D printing, e-payment). The term was coined by the information technology research and advisory company, Gartner, Inc. The hype cycle provides a snapshot of the relative maturity of different categories of technologies, IT methodologies, and management-related disciplines overtime. The hype cycle highlights the overhyped technologies versus those that are matured and already have high usage in industry. The hype cycle also provides estimates of how long technologies and trends will take to reach maturity. The methodology and details are presented at **gartner.com/technology/research/**

methodologies/hype-cycle.jsp. Hype cycles can be customized (by Gartner Inc., for a fee) to fit certain industries and companies. Gartner revises the hype cycles once a year.

Each hype cycle has five stages that reflect the basic adoption path any technology follows, starting with a trigger point, through over-enthusiasm hype, and then enduring disillusionment, before finally becoming accepted. (Note that Gartner developed the hype cycle to replace the *product life cycle*, which includes four stages.) The five stages of the hype cycle are:

1. **Technology trigger.** The generation of media interest and industry exposure in new IT or EC technology, which includes publicity events (such as product launch parties, public demonstrations, or press releases), that result in considerable attention to the technology.
2. **Peak of inflated expectations.** This is the phase of exuberance and overenthusiasm, and too much publicity and overestimation of the technology's potential. In 2013, augmented reality and the Internet of Things were in this stage. The technology performance may not be able to keep up with the promises made by technology leaders, consultants, and financial analysts.
3. **Trough of disillusionment.** A point where the media no longer care about the technology because its results were disappointing.
4. **Slope of enlightenment.** The usefulness, risks, and benefits of the technology are understood because of the combined good results and best efforts and practices of many organizations.
5. **Plateau of productivity.** The technology has shown to have actual benefits. Now in their second or third generation, the methodologies and tools are more stable and consistent. The location of the plateau of the technology depends on whether the technology is specifically for a niche market or is universal.

Application of the Hype Cycle

Gartner, Inc. provides an annual report that covers about 102 different hype cycles evaluating over 2,000 different technologies across 75 industries (e.g., see Gartner 2013). For information, including a video, see **gartner.com/technology/research/hype-cycle**. Gartner Inc. charges fees for providing its reports, which include technology trends. The 2011 and 2014 reports cover many EC technologies such as mobile commerce and devices, microblogging, augmented reality, green IT in data centers, social analytics, cloud computing, context-aware computing, Internet of Things, virtual worlds, location-based applications, security, RFID, video telepresence, and collective intelligence.

An example of how EC technologies were placed on the hype cycle in the past is available at **gartner.com/newsroom/id/2575515**. The press release provides interesting information about several emerging EC technologies. Examination of the hype cycle can be useful to any organization that seriously considers the emerging tools of e-commerce, m-commerce, and social commerce.

SECTION 14.3 REVIEW QUESTIONS

1. How do organizations measure performance and productivity? What are the difficulties in measuring performance and productivity?
2. Why is it difficult to relate EC (IT) investments to organizational performance? List the major reasons.
3. Define tangible costs and benefits.
4. Define intangible costs and benefits and explain why they must be considered when justifying an EC investment.
5. How should management handle the intangibles and uncertainties of benefits?
6. Define the hype cycle and describe its five stages.
7. Describe how the hype cycle is used in e-commerce.

14.4 METHODS AND TOOLS FOR EVALUATING AND JUSTIFYING E-COMMERCE INVESTMENTS

At their core, all economic justification approaches attempt to account for the costs and benefits of investments. They differ in their ability to account for the tangible and intangible costs and benefits of EC, particularly when compared to other corporate investments.

Opportunities and Revenue Generated by EC Investments

In preparing the business case for EC investments, as we will describe later, one should examine the potential *additional revenues* created by the EC investments. Chapter 1 presented the typical revenue models generated by EC and the Web. Additional examples are:

- Companies that allow people to play games for a fee, or watch a sports competition in real time for a fee (e.g., see **espn.go.com**)
- Increased revenues via selling goods and services online in other countries (e.g., NFL in China)
- By using less expensive business processes, the profitability increases
- Ability to sell from mobile devices
- Using social networking for advertising and marketing
- Selling data collected with Web analysis to other companies
- Selling space for ad display on one's website
- Commissions generated from affiliate marketing

Companies use a variety of commercially available tools or develop in-house tools.

Methodological Aspects of Justifying EC Investments

Before presenting the specific methods for EC justification, let us examine the cost issue that is common to most of the justification methods.

Types of Costs

Although costs may appear to be the simple side of a cost–benefit analysis, they may be complex at times. Here are a few things to consider:

- **Distinguish between initial (up-front) costs and operating costs.** The initial costs may be a one-time investment or they may spread over several months or years. In addition, system operating costs need to be considered.
- **Direct and indirect shared costs.** Direct costs can be related directly to a specific EC project. Indirect costs usually are shared infrastructure-related costs. In addition, the costs may be related to several EC and IT projects. Therefore, one needs to allocate these costs for the specific project(s). Such allocation may not be easy to perform; a number of approaches to cost allocation are available (consult an accountant).
- **In-kind costs.** Although it is easy to track monetary payments, costs also may be of the in- kind type; for example, costs of the efforts of a manager working on an EC project and on other projects at the same time, and so on. These frequently are indirectly shared costs (e.g., overhead), which complicates their allocation to specific projects.

Traditional Methods for Evaluating EC Investments

The following are the most popular methods for evaluating IT and EC investments. For details, see Nucleus Research (2014). The major ones follow.

The ROI Method

The *ROI method* uses a formula that divides the total net benefits (revenue minus costs, for each

year) by the initial cost. The result is a ratio that measures the ROI for each year or for an entire period; see Fell (2013) and Keen and Joshi (2011). In calculating ROI, one should consider the following techniques.

Payback Period

With the *payback-period* method, the company calculates how long it will take for the initial investment to be paid back from the profits.

NPV Analysis

In an *NPV analysis*, analysts convert future values of benefits to their present-value equivalents using an interest rate that equals what the company paid to obtain funding. The analyst then can compare the present value of the future benefits with the present value of the costs required to achieve those benefits to determine whether the benefits exceed the costs. In this case one needs to also consider the intangible benefits. For guidelines that are more specific and decision criteria on how NPV analysis works, consult Nucleus Research (2014).

Internal Rate of Return (IRR)

For an investment that requires and/or produces a number of cash flows over time, it is common to use the *internal rate of return (IRR)* method. The IRR is the discount rate that makes the NPV of those cash flows equal to zero.

Break-Even Analyses

A *break-even point* is the point at which the benefits of a project are equal to the costs. Firms use this type of analysis to determine the point at which the EC investment starts to pay for itself.

The Total Costs and Benefits of Ownership

The costs of an EC system may accumulate over many years. An important factor in an EC cost evaluation is the *total cost of ownership.* **Total cost of ownership (TCO)** is a formula for estimating the direct and indirect cost of owning, operating, and controlling an EC system, over the entire life of the project. The cost includes acquisition costs (hardware and software), operation costs (maintenance, training, operations, etc.), and any other related cost. The TCO may be 100% higher than the cost of the hardware, especially for PCs.

By considering TCO, organizations can make more accurate cost–benefit analyses. Boardman et al. (2011) offer a methodology for calculating TCO. They also provide a detailed example of the items to include in TCO calculations. A similar concept is **total benefits of ownership (TBO)**. The TBO calculation includes both tangible and intangible benefits. By calculating and comparing TCO and TBO, one can compute the payoff of an IT investment (i.e., payoff = TBO – TCO).

Economic Value Added

Economic value added (EVA) attempts to quantify the net value added by an investment. It is the return on invested capital (i.e., after-tax cash flow) generated by a company, minus the cost of the capital used in creating the cash flow.

Using Several Traditional Methods for One Project

Some companies use several traditional methods to be cautious. Each of these methods provides us with a different aspect of the analysis.

Business ROI Versus Technology ROI

When implementing ROI, one should look at both the business side and the technology side of the project to be justified. For details, see Fell (2013). Related to this is the issue of measuring the quality of EC projects.

ROI Calculators

The traditional methods of calculating ROI involve simple formulas and are available as Excel functions or other calculators. Calculators are also available for complex and proprietary formulas, as illustrated in the opening case.

Practitioners' experiences and theories are embedded in **ROI calculators** to evaluate investments using metrics and formulas. Recently, companies specializing in ROI also have developed ROI calculators, some of which are available for free.

The Offerings from Baseline Magazine

One of the major sources of simple calculators is *Baseline* (**baselinemag.com**). It offers several dozen Excel-based calculators (for free or for a fee). Examples of calculators offered include:

- Calculating ROI in general
- Figuring the ROI of RFID
- Comparing smartphones and laptops
- Figuring the ROI of application performance management
- Determining the true total cost of ownership (TCO)
- Calculating the ROI of VoIP
- Determining the cost of videoconferencing solutions

In addition, *Baseline* offers tutorials, guides, statistical data, and more, related to these calculators.

Other Calculators

Nucleus Research Inc. (**nucleusresearch.com**) offers several ROI calculators. Nucleus Research believes that if an EC justification includes intangible costs and benefits, then a customized calculator will be needed. ROI calculators for e-services are also available.

Example

A few organizations have attempted to assess the ROI on e-learning. For example, **elearningindustry.com** provides resources such as ROI calculators, methodologies, infographics, articles, and online communities to support the assessment of e-learning (see **elearningindustry.com/free-elearning-roi-calculators**).

ROI calculators also are available from various other companies, such as Phoenix Technologies (**phoenix.com**), and Citrix's XenDesktop (**citrix.com/products/xendesktop/overview.html**). CovalentWorks Corporation (**covalentworks.com**) specializes in B2B calculators. For more examples of ROI calculators, see ROI-Calc, Inc. (**roi-calc.com**), Money-Zine (**money-zine.com**), and Microsoft (**microsoft.com**).

Advanced Methods for Evaluating IT and EC Investments

Traditional methods that are based only on tangible financial factors may not be sufficient for many IT and EC justifications. Therefore, new methods have evolved with time and now include intangible factors such as customer satisfaction. These methods may supplement the ROI traditional methods or replace them.

Renkema (2000) presents a comprehensive list of more than 60 different appraisal and justification methods for IT investments. Most justification methods can be categorized into the following four types:

1. **Financial approaches.** These methods consider only financial factors. ROI, IRR, and payback period are examples of financial methods.
2. **Multicriteria approaches.** These methods consider both financial impacts and non-financial impacts that cannot be (or cannot easily be) expressed in monetary terms. These methods employ quantitative and qualitative decision-making techniques. Examples include information economics, balanced scorecards, and value analysis.
3. **Ratio approaches.** Several ratios can be used in these methods to aid in the evaluation of EC investments. The ratios used frequently are financial in nature, but other types of metrics can be used as well. An example of this would be EC expenditures divided by annual sales or EC expenditures as a percentage of the operating budget.
4. **Portfolio approaches.** These methods plot a group of investment alternatives against decision-making criteria. Portfolio methods can be very complex.

Table 14.1 Advanced methods for EC justification and evaluation

• **Information economics.** Using the idea of critical success factors, this method focuses on key organizational objectives and the potential impacts of the proposed EC project on each of them and on economic decisions
• **Scoring methodology.** This method assigns weights and scores to various aspects of alternative evaluated projects (e.g., weights to each metric) and then calculates a total (or weighted average) score. Information economics theories are used to determine the factors to include in the scoring
• **Benchmarks.** This method is appropriate for evaluating EC infrastructure. Using industry standards (or indices), for example, the organization can determine what the industry is spending on e-CRM on the average. The organization can decide then how much it should spend. Benchmarks may be industry metrics or best practices recommended by professional associations or consultants
• **Management by maxim.** An organization may use this method to determine how much it should invest in large EC (and IT) infrastructures. It is a combination of brainstorming and consensus-reaching methodologies
• **Real-options valuation.** This is a complex assessment method, and is used infrequently. It can be accurate only in certain situations. The idea behind this method is to look at future opportunities that may result from the EC investment and then place monetary values on those opportunities
• **Balanced scorecard.** This method evaluates the health or performance of the organization by looking at a broad set of factors, not just financial ones. It is becoming a popular tool for assessing EC projects
• **Performance dashboard.** This is a variant of the balanced scorecard that is popular in e-business investment situations. A dashboard is a single view that provides the status of multiple metrics on one chart
• **Activity-based costing and justification.** This method considers costs that occur when certain activities are performed. This managerial accounting concept was adapted by some companies for assessing EC investments, and has proven to be successful

Table 14.1 summarizes representative advanced methods useful in evaluating EC investments.

Unfortunately, none of these methods is perfect or universal. Therefore, you need to look at the advantages and disadvantages of each. Justification methods usually are included in a business plan or business case. Business case software for EC is available from BPlans (**bplans.com**) and Palo Alto Software (**paloalto.com**).

SECTION 14.4 REVIEW QUESTIONS

1. Briefly define ROI, NPV, payoff period, IRR, and break-even methods of evaluation.
2. What are ROI calculators?
3. Describe the four major justification approaches.

14.5 EXAMPLES OF E-COMMERCE METRICS AND PROJECT JUSTIFICATION

The methods and tools described in the previous section can be used alone, in a combination, or with modifications to justify different EC projects. Here, we provide a few examples of how these methods and tools can be used to justify different types of EC projects.

Justifying E-procurement

E-procurement includes the supporting administrative processes of procurements (e.g., selecting suppliers, submitting formal requests for proposals, processing purchase orders, and organizing payments).

Setting metrics for e-procurement is difficult especially when procurement is done in B2B exchanges. An example of e-procurement metrics is provided next.

Example: E-procurement Metrics

The following performance on the designated metrics signifies success of e-procurement.

- Increased on-time deliveries of purchased goods
- Decreased purchase order processing time
- Decreased prices of items procured due to increased supplier availability, improved interactions, and use of order aggregation (volume discount)
- Decreased ratio of transportation and handling costs to purchasing costs

Indirect metrics include minimizing costs, such as:

- Reduced inventory handling costs
- Reduced damage in-transit costs
- Reduced raw material costs
- Reduced rework costs (of defective items)
- Reduced operating and administrative costs
- Reduced transportation and handling costs

E-procurement can directly or indirectly affect these and similar metrics. Measuring and monitoring e-procurement activities is crucial to identifying both problematic and successful areas. The evolution from basic online purchasing to the use of exchanges is shown in Online File W14.1.

Justifying Social Networking and the Use of Web 2.0 Tools

Justifying social networking initiatives and the use of Web 2.0 tools can be difficult due to the intangible benefits and the potential risks. However, in many cases, the cost is relatively low and so companies embark on such projects without formal justification, especially in cases where project is just experimenting with the technology. The major issue could be that of risk assessment. Some of the tools are available for free or are being added by vendors to communication and collaboration tools. For a comprehensive e-book, see Petouhoff (2012). For a white paper on the business case for making business processes social, see Ziff Davis (2012). Also, watch two videos from Salesforce.com: "How to Build a Business Case for Social Media" (**youtube.com/watch?v=_59iJrYanw0**) and "How to Measure Social Media ROI" (**youtube.com/watch?v=UhUO30VRN1M.com**). For a comprehensive coverage see Turban et al. (2015).

Justifying an Investment in Mobile Computing and in RFID

Justifying the cost of mobile computing may be difficult due to cost sharing infrastructure and the many intangible benefits of mobile applications. **Baselinemag.com** offers tutorials and several calculators to help companies do the following:

- Calculate the ROI on the wireless workforce
- Calculate the ROI on outsourcing mobile device management
- Calculate the cost of the wireless networks

Vendors of wireless and mobile hardware, software, and services offer tutorials and calculators, as well (e.g., Symbol Technologies [**symboltech.net**]; now a Motorola company, Sybase [**sybase.com**]; a SAP company, and Intel [**intel.com**]). For a comprehensive discussion of the justification of mobile computing, see *MobileInfo.com* (2011).

Justifying Investing in RFID

Many medium and large corporations are considering implementing RFID systems to improve their supply chain and warehousing operations (see Chapter 12). Although such systems offer many tangible benefits that can be defined, metrics are difficult to develop because the technology is new and legal requirements (for privacy protection) are still evolving.

An example of justifying an investment in wireless computing is provided in Online File W14.2.

Justifying Security Projects

More than 85% of viruses enter business networks via e-mail. Cleaning up infections is labor intensive, but antivirus scanning is not. ROI calculators are available for investing in security software and employee training at **baselinemag.com**.

Justifying Buying Products or Services from Vendors

Google developed a methodology and calculators that enable organizations to justify the investment in some of Google's major products, notably "Search." See the 2009 white paper by Google titled: "Maximizing Website ROI: The Crucial Role of High Quality Search" at **static.google-usercontent.com/media/www.google.com/en/us/enterprise/search/files/Google_MaximizingWebsiteROI.pdf**.

SECTION 14.5 REVIEW QUESTIONS

1. List five success factors for e-procurement.
2. List five performance metrics for e-procurement.
3. List some metrics that can justify social networking.
4. List some metrics for justifying the installation of a wireless network in a restaurant.

14.6 THE ECONOMICS OF E-COMMERCE

The economic environment of e-commerce is broad and diversified. In this section, we present only representative topics that relate to the traditional microeconomic theory and formula. For a theoretical paper, see Prieger and Heil (2009).

Reducing Production Costs

Production costs are the costs to produce the product or service a company is selling. E-commerce makes a major contribution to lowering production costs. For example, e-procurement may result in cost reduction for purchasing. Much of intrabusiness EC consists of cost reduction. The following economic principles express these reductions.

Product Cost Curves

The *average variable cost (AVC)* represents the behavior of average costs as quantity changes. The AVC of many physical products and services is U shaped (see Figure 14.4). This curve indicates that, at first, as quantity increases, the more the cost declines (Part A). The more the quantity increases, the cost starts to go back up, due to increasing variable costs (especially marketing costs) and fixed costs (because more management is needed) in the short run. In contrast, the variable cost per unit of digital products is very low in most cases, and almost fixed once the initial investment is recovered. Therefore, as Figure 14.4

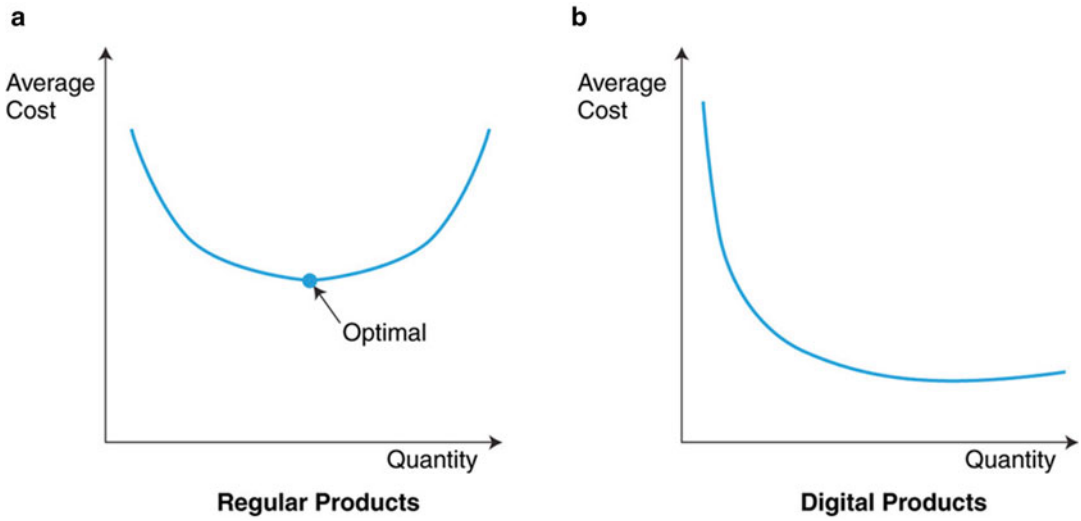

Figure 14.4 Average cost curve of (**a**) regular and (**b**) digital products

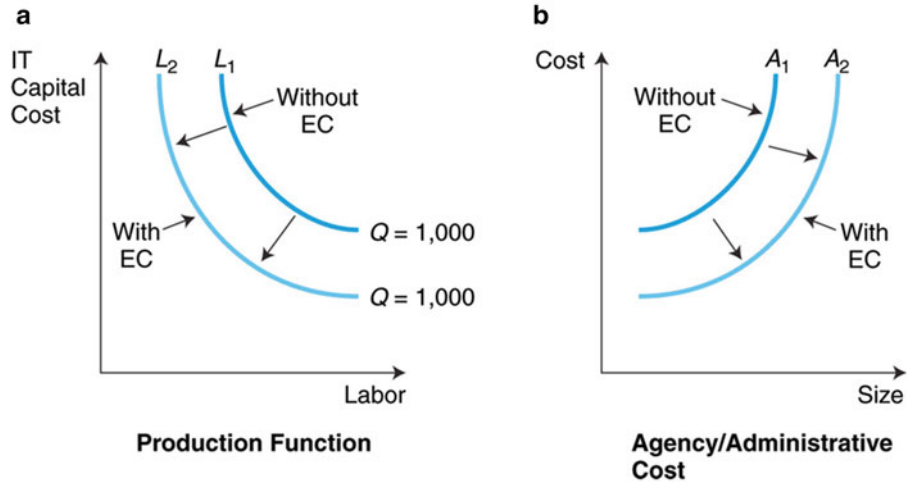

Figure 14.5 The economic effects of EC: the production function and agency costs

(Part B) shows, with digital products the average cost per unit declines as quantity increases, because the fixed costs are spread (prorated) over more and more units. This relationship results in increasing returns with increased sales. It provides a competitive advantage, because EC users can sell their products at lower prices.

Production Function

The **production function**, shown in Figure 14.5 (Part A), represents a mathematical formula that indicates that for the same quantity of production, Q, companies either can use a certain amount of labor or invest in more automation (e.g., they can substitute IT capital for labor). For example, for a quantity Q 1,000, the lower the amount of labor needed, the higher the required IT investment (capital costs). When EC enters the picture, it *shifts* the function inward (from L_1 to L_2), lowering the amount of labor and/or capital needed to produce the same Q 1,000. Again, EC provides a competitive advantage, allowing companies to sell at lower prices than the competition.

Agency Costs

Figure 14.5 (Part B) shows the economics of the firm's **agency costs** (or *administrative costs*). These are the costs incurred in ensuring that certain support and administrative tasks related to production are performed as intended (e.g., by an agent). In the "old economy," agency costs (A_1) grew with the size (and complexity) of the firm, quickly reaching a high level of cost. This frequently prevented companies from growing to a very large size. In the digital economy, the agency costs curve shifts outward, to A_2. This means that EC, companies can significantly expand their businesses without too much of an increase in administrative costs. Again, this is a competitive advantage for rapidly growing EC companies.

Transaction Costs

Transaction costs describe a wide range of expenses that are associated with commercial transactions, including the bartering of products and services. Transaction costs according to **businessdictionary.com**, cover a wide range: communication charges, legal fees, information cost of finding the price, quality, and durability, and so forth, and may also include transportation costs, which are a critical factor in justifying EC investment. Many economists (e.g., Chen 2005) divide these costs into the following six categories:

1. **Search costs**
2. **Information costs**
3. **Negotiation costs**
4. **Decision costs**
5. **Monitoring and policing costs**
6. **Legal-related costs**

As we have seen throughout the book, e-commerce can reduce all these costs. Reducing transaction costs benefits merchants by providing them a competitive advantage and enabling them to deliver better customer service. For example, search engines and comparison bots can reduce search costs and information costs. EC also can drastically reduce the costs of monitoring, collaborating, and negotiating.

Figure 14.6 reflects one aspect of transaction costs. As seen in the figure, there is a trade-off between transaction cost and size (volume) of business. Traditionally, in order to reduce transaction costs, firms had to grow in size (as depicted in curve T_1). In the digital economy, the transaction cost curve shifts downward to position T_2. This means that EC makes it possible to have low transaction costs, even with smaller firm size, and to enjoy much lower transaction costs as firm size increases.

Increased Revenues

Throughout the text, we have demonstrated how an organization can use EC to increase revenues through webstores, auctions, cross-selling opportunities, multichannel distribution arrangements, and so on. EC also can be used to increase revenues by improving reach and richness.

Reach Versus Richness

Another economic issue of EC is the trade-off between the number of customers a company can reach (called *reach*) and the amount of interactions and information (e.g., advertisement) it can provide to them (called *richness*). For a given amount of cost (resources), there is a trade-off between reach and richness. For a given amount of expenses, the more customers a company wants to reach the fewer services it can provide to them. Figure 14.7 depicts this economic relationship.

The case of investment and brokerage company Charles Schwab illustrates the implementation of the reach versus richness trade-off. Initially, Schwab attempted to increase its reach. To do so, the company went downward along the curve (see Figure 14.7), reducing its richness. However, using its website (**schwab.com**), Schwab was able to drastically increase

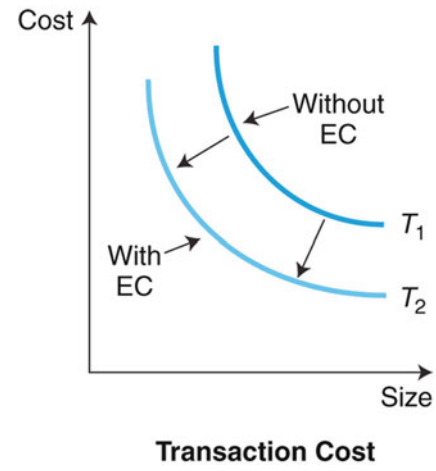

Figure 14.6 The economic effects of EC: transaction costs

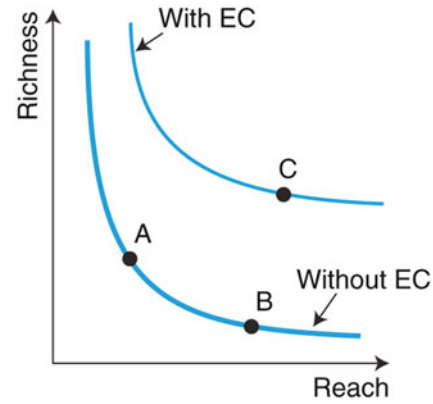

Figure 14.7 Reach versus richness

its reach (moving from point A to B) and at the same time provide more richness in terms of customer service and financial information to customers (moving from point B to point C). For example, by using Schwab's Mutual Fund Screener, customers can build investment portfolios comprised of several mutual funds. Providing such services (richness) allows Schwab to increase the number of customers (reach), as well as charge higher fees than competitors who provide few value-added services. In summary, the Internet pushes the curve outward toward the upper right-hand corner of the chart, allowing more reach at the same cost. For additional details, see Jelassi and Enders (2008).

Facilitating Product Differentiation

Organizations can use EC to provide **product differentiation** – products with special features. For example, McAfee allows users of its VirusScan (a virus detection software) to update the latest security patches online automatically, differentiating itself from competing software that require manual upgrades. Differentiation does not necessarily require a physical product; it can also be done for services. EC can provide differentiation through Web-based product information, informing users how to use the product, how to replenish it, and how to provide feedback.

EC Increases Agility

EC can provide firms with the *agility* needed to monitor, report, and quickly respond to changes in the marketplace and the business environment. Companies with agile systems can respond to customer requests quickly, improving customer service. FedEx, UPS, and other delivery companies can provide location information because they use EC to connect with customers and make package tracking information available. EC systems enable companies to learn more about customers and understand their buying habits. This enables a company to better predict trends for better planning and quickly introduce changes when needed. Similarly, e-procurement has given firms the ability to swiftly locate sellers and place orders with them online. Sellers, in turn, use e-fulfillment to rapidly locate products in their warehouses and fill customer orders.

Valuation of EC Companies

Valuation is the process of trying to determine the value or worth of a company. It is done for the purpose of selling a company or determining its value for going public (an IPO) or for a proposed merger. In the EC context, valuation often is conducted to determine a reasonable IPO price when a start-up company goes public or is acquired by another company. For example, in 2014 Facebook paid $19 billion to acquire messaging service What'sApp Inc.

The three most common valuation methods, according to Rayport and Jaworski (2004), are the *comparable method*, the *financial performance method*, and the *venture capital method*:

- **The comparable method.** Using this method, analysts compare the company with similar companies based on as many factors as possible (e.g., size, industry, customer base, products, growth rate, book value, debt, sales, financial performance). In addition, they may look at performance trends, management teams, and other features. A major difficulty with this method is finding such information for privately held companies. Another difficulty is a lack of such data for start-ups.
- **The financial performance method.** This method uses projections of future earnings (usually 5 years), cash flows, and so on, to find the NPV of a company. The major problem with this method is in determining the discount rate.
- **The venture capital method.** Venture capital (VC) firms invest in start-ups and usually take them through to their IPOs. They may use a combination of the first two methods or their proprietary formulas. The VC firm may use a very high discount rate (e.g., 30–70%). When companies pay using their stock, they tend to agree to a higher valuation. An example is Apple's acquisition of Instagram in 2012.

Let us look at one of the most successful IPOs of an EC company – Google. Google floated its IPO in fall 2004, targeting it at $85 per share. Within a few weeks, the share price more than doubled, reaching over $450 in late 2005, $500 in 2006, more than $700 in 2007, and over $1,100 in 2014, giving Google a market capitalization of $350 billion. Facebook went public in 2013 at a price of $38 per share. Making its valuation in 2014 estimated at over $200 billion. The increase in share price indicated that investors were willing to pay huge premiums for anticipated future performance and valuation. Many acquisitions and mergers from 1996 through 2001 involved unrealistically high valuations, and so did the acquisition of social networks from 2005 to 2014. For example, note that, when EC companies acquire other EC companies, they frequently pay in the form of stock, not cash, so such high valuations are more appropriate. Google used this same strategy to acquire other companies. In 2010, Groupon refused Google's offer of $6 billion. It went public as an IPO in the stock market in 2011 with $20 billion valuation. However, in May 2014 the valuation decline to about $4.5 billion.

In summary, the economics of EC enables companies to be more competitive and more profitable. EC economics also enables them to grow faster, collaborate better, provide excellent customer service, and innovate better. As in any economic environment, here, too, those who capitalize on these opportunities will excel; the rest are doomed to mediocrity or failure.

Once EC projects are justified, these systems need to be developed.

SECTION 14.6 REVIEW QUESTIONS

1. How does EC impact the production cost curve?
2. Define transaction costs. List the major types and explain how EC can reduce such costs.
3. How can EC increase revenue?
4. How can EC increase the competitive advantage for a firm?
5. What are the benefits of increasing reach? How can EC help?
6. Explain the impact of EC on product differentiation and agility.
7. Define valuation. Why is it so high for some EC start-ups?

14.7 A FIVE-STEP APPROACH TO DEVELOPING AN E-COMMERCE SYSTEM

Once it has been determined that a business can benefit from a specific EC initiative, it is time to establish detailed plans of what and how to do it,

Table 14.2 Capabilities needed by webstore users

Buyers need the ability to	Sellers need the ability to
• Discover, search for, evaluate, and compare products for purchase using e-catalogs	• Provide access to a current catalog
• Select products to purchase and compare their price and terms	• Allow price comparisons
• Place an order for desired products using a shopping cart	• Provide an electronic shopping cart
• Pay for the ordered products, usually by credit card or e-payment	• Verify a customer's credit card or accept PayPal (or similar) e-payments
• Confirm an order, ensuring that the desired product is available	• Process orders (back-end services)
• Track orders once they are shipped	• Arrange for product fulfillment and delivery • Track shipments to ensure that they are delivered • Provide the means for buyers and visitors to register at the site, to make comments and recommendations, or to request additional information • Answer customers' questions or pass queries and requests on to a Web-based call center • Provide the ability to customize products/services • Provide Web-based post-sale support • Create the capability for cross-selling and up-selling • Provide language translation if needed • Measure and analyze the traffic at the site to improve services and operations

and to design the components and the capabilities of the EC system. It is wise to start with the identification of the users' needs. Some typical capabilities needed by a webstore are shown in Table 14.2.

Next, one should consider all the elements that can be used in a comprehensive EC system. These include hardware, software, networks, site design, capabilities, people involved, and interactions with other systems.

It is also important that a firm choose the correct development strategy to obtain the greatest return on its investment. The diversity of e-business models and applications, which varies in size from small webstores to global exchanges, requires a variety of development methodologies and approaches.

Building medium to large applications requires extensive integration with existing information systems, such as corporate databases, intranets, enterprise resource planning (ERP), and other application programs. Therefore, although the process of building EC systems can vary, in many cases, it tends to follow a standard format, such as using the systems development life cycle (SDLC; described next). Before we present the SDLC, it is worthwhile to look at the life cycle of a typical EC system. This life cycle is illustrated in Figure 14.8, and it is self-explanatory.

Building a large EC system can be a very complex process, as is illustrated in Figure 14.9. The SDLC organized this process.

The Essentials of the SDLC: An EC Application

The traditional *systems development life cycle (SDLC)* systematically leads developers through several analysis and design stages: problem identification, analysis, logical design, physical design, implementation, and maintenance. The SDLC is the basis for the development of the majority of traditional business systems (see Kendall and Kendall 2013 for more details on this approach). However, innovative new software and hardware are enabling a move to a more streamlined approach to e-commerce development.

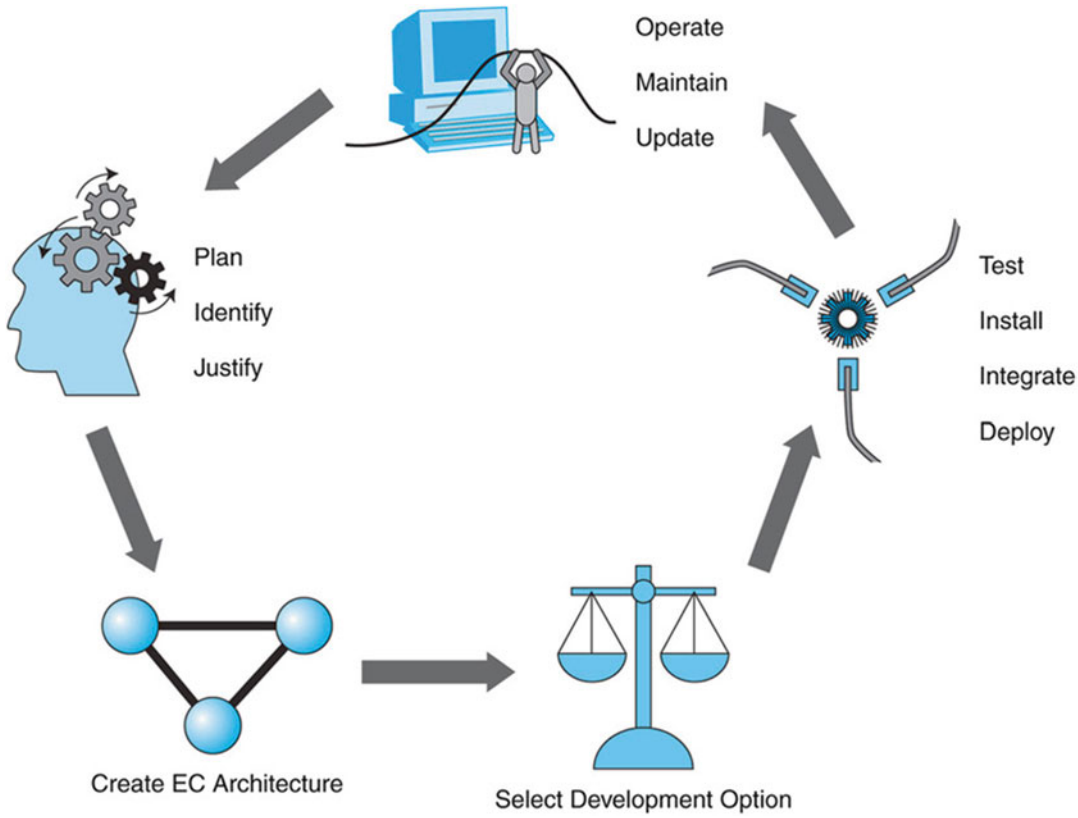

Figure 14.8 E-commerce system life cycle

The Five Traditional Steps

These steps are:

- **Step 1:** Identifying, justifying, and planning EC systems
- **Step 2:** Creating an EC architecture
- **Step 3:** Selecting a development option
- **Step 4:** Installing, testing, integrating, and deploying EC applications
- **Step 5:** Operations, maintenance, and updates

Managing the Development Process

The development process can be complex and must be managed properly. For medium-to-large applications, a project team is usually created to manage both the process and the vendors. Collaboration with business partners also is critical. Some e-business failures are the result of a lack of cooperation by business partners. For example, a firm can install an effective e-procurement system, but if its suppliers do not use it properly, the system will collapse. Projects can be managed with project management software. Best practice management also includes periodic evaluations of system performance. Standard project management techniques and tools are useful for this task. Finally, do not rule out the possibility that implementing an EC project may require restructuring one or more business processes.

SECTION 14.7 REVIEW QUESTIONS

1. Examine 10 different websites and choose your five favorites. Explain why you like each site. Relate your answers to the content of this chapter.
2. Go to the website of each of the developers/Webmasters of your five favorite websites. What expertise do they profess to have? What projects have they completed? Would you feel comfortable hiring their services?

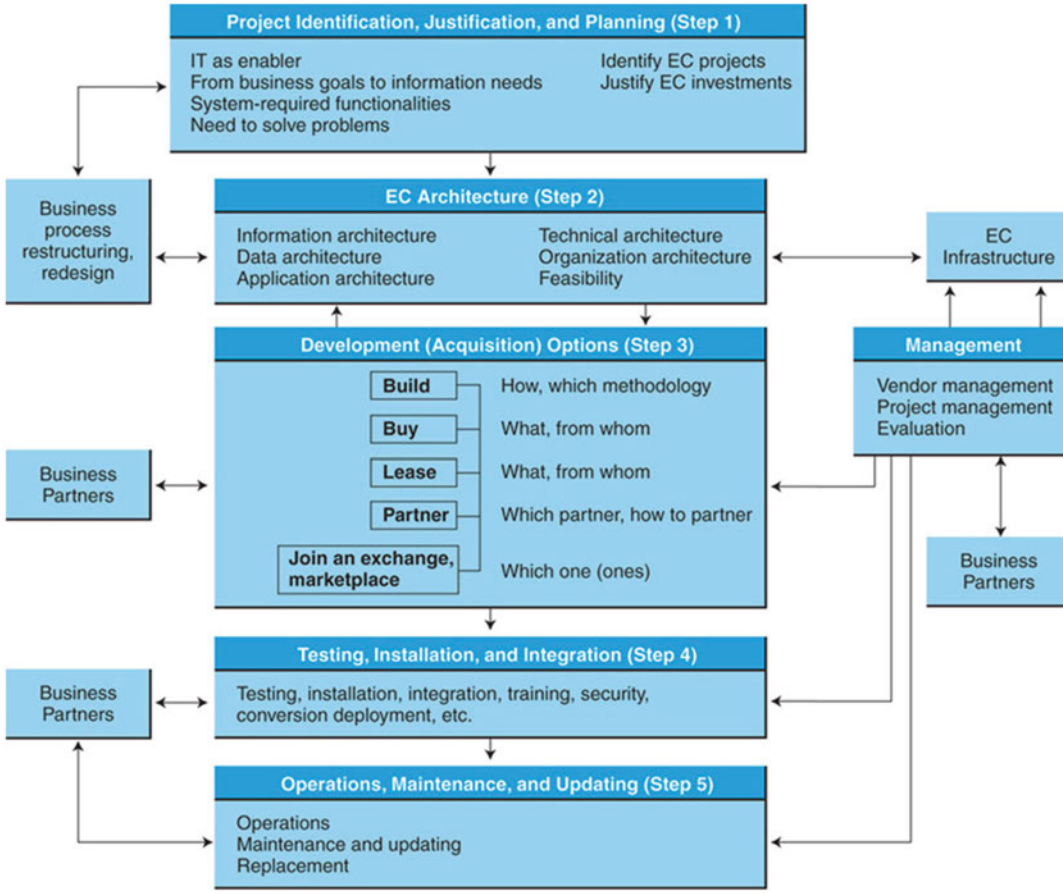

Figure 14.9 The EC application development process

3. List the major steps in developing an EC application.
4. Comment on the management of the development process.

14.8 DEVELOPMENT STRATEGIES FOR E-COMMERCE PROJECTS

If a company does not want to acquire a website or an EC system it could build one in-house. However, before deciding on self-building a website, a company should ask itself a few questions: Is the firm capable of developing the site (e.g., having qualified staff)? Does the firm have access to the proper tools to build the EC system and so forth? If the firm does not have these capabilities, it usually is best to hire a qualified contractor (e.g., see the closing case about Memphis Invest). A useful directory of vendors is **webdesigners-directory.com**. The Microsoft Small Business Center (**microsoft.com/business/en-us/resources/technology/ecommerce/ecommerce-website-design-mistakes.aspx?fbid=oQfmmYZYpzu**) offers some tips for avoiding common e-commerce site developing mistakes. There are four popular options for developing an EC website:

1. **Develop the site in-house** either from scratch or with off-the-shelf components.
2. **Buy a packaged application** designed for a particular type of EC activity (e.g., e-procurement).

3. **Outsource the system development** to a vendor(s) either completely, or partially.
4. **Lease the application** from a third party (e.g., use *software as a service* or another cloud-based approach).

Each of these approaches has its benefits and limitations, and it is important to remember that the development options are not mutually exclusive. That is, two or more options may be used in one EC project. Each of these development options is discussed next.

In-House Development: Insourcing

The first generation of EC development was accomplished largely through proprietary programming and in-house development that is widely referred to as **insourcing**.

Although insourcing can be time-consuming and costly, it may lead to EC applications that best fit an organization's strategy and needs, and differentiate the company from its competition. The in-house development of EC applications, however, can be lengthy and expensive. Furthermore, the system's maintenance and updating may require considerable resources in the future.

Buy the Applications (Off-the-Shelf Approach)

A number of software packages provide many features that are required by EC applications. These packages are ready to turn on and operate. Therefore, this option is also known as a **turnkey approach** — the packages are ready to use with minimal installation and testing efforts.

Because one package can rarely meet all of an organization's requirements, it is sometimes necessary to acquire multiple packages. In this case, the packages need to be integrated with each other and with other software and data.

Advantages and Limitations of Ready Made Packages

The following are the major advantages of purchasing ready-made EC systems:

- A large variety of off-the-shelf software packages is available.
- It saves time and money (compared to in-house development).
- The company does not need to hire programmers with EC programming skills.
- The company knows the system's capabilities before it invests in it.
- The company is neither the first nor the only user of the package.
- Updating is done by the vendor with little or no cost to the users.

This option also has some major disadvantages:

- Software may not exactly meet the company's needs.
- Software may be difficult or impossible to modify, or it may necessary to modify the company's business processes.
- The using company has little control over software improvements and new versions.
- Off-the-shelf applications can be difficult to integrate with existing software systems.
- Vendors may discontinue a product or go out of business (risk factor).

Outsourcing EC Systems Development and Applications

The use of vendors for EC system acquisition or development is one type of *outsourcing*. In many cases, the systems need to be built quickly, (e.g., in a week or two), and special expertise of outside contractors and software vendors is necessary. Therefore, outsourcing is used.

Outsourcers can perform any or all tasks in EC applications development. For example, they can plan, program, and build applications and integrate, operate, and maintain them. It is useful for firms to develop good relationships with outsourcers.

Types of Outsourcing Options

Several types of vendors offer services for creating and operating EC applications:

- Software houses.
- Outsourcers and others.
- Telecommunications companies.

Leasing EC Applications: Cloud Computing and Software as a Service (SaaS)

An option in EC acquisition is to lease systems rather than to buy or build them. This includes ready to use applications and tools/components for system development.

Companies may choose leasing when they want to experiment with new EC technologies without a great deal of up-front investment. Leasing also allows firms to protect their internal networks and gain expert advice. Small firms with limited IT expertise and tight budgets also may find leasing advantageous.

Leasing eliminates the users' need to buy software, install it, run it, and maintain it. Furthermore, users can start utilizing leased systems very quickly. (Remember that "time is money.") Finally, since all users have the same software, they can connect to each other in an expeditious fashion.

In recent years, leasing has become very popular, appearing under several variations and names. The most well-known are *utility computing*, *software-as-a-service*, and *on-demand computing.* As of 2009, these are bundled under the concept of *cloud computing.*

Cloud Computing

Cloud computing refers to the delivery of computational assets and services required by users and systems when needed (on demand). The delivery is done via the Internet or other computer networks. Users only pay for actual usage. It is the same as the supply of metered utilities, such as water or electricity. Therefore, cloud computing is also called utility computing. The details and internal structures of cloud computing are simplified to the point where they can be ignored by computer application developers and users. A large number of companies provide cloud computing products and services (e.g., Salesforce, Inc., Oracle, Microsoft).

Cloud computing includes cloud platforms, cloud infrastructure, cloud applications, cloud storage, and more. For details, see Online Tutorial T2 and Kavis (2014).

Advantages of Cloud Applications

The major advantages for the users are:

- Accessible from anywhere. All you need is an Internet (or intranet) connection
- No need for an onsite server or the installation of a local server
- Pay per use or per time period (e.g., monthly, like for cable TV)
- Rapid scalability – provides a strategic advantage due to the ability to change in a timely manner
- Shorter time-to-market (TTM)
- Often includes system maintenance (security, updates, backup, etc.) in the service
- The possibility of improved security; however, users that require a high level of security (e.g., financial institutions) may see SaaS as a security concern
- Dependability of the systems that incorporate the technology

For other benefits, see **intel.com/content/www/us/en/cloud-computing/intel-cloud-based-solutions.html** and **ibm.com/marketplace/cloud/**

us/en-us. For detailed benefits and limitations see Viswanathan (undated).

Other Development Options

Several additional options are currently available for developing EC applications. Some popular ones are:

- **Join an e-marketplace.** With this option, the company can be connected to an e-marketplace. For example, a company can place its catalogs in Yahoo!'s marketplace. Visitors to Yahoo! Shopping will find the company's products and will be able to make purchases. The company pays Yahoo! a monthly space-rental fee . In such a case, Yahoo! is a hosting service for the company as well. As for development, the company will use templates to build its webstore, and it can start to sell after only a short time of preparation.
- **Join a consortium.** This option is similar to the previous one, except that the company will be one of the e-market owners. Thus, the company may have more control over the market operations.
- **Join an auction or reverse auction third-party site.** Joining a third-party site is another alternative. A plug-in can be created quickly. Many companies use this option for e-procurement activities.
- **Form joint ventures.** Several different joint-venture partnerships may facilitate e-business applications development. For example, in Hong Kong, four small banks developed a joint e-banking system. In some cases, a company can team up with another company that already has an application in place.
- **Use a hybrid approach.** A hybrid approach combines the best of what the company does internally with an outsourced strategy.

Selecting a Development Option

Before choosing an appropriate development option, you need to consider the following factors (given here as questions):

- **Customers.** Who are the target customers? What are their needs? What kind of marketing tactics should a business use to promote the webstore and attract traffic? How can a business enhance customer loyalty? How can a business engage the customers and make them happy so they will return?
- **Merchandising.** What kinds of products or services will the business sell online? Are soft (digitized) goods or hard goods sold? Are soft goods downloadable?
- **Sales service.** Can customers order online? How? Can they pay online? Can they check the status of their order(s) online? How are customer inquiries handled? Are warranties, service agreements, and guarantees available for the different products? What are the refund procedures?
- **Promotion.** How are the products and services promoted? How will the traffic to special events be organized? Are coupons, manufacturer's rebates, or quantity discounts offered? Is cross-selling possible?
- **Transaction processing.** Is transaction processing done in real time? How are taxes, shipping and handling fees, and payments processed? What kinds of shipping methods will the site offer? What kind of payment method(s) will the site accept? How will the site conduct order fulfillment?
- **Marketing data and analysis.** What information, such as sales, customer data, and advertising trends will the site collect? How will the site use such information for future marketing? How is the information secured?
- **Branding.** What image should the webstore reinforce? How is the company's webstore different from the competition webstore?

The initial list of requirements should be as comprehensive as possible. It is preferable to validate the identified requirements through focus group discussions or surveys with potential

customers. The business can then prioritize the requirements based on customer preferences.

SECTION 14.8 REVIEW QUESTIONS

1. List the major e-commerce development and acquisition options.
2. Define insourcing.
3. List some of the pros and cons of using packaged EC applications.
4. Compare the buy option against the lease option. What are the benefits and risks associated with each option?
5. Compare the other development options. If you were the owner of a small company trying to establish a new webstore, which would you choose?
6. How can cloud computing be used as an option for acquiring a system?
7. What is SaaS?
8. What are the advantages of building with templates? What are the disadvantages?
9. List the typical features of a webstore.
10. What are some of the selection criteria for a software option?
11. Describe cloud computing technology as a leasing option.

14.9 ORGANIZATIONAL IMPACTS OF E-COMMERCE

Only limited statistical data or empirical research on the full organizational impact of EC is available because the field is so new. Therefore, the discussion in this section is based primarily on expert opinions, logic, and only limited empirical data.

Existing and emerging Web technologies provide companies with a chance to reconsider business models, relationships, and business processes. These e-opportunities can be divided into three categories: e-marketing (Web-based initiatives that improve the marketing of existing products) e-operations (Web-based initiatives that improve the creation of existing products); and e-services (Web-based initiatives that improve service industries and customer service). The discussion here is also based in part on the work of Bloch et al. (1996), who approached the impact of e-marketplaces on organizations from a value-added point of view. Their model, divides the impact of e-marketplaces into three major categories: *improving direct marketing*, *transforming organizations*, and *redefining organizations.* This section examines each of these impacts.

Improving Direct Marketing and Sales

Brick-and-mortar direct marketing is done by mail order (from catalogs) and by telephone (telemarketing).

For digital products – software, music, and videos – the changes brought by e-markets is dramatic. Already, digital products are downloadable from the Internet. The ability to transfer digitized products electronically eliminates the need for packaging and shipping, and greatly reduces the need for specialized distribution services.

New sales and distribution models for digitized goods such as downloading music, videos and software, shareware, freeware, social shopping, and pay-as-you-use are emerging. In certain cases, all of these impacts of EC on direct marketing provide companies with a competitive advantage over those that use only traditional direct-sales methods, as illustrated in the Blue Nile case in Chapter 2 (p. 59) and described in Chapter 3 (Section 3.9). Furthermore, because the competitive advantage is so large, e-markets are likely to replace many non-direct marketing channels. Some people predict the "fall of the shopping mall," and label many retail stores and full-service brokers (e.g., stocks, real estate, and insurance) as a soon-to-be-endangered species.

Transforming Organizations and Work

A second impact of e-marketplaces is the transformation of organizations. Here, we look at four key topics: *organizational learning*, *changing the nature of work*, *disintermediation and reintermediation*, and the *structure of the EC unit.*

Technology and Organizational Learning

Rapid progress in EC will force a Darwinian struggle: To survive, companies will have to learn and adapt quickly to the new technologies. An example is the newspaper industry, where losses, bankruptcies, and consolidations are regular events. For example, the *New York Times* developed its electronic version and products to compensate for the reduction in advertising income from its print version. These changes may transform the way in which business is conducted. EC may have a significant impact on the strategies of many organizations and industries. New technologies may lead to new organizational structures and procedures. Problems with traditional bookstores and record stores, and the struggle of companies such as Best Buy and Blockbuster to survive, illustrate what is occurring in some industries.

The Changing Nature of Work

Certain EC applications, and especially social commerce, could change the way people work. Changes are occurring, for example, in man–machine interactions and in sharing Web material and online activities. Another area is that of collaboration. Web 2.0 tools as well as m-commerce are changing the way people collaborate (e.g., a joint design). Innovations in e-payments are changing the manner in which cashiers work in supermarkets, and much more.

Disintermediation and Reintermediation

Intermediaries are agents that mediate between sellers and buyers. Usually, they provide two types of services: (1) they provide relevant information about demand, supply, prices, and requirements and, in doing so, help match sellers and buyers; and (2) they offer value-added services such as transfer of products, escrow, payment arrangements, consulting, or assistance in finding a business partner. In general, the first type of service can be fully automated and thus is likely to be performed by e-marketplaces, infomediaries, and portals that provide free or low-commission services. The second type requires expertise, such as knowledge of the industry, the products and technological trends, and it can only be partially automated.

Intermediaries that provide only (or mainly) the first type of service can be eliminated; this phenomenon is called *disintermediation*. An example is travel agents in the airline industry. The airlines are advocating electronic tickets. Most airlines require customers to pay $25 or more per ticket if they buy the ticket from a travel agent or by phone, which may be equivalent to the agent's commission. Online transactions results in the *disintermediation* of travel agents from the purchasing process. In another example, traditional stockbrokers who only execute trades manually, are disappearing. However, brokers who manage electronic intermediation are not only surviving, but may also be prospering (e.g., E*TRADE). This phenomenon, in which disintermediated entities or newcomers take on new intermediary roles, is called *reintermediation* (see Chapters 3 and 4).

Disintermediation is more likely to occur in supply chains involving several intermediaries, as illustrated in the Blue Nile case in the jewelry industry (Chapter 2).

Restructuring Business Processes

We stated earlier that to use over-the-counter software packages may lead to a change in some business processes. The same is true for implementing some of the new business models introduced by EC. For the topic of restructuring business processes, as well as the techniques used see Lymbersky (2013).

Redefining Organizations

The following are some of the ways in which e-markets redefine organizations.

New and Improved Products and Services

E-commerce allows for new products to be created and for existing products to be changed (e.g., to customized). Such changes may redefine organizations' strategies, products, and services. Also, the more powerful and knowledgeable customers are demanding new or improved products and services.

Mass Customization and On-Demand Manufacturing

Mass customization, also known as **on-demand manufacturing**, enables manufacturers to create specific products for each customer based on the customer's preferences. We described this topic in Chapters 3, 12, and 13. There are many examples of mass customization ranging from customizing shoes at Nike and toys at LEGO to designing engagement rings at Blue Nile. In an effort to save billions in inventory reduction, the automobile industry is producing customized cars where the orders and configurations are made online. Today you can design your own T-shirt, Swatch watch, and many other products and services online. Configuring the details of the customized products is done online. Also known as *build-to-order*, customization can be done on a large scale, in which case it is called *mass customization.* With the use of mass-customization methods, the cost of customized products is at, or slightly above, the comparable retail price of standard products. Figure 14.10 shows how customers can order customized Nike shoes.

The technology of 3D is expected to enable companies to manufacture customized products at a competitive cost. For a comprehensive discussion see Gandhi et al. (2014).

The On-Demand Revolution

EC is changing manufacturing systems from mass production to mass customization, which is demand-driven. These new production systems need to be integrated with finance, marketing, and other functional systems, as well as with business partners and customers. In fact, the entire supply chain is changing (see discussion in Chapter 12).

In what Flynn and Vencat (2012) call "Custom Nation," a growing number of scholars and practitioners predict that the on-demand phenomena, which drives manufacturing and is facilitated by e-commerce, will significantly change both businesses and manufacturing. Many successful brands, e.g., Netflix, Pandora, Nike, and Chipotle are already mostly on-demand companies. Other companies incorporate customization into their businesses in a larger volume. For a strategy on

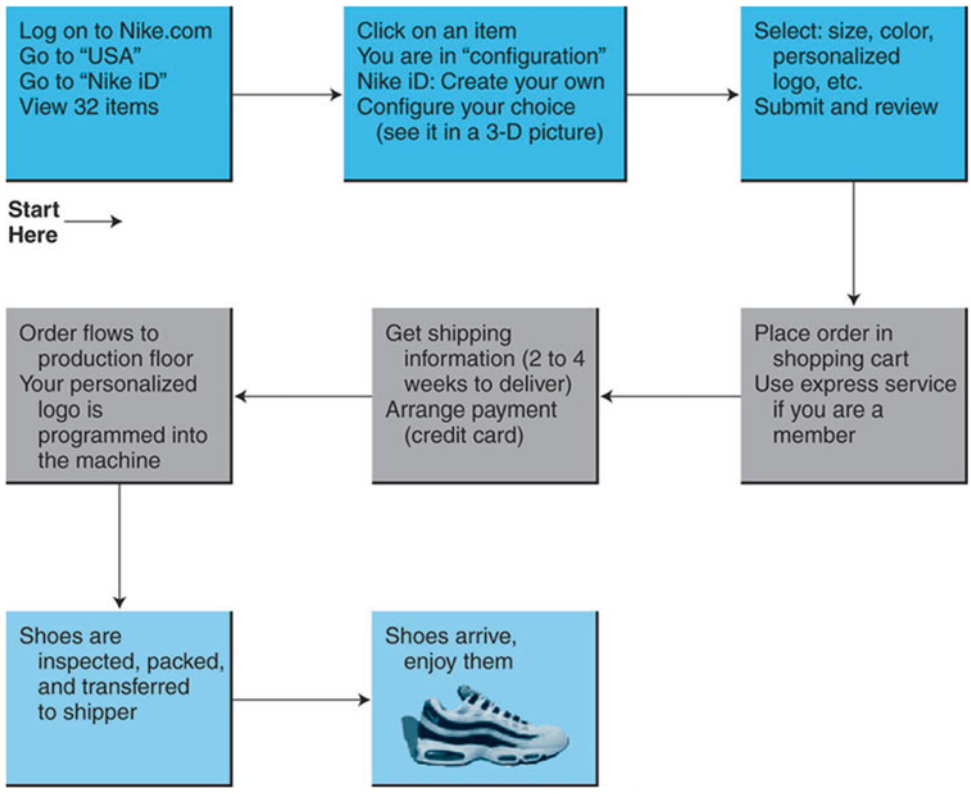

Figure 14.10 How customization is done online: the case of Nike shoes

how to do this, consult Flynn and Vencat (2012). One technology that may revolutionize on-demand manufacturing is 3D printing.

3D Printing

3D printing, also known as *additive manufacturing*, is a computer-driven manufacturing process for making parts (from plastic, metals, or other material), by producing one layer at a time and as many layers as needed. The process, which saves time and money, is done directly from computer-aided manufacturing (CAD) blueprints. For the current and future impact of 3D printing on on-demand manufacturing and factories, see Hausman and Horne (2014) and Winnan (2012). 3D printing is already changing manufacturing processes (e.g. Autodesk Corp.). The *Economist* calls the use of 3D printing "A Third Industrial Revolution."

Change Management

Deploying an EC project, especially if it involves major restructuring, introduces changes to organizations that must be managed properly.

Change management in business is a process of managing the administrative and behavioral issues related to a change in people's jobs, work areas, relationships, procedures, and so forth. The process, which includes an analysis of the need for change and feasibility, is intended to encourage employees to adopt such changes. For details see *Harvard Business Review* (2011) and Kotter (2012).

How to Organize an EC Unit in a Company

If a company is engaged in EC, it will usually have employees in this area. The question is how to organize the EC unit of these employees. The best structure depends on many variables such as:

- The size of the EC workforce
- The nature of the EC projects (e.g., e-tailing, e-procurement, e-training)
- The existing organizational structure of the company
- Is the company pure-play EC?
- The types of products/services delivered by the company
- The internal politics of the organization
- The number of active EC projects
- The budget of the EC workforce

These factors need to be considered. The major options available are discussed next.

Options for Organizing the EC Workforce

The major options are as follows.

Report to the Marketing Department
This is a viable solution for the case where e-tailing is the major EC activity.

Report to the Finance Department
This happens in cases where EC involves repeated RFQ, outsourcing, and other finance-related activities.

Report to the Chief Operating Officer
This could be a good solution if the major EC activity is e-procurement.

Distribute the EC Workforce in Several Departments
This can be a suitable solution when EC activities are independent of each other and closely related to specific departments.

Report to the IT Department
This makes sense when EC is continuously engaged in the technical aspects of EC.

Create a New, Possibly Autonomous EC Department
This solution can vary for a large EC workforce.

No Formal Structure for EC Exists

Create an Autonomous Division or a Separate Online Company

When the volume of an e-business is large, the temptation to create a separate company increases, especially if it goes public (undertaking an IPO). Barnes & Noble did just that.

The advantages of creating a separate company are:

- Reducing or eliminating internal conflicts.
- Providing more freedom for the online company's management in pricing, advertising, and other decisions.
- Creating a new brand more quickly.
- Taking the e-business to an IPO, and if successful, making a fortune.

The disadvantages of creating an independent division are:

- It may be very costly and risky.
- Collaboration with the offline business may be difficult.
- You lose the expertise of the offline business (e.g., marketing, finance, distribution), unless you get true and committed collaboration.

Note that some spin-offs of this nature, such as Barnes & Noble (**barnesandnoble.com**), were not doing so well, and Grainger, Inc. (**grainger.com**) ceased to be a separate company. However, several spin-off online companies have succeeded as independent entities.

SECTION 14.9 REVIEW QUESTIONS

1. Describe how EC improves direct marketing.
2. Describe how EC transforms organizations.
3. Describe how EC redefines organizations.
4. Discuss the need for change management in deploying EC projects to e-businesses.
5. Describe the position and structure of the EC unit in organizations.

14.10 OPPORTUNITIES FOR SUCCESS IN E-COMMERCE AND AVOIDING FAILURE

Now that EC has been around for about 20 years, it is possible to observe certain patterns that contribute to the success or failure of EC projects. By examining these patterns, one can find indications of the opportunities that lie ahead and avoiding pitfalls along the way.

Factors that Determine E-Commerce Success

The economic capabilities of EC described earlier influence some industries more than others do. The success factors of EC depend on the industry, the sellers and buyers, and the products sold. Furthermore, the ability of sellers to create economic value for consumers will also determine EC success. When deciding to sell online, looking at the major factors that determine the impact of EC can assist in evaluating the chances for success.

Four categories of e-market success factors exist: *product*, *industry*, *seller*, and *consumer* characteristics.

E-Commerce Failures

By examining the economic history of previous innovations, the failure of EC initiatives and EC companies should come as no surprise. Three economic phenomena suggest why this is the case (e.g., see the description of the hype cycle in this chapter).

Chapters 3 and 13 provide some of the specific reasons for failure in B2C EC: lack of profitability, excessive risk exposure, the high cost of customer acquisition, poor performance, and static website design. Two additional financial reasons are lack of funding and incorrect revenue models. An example of a failure is the Webvan case – an express delivery company that lost $1.2 billion – the largest of any other bankrupt dot-com. Another bankrupt company is Kozmo, whose story is available in Online File W14.3.

E-Commerce Successes

Despite the failure of hundreds of start-ups and thousands of EC projects, EC is alive and well, and continues to grow rapidly (after a short pause from 2000 through 2002), as discussed throughout the text.

Table 14.3 Critical success factors: old economy and EC

Old Economy CSFs	EC CSFs
Vertically integrate or do it yourself	Create new partnerships and alliances; stay with core competency
Deliver high-value products	Deliver high-value service offerings that encompass products
Build market share to establish economies of scale.	Optimize natural scale and scope of business; look at mass customization.
Analyze carefully to avoid missteps	Approach with urgency to avoid being left out; use proactive strategies
Leverage physical assets	Leverage intangible assets, capabilities, and relationships – unleash dormant assets
Compete to sell product	Compete to control access to markets, and build relationships with customers; compete with other websites

EC success stories abound, primarily in the specialty and niche markets. One example is Puritan's Pride Inc., (**puritan.com**), a successful vitamin and natural health care product store. Another is GrubHub, Inc. (**grubhub.com**), which allows people to order food online for either pickup or delivery (previously CampusFood.com). Also doing very well are travel sites, such as Expedia, Trip Advisor or Priceline.

Alloy Apparel (**alloy.com**) is a successful shopping and entertainment portal for young adults. As pointed out in Chapter 3, online services such as stock trading, travel and hospitality, online banking, and more are commanding a major part of the transactions in their industries. For a comparison of how these and other thriving online businesses have translated critical success factors (CSFs) from the old economy into EC success, see Table 14.3. EC successful companies such as Priceline, Netflix, Amazon.com, Facebook, and Google are becoming major players in their industries, making their shareholders very rich.

Following are some of the reasons for EC success and suggestions from EC experts and consultants on how to succeed in EC.

Strategies for EC Success

- Thousands of brick-and-mortar companies are adding online marketing and/or procurement channels with great success. Examples are Uniglobe Travel (**uniglobetravel.com**), Staples (**staples.com**), Home Depot (**homedepot.com**), Walmart (**walmart.com**), FIS (**fisglobal.com/products-retailpayments-ecommerce**), 1-800-Flowers.com (**1800flowers.com**) and Southwest Airlines (**southwest.com**). Existing firms can use organizational knowledge, brand recognition, infrastructure, and other "morphing strategies" to migrate from the offline marketplace to the online marketspace. The following are strategies and critical success factors that can help EC succeed. A group of Asian CEOs recommend the following EC CSFs: select proper business models, project, predict, and prepare for the EC company, encourage e-innovation, co-brand marketing, and focus on younger customers (e.g., see **alloy.com** and **bolt3.com**).
- For an EC exchange to be successful, it has to create value for *all* participants. A vivid example is Alibaba.com.
- Pricing in EC has continued to be a challenge for sellers because of shipping and handling costs. Often, the seller and market maker will see the potential for profits and ignore the fact that the buyers will subscribe to EC only if they see a benefit in price or product variety. For example, Amazon.com decided to absorb delivery costs for orders above a certain amount (e.g., $25). Free shipping is also available at Dell, Newegg, and many other e-tailers.
- New technologies can boost the success of EC. For example, RFID has great potential for improving the supply chain (Chapter 12); however, it will take a large investment in EC infrastructure and applications to realize its full potential.

Additional Guidelines for EC Success

A number of experts and consultants have proposed many more keys to success. Several studies identified success factors such as:

- Effective marketing and advertising
- User-friendly website
- Good relationships between customers and merchants
- Proper supply chain management and order fulfillment
- Integration with internal and external information systems
- Use of appropriate business models (including revenue models)
- Effective and efficient infrastructure
- Organization culture regarding becoming an e-business and social business

At this still-early stage of the EC revolution, success cannot be guaranteed, and failure rates remain high. However, if companies learn from the mistakes of the past and follow the guidelines offered by experts and researchers, their chances for success are greatly enhanced.

In the remainder of this section, we will discuss important strategies and factors that should be considered to ensure EC success.

Cultural Differences in EC Successes and Failures

In Chapter 13, we discussed the need to understand cultural issues such as differences in social norms, measurement standards, and nomenclature. Here, we add the issue of *cultural differences* so that appropriate strategies can be developed when doing business globally.

One of the strengths of EC is the ease with which sellers and buyers can reach a global population of consumers or suppliers. However, they must recognize existing cultural differences and act upon them. Even the content of online ads can mean different things in different cultures. Due to these differences, the transaction costs, including coordination costs, may vary among the consumer base.

EC success factors as well as adoption strategies differ among countries (see Online File W14.4).

Can EC Succeed in Developing Economies?

Similar to cultural differences, developed and developing economies vary in how EC is used and whether the economics favor electronic commerce. Developing economies struggle with various issues taken for granted in developed economies.

Developing economies often face power blackouts, unreliable shipments, unstable political and social environments, lack of regulations that protect customers and insufficient payment options. Such limitations make it difficult for firms to predict whether EC investments will pay off, and when. However, developing economies, such as in China and India, represent a significant opportunity for EC to connect businesses to customers, as well as other businesses. The potential volume of transactions in developed countries can make EC investments more attractive for established firms. This is because much of the cost of EC systems development would have already been recovered because EC initiatives frequently can use existing IT infrastructures.

The traditional EC assumption is that every computer user has the ability to own a computer and afford Internet connection, as is the case in developed economies. In developing economies, this assumption will have to be revised to include the existence infrastructure, poverty levels, and technology availability and affordability. The payoffs from EC use in developing countries are likely to go beyond financial returns. Enabling people to take advantage of EC technology without disrupting their traditions may be the most valuable, yet intangible, return.

A major booster for EC in developing countries is the increasing use of low-cost laptop computers and tablets in a wireless environment. With simple computers costing less than $100 (and declining in 2014), and the widespread use of cell phones with Internet access and free access in public places, it is likely that EC use will increase significantly in developing countries. For compre-

hensive coverage of e-commerce in developing countries, see Sanayei (2010).

As discussed in Chapter 6, the mobile revolution enables developing countries to leap frog EC deployment, especially in the areas of mobile banking (finance) and mobile marketing.

SECTION 14.10 REVIEW QUESTIONS

1. Describe product characteristics in EC.
2. What are industry characteristics in EC?
3. What are seller characteristics in EC?
4. What are consumer characteristics in EC?
5. List three reasons why EC failure should not come as a surprise.
6. What are some reasons for EC success?
7. Relate EC to cultural differences.
8. Discuss some factors of implementation in developing countries.

MANAGERIAL ISSUES

Some managerial issues related to this chapter are as follows:

1. **How should the value of EC investments be justified?** EC investments must be measured against their contribution to business objectives. The best justification may come from the behavior of competitors. If EC has a strategic value to customers, there is no choice but to invest as long as competitors provide EC services. EC investments will involve direct and indirect costs as well as tangible and intangible benefits. The impact of EC on restructuring existing processes and systems must not be ignored.

   Automated transactions in EC may replace human roles in sales, procurement, and services. However, in some applications like customer service and knowledge management, EC may only supplement the human element. To identify the intangible benefits, refer to the business performance indicators in the balanced scorecard, which may not be measured easily with tangible metrics.
2. **Which investment analysis method should we adopt for EC justification?** The precise estimation of total cost of ownership is a good starting point for financial investment analysis. If an intangible benefit, such as enhanced customer service and quality assurance of purchased material is the primary contributor to productivity increase, management has to include it in the analysis. However, if the benefit can be measured quantitatively, such as creation of new revenue and/or reduced purchase cost, the net present value and ROI can be computed with tangible benefits and costs. Based on the investment analysis, the intangible factors may be considered additionally for managers' multicriteria judgments. Since there is high uncertainty in estimating future revenue creation, the best or worst case analysis may supplement the most likely analysis.
3. **Who should conduct the justification?** For small projects, the project team, possibly in cooperation with the finance department, can do the analysis. For a large or complex project, an unbiased outside consultant may be used, although it may be expensive. The justification should include both tangible and intangible benefits and costs. However, some vendors may provide ROI calculators as part of a proposal that might fit with your application without extra charge.
4. **Should we use the hype cycle?** The hype cycle can be extremely useful in determining EC strategy. Small organizations may use some of the free material (e.g., one year old; no details). For specific advice, it may benefit the company to pay Gartner for the detailed charts and analysis.
5. **Should we embark on cloud computing products for our EC initiatives?** According to the hype cycle, you probably should wait for a while. However, companies do report successful implementation in EC system development, security, e-CRM, and e-procurement. Given that it takes only a few years to move from hype to maturity, it is wise to at least experiment with some projects.
6. **Which strategy should we choose for vendor selection: the inside-out or outside-in approach?** The success of the EC application depends on appropriate selection of vendors and software packages (e.g., using Gartner's

Magic Quadrant). Also, consider using one vendor against using several.

7. **What kinds of organizational changes may be needed?** Companies should expect organizational changes in all functional areas once e-commerce reaches momentum. Change is particularly evident in the financial services sector, where many services can be replaced by the Internet. Social marketing and shopping is another area with major potential changes (especially f-commerce). Electronic procurement changes the purchasing business processes, and affiliate programs change the paradigm of marketing and business partnerships. Finally, the trends toward build-to-order and demand-driven manufacturing will continue to expand and may require restructuring of some business processes.
8. **Is it possible to predict EC success?** The more comprehensive the analysis, the more accurate the justification of the EC project. Furthermore, the project's chances for approval will be greater even though management cannot precisely know the future success of the project. Procurement innovation using EC is almost risk free in achieving the goals. Using EC for sales may involve uncertainties. Opening new independent e-marketplaces may require a high investment and is very risky because the entry barriers may be very high. This kind of EC investment may fail. The risk depends on the type of EC being used.

SUMMARY

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

1. **The major components of EC implementation.** Four major categories exist for implementation: justification and economics (cost–benefit); acquiring and/or developing EC systems; assurance of organizational readiness and performance of necessary restructuring, training, and so forth; and cultivating the necessary success factors while avoiding mistakes.
2. **The need for EC justification.** Like any other investment, EC investment (unless it is small) needs to be justified. Many start-up EC companies have crashed because of incorrect or no justification. In its simplest form, justification looks at revenue minus all relevant costs. Analysis is done by defining performance and comparing actual performance to the desired metrics and KPI related to organizational goals.
3. **The difficulties in justifying EC investment.** The nature of EC makes it difficult to justify due to the presence of many intangible costs and benefits. In addition, the relationship between investment and results may be complex, extending over several years. Several projects may share both costs and benefits; and several different organizational areas may feel the impacts (sometimes negatively).
4. **Difficulties in establishing intangible metrics.** Intangible benefits may be difficult to define. Some of these benefits change rapidly; others have different values to different people or organizational units. Therefore, metrics that are based on intangible benefits have qualitative measures that are difficult to compare. One solution is to quantify the qualitative measures.
5. **Traditional methods for evaluating EC investments.** Evaluating EC involves a financial analysis, usually the ROI analysis, as well as an assessment of the technology and its architecture. Future costs and benefits need to be discounted, using the NPV method, especially if the costs and benefits will extend over several years. A payback period describes how long it will take to recover the initial investment. However, financial ROI alone can lead to an incomplete and misleading evaluation. Tools to integrate the various ROI aspects of EC investments include the balanced scorecard (BSC), which also emphasizes learning and growth in EC. ROI should take into account the risk of reducing possible failures or adverse events that can drain the financial ROI. No method is universal or perfect, so selecting a method (or a mix of methods) is critical.

6. **Describe the justification of representative EC projects.** The justification of an EC project starts with a need analysis and then involves listing all the costs and benefits. Examples of EC projects are the justification of e-procurement and m-commerce. All EC projects include intangible and tangible benefits and costs that must be identified. At that time, a method(s) must be selected to match the particular characteristics of the EC application.
7. **EC economic evaluation.** Economic fundamentals must be kept in mind when evaluating an EC investment. With non-digital products, the cost curve shows that average per unit costs decline as quantity increases. However, with digital products, the variable cost per unit usually is low, and thus, the evaluation will be different. Similar differences are evident in EC's ability to lower transaction costs, agency costs, and transaction risks. EC can also enable the firm to be agile in responding faster to changing market conditions and ensure increasing returns to scale, regardless of the volume involved. Finally, EC enables increased reach with multimedia richness at a reasonable cost.
8. **The major steps in developing an EC system.** Because of their cost and complexity, some EC sites need to be developed in a well-planned manner. The development of an EC site should proceed in steps. First, an EC application portfolio is defined based on an organization's strategy. Second, the EC architecture is created. Third, a decision is made whether to build, buy, or outsource the development. Fourth, the system is installed, tested, and deployed. Fifth, the system goes into maintenance mode, with continual changes being made to ensure the system's continuing success.
9. **The major EC development strategies, along with their advantages and disadvantages.** EC sites and applications are rarely built from scratch. Instead, enterprises buy a packaged EC suite and customize it to suit their needs (if possible), or they outsource the development to a vendor. A new generation of Web tools including social software, enables more "do it yourself" activities.
10. **The variety of EC application development methods, along with their benefits and limitations.** Numerous development methods can be used to develop an EC system. These include Web 2.0, cloud computing, software as a service (SaaS), and several other methods listed and detailed within the chapter. Depending on the resources available to the organization developing the EC system and the requirements of the system, one or more of the different development methods will be chosen to create the most efficient and effective solution.
11. **EC application outsourcing strategies.** Many enterprises elect to outsource the development and maintenance of their EC sites and applications. The most common type of EC applications outsourcing is the use of cloud computing. An enterprise can also rely on an existing e-marketplace or exchange. A webstore can be hosted by an Internet mall, or an enterprise could enter into a joint development agreement with a venture partner or a consortium. Again, the choice depends on the functional requirements of the EC site or application, the costs involved, the period, and the available IT resources.
12. **Organizational structure and change management.** All functional areas of an organization can be affected by e-markets. E-markets improve direct marketing and transform and redefine organizations. Direct marketing (manufacturers to customers) and one-to-one marketing and advertising are becoming the norm, and mass customization and personalization are thriving. Production is moving to build-to-order models, changing supply chain relationships, and reducing cycle time. Business process management (BPM) allows organizations to be more effective, more efficient, and more proficient in adapting to change. Change management is a process of managing the administrative and behavioral issues related to a change in people's jobs, work areas, relationships, procedures, and so forth; employees are encouraged to accept the

change. The process includes an analysis of the needs for the change and its feasibility.

13. **Reasons for EC success and failure.** Products, industries, sellers, and consumer characteristics require different metrics of EC value. With the growing worldwide connectivity to the Internet, EC economics will play a major role in supporting buyers and sellers. Like other innovations, EC is expected to go through the cycle of enormous success, followed by speculation and then disaster before the reality of the new situation sets in. Some EC failures are the result of problematic website design, lack of sustained funding, and weak revenue models. Success in EC has come through automating and enhancing familiar strategies, such as branding, morphing, building trust, and creating value for all trading partners by enriching the human experience with integrated and timely information. EC investments can go beyond the traditional business models by creating digital options. To ensure success, complementary investments must be made in managing change and responding to cultural differences among EC users.

KEY TERMS

3D printing
Agency costs
Change management
Cloud computing
Cost–benefit analysis
Hype cycle (of Gartner)
Insourcing
Key performance indicator (KPI)
Mass customization (on-demand manufacturing)
Product differentiation
Production function
ROI calculator
Total benefits of ownership (TBO)
Total cost of ownership (TCO)
Transaction costs
Turnkey approach
Valuation
Web analytics

DISCUSSION QUESTIONS

1. Your state government is considering an online vehicle registration system. Develop a set of EC metrics and discuss how these metrics differ from that of the existing manual system.
2. Discuss the advantage of using several methods (e.g., ROI, payback period) to justify investments.
3. Enter **businesscase.com** and find material on ROI analysis. Discuss how ROI is related to a business case.
4. A craftsperson operates a small business making wooden musical instruments in a small U.S. town. The business owner is considering using EC to increase the business's reach to the nation and the world. How can the business owner use EC to increase richness to make the products more attractive to consumers?
5. A company is planning a wireless-based CRM system for its customers. Almost all the benefits are intangible. How can you justify the project to top management?
6. An enterprise wants to modify its EC site so that it conforms more closely to the company's overall business strategies. What types of online data are available for this purpose? How can these data be collected? What types of business strategy questions can be addressed by these data?
7. Discuss product and industry characteristics as they affect EC success.
8. Discuss the need to restructure business processes and suggest how it can be accomplished.

TOPICS FOR CLASS DISCUSSION AND DEBATES

1. Discuss the logic of outsourcing the combination of Web hosting and site construction. What are some of the disadvantages?
2. Enter **broadvision.com/en/products/clearvale/#clearvale-overview** and find the free products that businesses can easily use to offer social networking capabilities to their employees. Examine the capabilities provided and discuss instances for which such an offer could be attractive.

3. Debate: A cost–benefit analysis may be inaccurate, so why should we conduct it?
4. Debate the use of cloud computing (leasing) against the purchase of a merchant suite by a retailer.
5. Debate: An airline offers extensive travel services online including hotels, car rentals, vacations, and so forth all over the globe. Its online business should be autonomous.
6. The stock market success of e-commerce and social commerce companies vary greatly from very successful (e.g., Google, LinkedIn) to poor (Groupon, Zynga, Facebook). Examine the IPOs of 2011 through 2014 and try to explain the CSF. Write a report.

INTERNET EXERCISES

1. Enter **idc.com** and find how it evaluates ROI on intranets, supply chains, and other EC and IT projects. Summarize your findings in a report.
2. Enter **salesforce.com/form/roi**. Register and download the free ROI kit. Summarize one case study. View two demos. Write a report.
3. Enter **schwab.com**. Examine the list of online services available for planning a retirement, and for advised investment services. Relate them to *richness* and *reach*.
4. Go to **google.com** and search for articles about the ROI of RFID. List the key issues in measuring the ROI of RFID.
5. Go to **alinean.com/value_selling** and follow the walk-through of the calculators. Find the capabilities of the calculators. Calculate the ROI of a project of your choice as well as the TCO.
6. Enter **sas.com**, **rocketsoftware.com/brand/rocket-corvu**, **balancedscorecard.org**, and **cio.com**. Find demos and examples of how to use the various tools and methods to evaluate EC projects. Write a report.
7. Enter **roi-calc.com**. View the demos. What investment analysis services does the company provide?
8. Enter **zebra.com/us/en/solutions/research-and-learn/roi-calculators.html**. What kind of analyses can the calculators do?
9. Design a pair of shoes at **nike.com** and **ralphlauren.com**. Compare all three sites.
10. Enter **sap.com** and use the "business case builder and ROI calculator" for a hypothetical (or real) EC project. Write a report on you experience.
11. Enter **baselinemag.com** and find free ROI analysis tools. Download a tool of your choice and identify its major components. Write a report.

TEAM ASSIGNMENTS AND PROJECTS

1. **Assignment for the Opening Case**
   Read the opening case and answer the following questions:
   (a) What motivated Telstra to prepare the calculators?
   (b) Why do the calculators include benefits to employees and to the community?
   (c) Download the e-book at AIIA (2009), and examine the list of benefits in all four cases. Which benefits are intangible?
   (d) The case cites the use of NPV. Explain how it works in this case.
   (e) Find the appendices cited in AIIA (2009) case, and comment on the detailed examples.
2. Explore the business value of EC. Each member enters a different site (e.g., Nicholas G. Carr (**nicholasgcarr.com**), Baseline (**baselinemag.com**), Strassmann, Inc. (**strassmann.com**), etc.). Prepare a presentation on issues, value, and directions.
3. This project requires reading the free White Paper by Saddington and Toni (2009). Each team concentrates on one of the following calculators: video conferencing, telecommuting, Web contact center, and Fleet and field force management. Examine the variables included for measuring costs and benefits. Analyze the savings. Add any missing variables, including intangible ones. Each team gives a presentation.
4. Several vendors offer products for creating webstores. The websites of these vendors usually list those webstores that currently use their software (customer success stories). Assign

each team a number of vendors. Each team should prepare reports comparing the similarities and differences among the vendors' sites and evaluating the customers' success stories. Are the customers taking advantage of the functionality provided by the various products?

5. Enter **youtube.com/watch?v=qh1drAg1jdg** and watch the video titled "Gartner Hype Cycle." Write a summary of the major points. Do the assignment provided there.
6. The class will set up a webstore on Facebook. You can use the application from **ecwid.com/pavvment** or from **bigcommerce.com**. Have several members place products there while others shop. Write a report on your experience.

CLOSING CASE: MEMPHIS INVEST EXCELS THANKS TO E-COMMERCE

Memphis Invest (**memphisinvest.com**) is a small, family-owned real estate investment company. Most of its clients live more than 100 miles away from Memphis. Therefore, the Internet plays a major role in the company's success.

The Problem

In 2009, the company was very small and barely able to stay in a static condition. All it had on its website was a simple brochure, with no interaction with customers or any marketing or Web strategies. The online and offline activities were not connected, and there was no analysis of what was occurring on the website. Management realized that a change was needed.

The Solution

The first step was to set up a marketing department. However, being a small business of 8 people at that time, in-house expertise was lacking about what to do, especially with respect to e-commerce strategy. Therefore, the company collaborated with HubSpot Inc. (**hubspot.com**), a company that makes inbound marketing software that allows businesses to conduct marketing online. Memphis Invest initiated a Web strategy (see steps in Chapter 13). Among the initial EC initiatives was the creation of a blog. The owner posted news, commentaries, and tutorials regarding the real estate investment business. The site was optimized for SEO (Chapter 9) to have better exposure. On the revitalized website, the company provided the investors with *investor kits* and generated opportunities for conversations with potential customers. All this increased the company's visibility, traffic, and marketing skills.

The company created interesting content on the website that facilitated conversations. The more conversations initiated, the more buyers appeared. The company also introduced metrics for strategy assessment. The company created a page on Facebook (**facebook.com/meminvest**), and uses video ads on its own website and on pages in other social networks.

Note: Real estate investment provides opportunities for people to make money from buying, remodelling, renting out, exchanging, and managing real estate. To learn what to do and how to avoid the pitfalls, consult the free Jump Start Success Package provided by Memphis Invest.

The Results

According to HubSpot, Inc. (2012), sales increased 260% in 24 months, reaching 30.4 million in 2011. In 2013, the company now has over 40 employees. All this was achieved, despite the economic problems in the real estate industry between 2008 and 2012.

The company was ranked #1355 in the top 5,000 Real Estate Companies in 2014, by Inc. (**inc.com/inc5000/list/2014/industry/real-estate**). Different rankings by other institutions improved dramatically. The company's reputation and trust level are at an all-time high and increasing. Finally, the organizational climate improved dramatically and employees care much more about the business and the customers.

Sources: Based on HubSpot, Inc. (2012), **memphisinvest.com/about.php**, **inc.com/profile/Memphis-invest**, and **memphisinvest.com** (all accessed November 2014).

Questions

1. Identify the success factors of Memphis Invest.
2. Describe the development of Web analysis.
3. Enter **youtube.com/watch?v=00JMdY-dBuA** and watch the video titled "Than Merrill Visits Memphis Real Estate Company Memphisinvest.com." Summarize the critical success factors of Memphis Invest.
4. Why is reputation and trust so important for the company, and how did they increased it using e-commerce?
5. Why was the collaboration with HubSpot so successful?
6. Go to **youtube.com/user/MemphisInvest** and describe the use of video ads on the site.

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

W14.1 E-Procurement Complexities in Marketplaces
W14.2 Application Case: Cost–Benefit Justification of Wireless E-Commerce at Paesano Restaurant of Australia
W14.3 Application Case: The Rise and Fall of Kozmo.com
W14.4 Application Case: The Success Story of E-Choupal

COMPREHENSIVE EDUCATIONAL WEBSITES

mmv.vic.gov.au/ecommerce: Tips and case studies.
nucleusresearch.com: Metrics, ROI.
roi-calc.com: Calculators, metrics.
baselinemag.com: Calculators, metrics.
strassmann.com: ROI, justification.
fstc.org: Financial Services Technology Consortium.
gartner.com/technology/research/methodologies/magicQuadrants.jsp: The Gartner Magic Quadrant for E-Commerce.
wiki.secondlife.com/wiki/Video_tutorials: Video tutorials for distance learning providers.
vectec.org/resources: Research resources into the various aspects of e-business.
allthingsweb2.wordpress.com: Open directory of Web 2.0 tools and so forth.

GLOSSARY

3D printing Computer driven manufacturing process of making parts (from plastic, metals, or other materials), by producing one layer at a time, and as many layers as needed.
Agency costs Costs incurred in ensuring that certain support and administrative tasks related to production are performed as intended (e.g., by an agent). (Also called *administrative costs*.)
Change management A process of managing the administrative and behavioral issues related to a change in people's jobs, work area, relationships, procedures, and so forth. The process is intended to encourage employees to adopt such changes.
Cloud computing The delivery of computational assets and services required by users and systems when needed (on-demand).
Cost–benefit analysis A comparison of the costs of each project against its benefits.
Hype cycle (Gartner, Inc.) A graphic representation of the life cycle of specific IT and EC technologies (e.g., cloud computing, 3D printing, e-payment).
Insourcing In-house development of applications.
Key performance indicators (KPIs) The quantitative expression of critically important metrics.
Mass customization (on-demand manufacturing) A method that enables manufacturers to create specific products for each customer based on the customer's preferences.
Product differentiation Products with special features.
Production function A mathematical formula that indicates that for the same quantity of production, Q, companies either can use a certain amount of labor or invest in more automation (e.g., they can substitute IT capital for labor).
ROI calculator Calculator used to evaluate investments using metrics and formulas.
Total benefits of ownership (TBO) This calculation includes both tangible and intangible benefits.
Total cost of ownership (TCO) A formula for estimating the direct and indirect cost of owning, operating, and controlling an IT system, over the entire life of a product or system.
Transaction costs Costs that cover a wide range of expenses that are associated with

commercial transactions, including the bartering of products and services.

Turnkey approach Software packages that are ready to use with minimal installation and testing efforts.

Valuation The process of trying to determine the value or worth of a company.

Web analytics Tools and methods that are used to measure, analyze, and optimize Web usage and other Internet activities.

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