GLOBAL EDITION

Information Systems Today

Managing in the Digital World

NINTH EDITION

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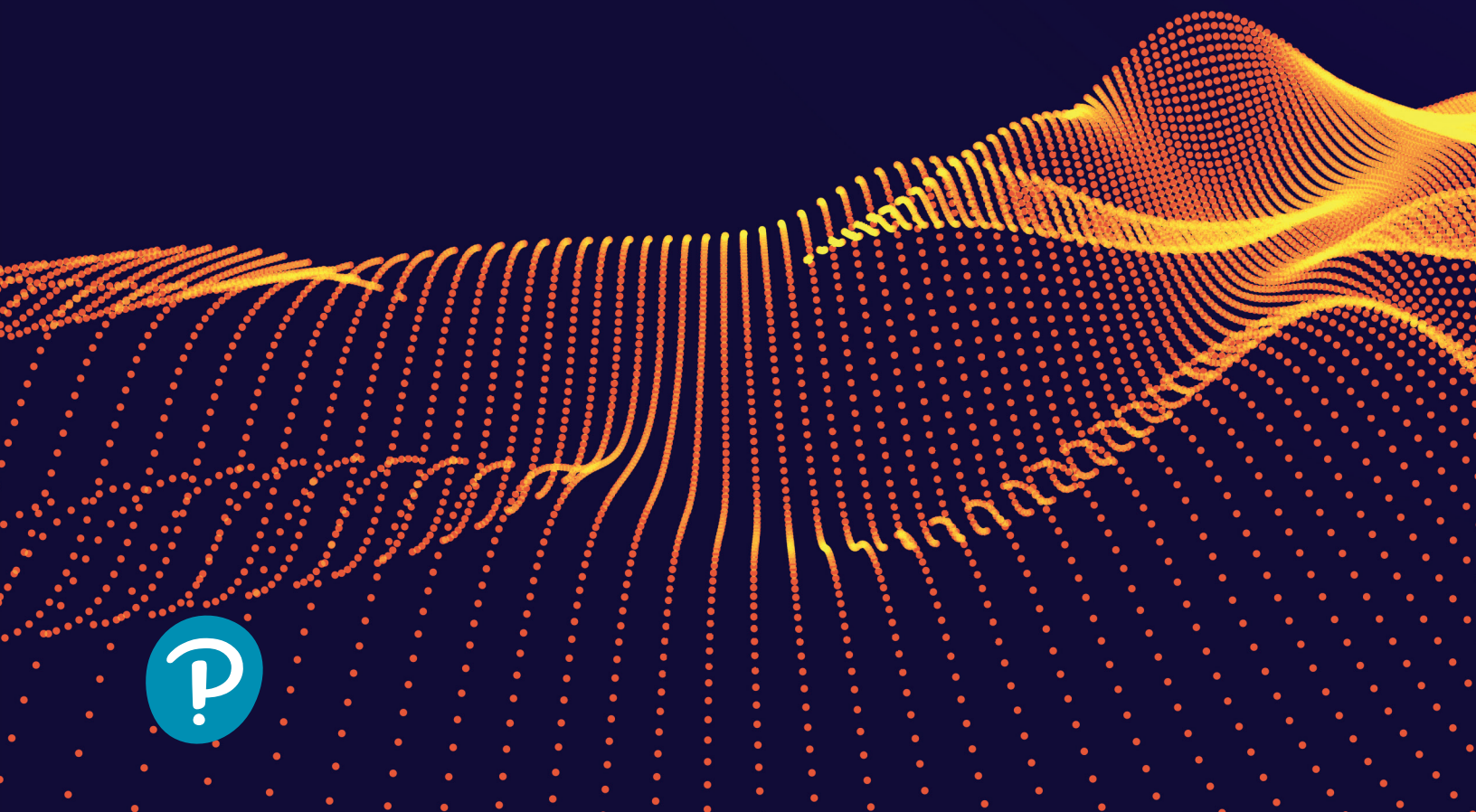
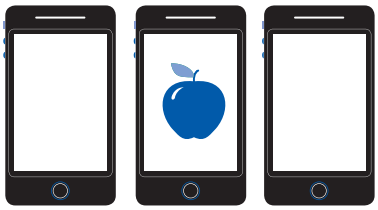


- **Dynamic Study Modules**—help students learn the language of MIS by continuously assessing their activity and performance in real time by adapting to the student's **knowledge** and confidence on each concept. These are available as graded assignments prior to class, and accessible on smartphones, tablets, and computers.



- **Learning Catalytics™**—is an interactive, student response tool that uses students' smartphones, tablets, or laptops to engage them in more sophisticated tasks and **critical thinking** as well as **collaboration** with other class members. Included with MyLab with eText, Learning Catalytics enables you to generate classroom discussion, guide your lecture, and promote peer-to-peer learning with real-time analytics.

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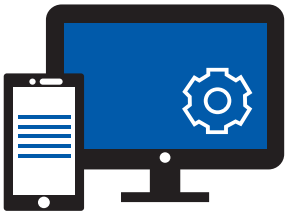
- **Pearson eText**—keeps students engaged in learning on their own time, while helping them achieve greater conceptual understanding of course material. MyLab with Pearson eText provides students with a complete digital learning experience—all in one place.



- **Accessibility (ADA)**—Pearson is working toward WCAG 2.0 Level AA and Section 508 standards, as expressed in the **Pearson Guidelines for Accessible Educational Web Media.** Moreover, our products support customers in meeting their obligation to comply with the Americans with Disabilities Act (ADA) by providing access to learning technology programs for users with disabilities.

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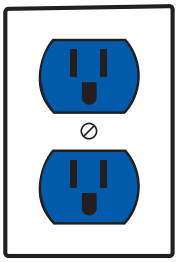
  Single sign-on provides students access to all the personalized learning resources that make studying more efficient and effective.



E-Commerce and E-Government

The internet provides a set of interconnected networks for individuals and businesses to complete transactions electronically. **Electronic commerce (EC)** refers to the exchange of goods, services, and money[1] among firms, between firms and their customers, and between customers, supported by communication technologies and, in particular, the internet. The Census Bureau of the Department of Commerce reported that, in the first quarter of 2020, online retail sales were up by nearly 15 percent compared to the first quarter of 2019, and that EC accounted for 11.8 percent of total retail sales, resulting in sales of more than US$160.3 billion in one quarter alone (Figure 4.2). Research firm Statista forecasts steady growth, anticipating global business-to-consumer e-commerce sales to exceed US$6.5 trillion by 2023. With this much money at stake, it is little wonder that no other information systems (IS) issue has captured as much attention as has EC. Already during the Berlin airlift in 1948, the foundations for EC transactions between businesses were laid, as the Military Air Transport Service of the U.S. Air Force in Europe realized that the airlifted cargo was important but that *information* about the cargo—such as what exactly was contained in a shipment, where it was located, or when it was scheduled to arrive—was equally important and devised standard universal codes for transmitting these data via teletype (Seideman, 1996). The emergence of the internet and web further facilitated EC and, in addition, paved the way for marketing and selling products and services to individual consumers. This has led to the creation of an electronic marketplace where a virtually limitless array of services, features, and functionality can be offered. As a result, a presence on the web has become a strategic necessity for most companies.

Types of Electronic Commerce

Contrary to popular belief, EC goes beyond consumers merely buying and selling products online. EC can involve the events leading up to the purchase of a product as well as customer service after the sale. Furthermore, EC is not limited to transactions between businesses and consumers, which is known as **business-to-consumer (B2C)** EC. EC is also used by organizations to conduct business with business partners such as suppliers and intermediaries. This form

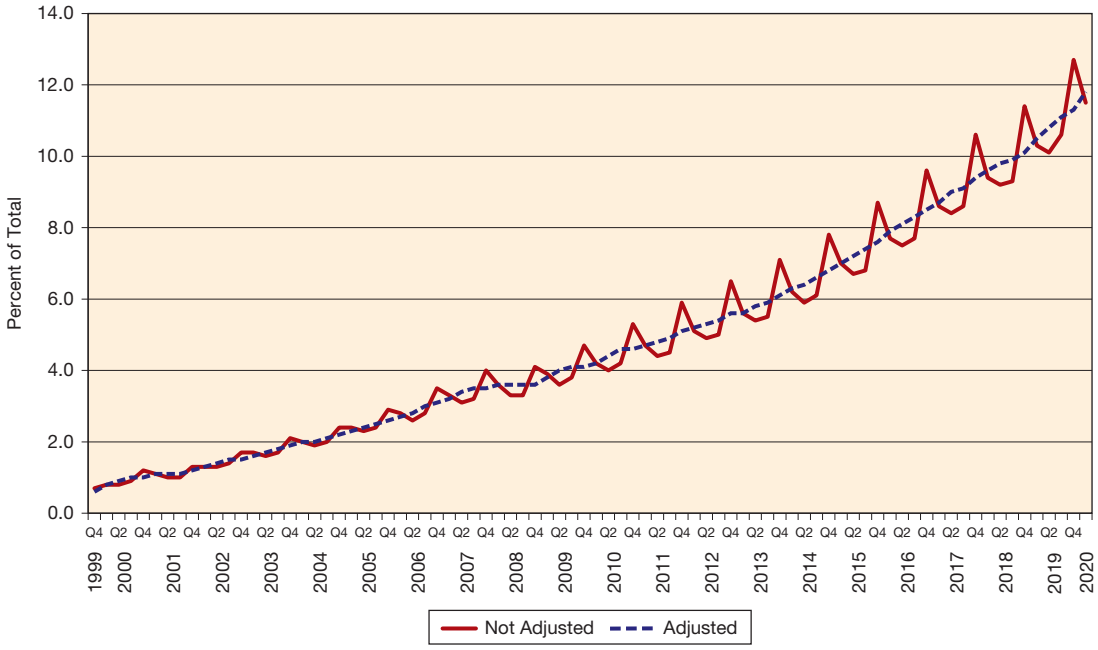


FIGURE 4.2

Online retailing continues to grow rapidly.
Source: U.S. Census Bureau News, U.S. Department of Commerce.

[1]EC can also include the distribution of digital products, such as software, e-books, music, movies, and digital images.

TABLE 4.1 Types of EC

Type of EC	Description	Example
Business-to-consumer (B2C)	Transactions between businesses and their customers	A person buys a book from Amazon.
Business-to-business (B2B)	Transactions among businesses	A manufacturer conducts business over the web with its suppliers.
Consumer-to-business (C2B)	Transactions between customers and businesses	A person offers his or her photography at shutterstock.com.
Consumer-to-consumer (C2C)	Transactions between people not necessarily working together	A person purchases some memorabilia from another person via eBay.

of EC, not involving the end consumer, is commonly referred to as **business-to-business (B2B)** EC. As many firms concentrate solely on B2B transactions, B2B EC is by far the largest form of EC in terms of revenues, with U.S manufacturers reporting e-commerce shipments totaling more than US$4 trillion in 2018 and wholesalers reporting e-commerce sales of US$2.6 trillion. Further, almost all companies focusing on the B2C arena, such as the clothing and home furnishing retailer Eddie Bauer, also engage in B2B EC. In the process of producing goods and services, a business typically sources its raw materials from a variety of specialized suppliers (in B2B transactions); after the production, the business sells each finished product to a distributor or wholesaler (in a B2B transaction) or directly to the end consumer (in a B2C transaction). We will discuss B2B EC in Chapter 8, "Strengthening Business-to-Business Relationships via Supply Chain and Customer Relationship Management."

Some forms of EC do not even involve business firms, as would be the case with transactions between consumers on an online auction site such as eBay; these forms of EC are referred to as **consumer-to-consumer (C2C)** EC (note that a business, eBay, provides a platform to enable transactions between consumers). A related EC model is **consumer-to-business (C2B)** EC, where consumers offer products, labor, and services to companies, a complete reversal of the traditional B2C model. These basic types of EC are summarized in Table 4.1.

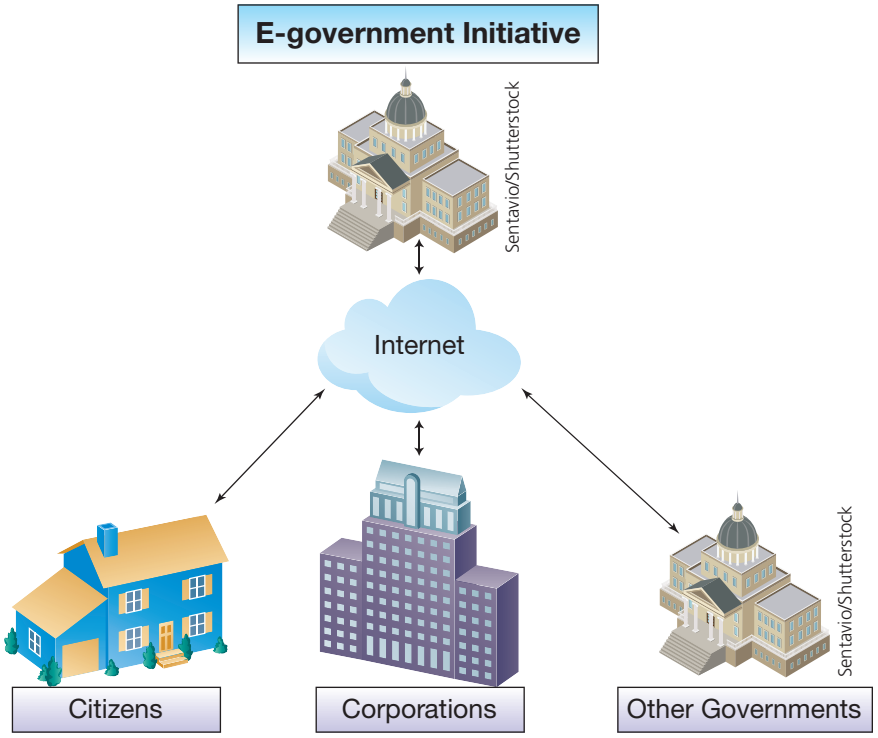
The ever-increasing digital density has influenced various aspects of the digital world, and e-commerce is no exception. Fueled by the rise of social media, organizations are trying to leverage social networks to build lasting customer relationships, advertise products, or otherwise create value—a trend referred to as *social commerce*. Digital products and services are provided through the cloud (think iTunes, Dropbox, or Gmail). The Internet of Things enables companies to offer various innovative products and services that go beyond the initial purchase (such as the Nest thermostat that not only can be controlled from one's smartphone but also learns the user's schedules and habits, optimizing home energy use). With the ubiquitous use of mobile devices, **mobile commerce (m-commerce)**—that is, any electronic transaction or information interaction conducted using a wireless, mobile device and mobile networks (wireless or switched public network) that leads to the transfer of real or perceived value in exchange for information, services, or goods (MobileInfo, 2016)—has become a natural way of shopping online for many. Forrester Research estimates that, in the major European economies, m-commerce will double between 2018 and 2023, reaching €330 billion. Likewise, Forrester expects the share of m-commerce in U.S. B2C e-commerce (retail and travel) to reach 45 percent in 2024. In addition, B2B transactions are increasingly taking place on mobile platforms. Together, these megatrends generate a wealth of data, allowing companies to obtain an in-depth understanding of each individual customer to deliver individualized value propositions and build long-lasting customer relationships. Next, we examine the use of information systems for interactions with and between governments.

E-Government

E-government is the use of information systems to provide citizens, organizations, and other governmental agencies with information about public services and to allow for interaction with the government. Similar to the EC business models, e-government involves three distinct relationships (Figure 4.3).

FIGURE 4.3

E-government initiatives include interaction with citizens, corporations, and other governments.



GOVERNMENT-TO-CITIZENS. **Government-to-citizen (G2C)** EC allows for interactions between federal, state, and local governments and their constituents. The U.S. Internal Revenue Service's internet tax filing, or *e-filing*, is one of the more recognizable G2C services, saving resources in terms of time and paper. Other services provided by governments include the online application for ID cards, municipal services, e-voting, or the provision of electronic access to public government data.

GOVERNMENT-TO-BUSINESS. **Government-to-business (G2B)** is like G2C, but this form of EC involves businesses' relationships with all levels of government. This includes e-procurement, or a government's streamlining its supply chain by purchasing materials directly from suppliers using proprietary internet-enabled procurement systems. Also included in G2B initiatives are forward auctions that allow businesses to buy seized goods and surplus government equipment (these transactions can take place on a G2C level as well). Other G2B services include online applications for export licenses, verification of employees' Social Security numbers, and online tax filing.

GOVERNMENT-TO-GOVERNMENT. Finally, **government-to-government (G2G)** EC is used for electronic interactions that take place between countries or between different levels of government within a country. Since 2002, the U.S. government has provided comprehensive e-government tools that allow foreign entities to find government-wide information related to foreign trade or business topics. Other G2G transactions relate to the intergovernmental collaboration at the local, state, federal, and tribal levels.

Managing Financial Transactions on the Web

As we move further into the digital age, various products, services, and industries are being disrupted (see Chapter 2, "Gaining Competitive Advantage Through Information Systems"), and the financial industry is no exception. Ubiquitous accessibility, the proliferation of mobile devices, advances in cloud computing, and Big Data analytics have brought about many radical changes for the financial services industry, and many foresee further radical changes in the near future. For example, financial companies can now operate on a global scale, and many services traditionally offered by banks can now be offered by other, nontraditional players. Likewise, *disintermediation* has enabled firms to provide many financial services directly to the end customers, and the internet has enabled customers to easily compare prices for financial services. These changes have affected not only traditional banks but also brokerage firms, insurance companies, and other players in the financial market.

E-BANKING AND ONLINE BROKERAGE. One type of service frequently offered online is managing financial transactions. Whereas traditionally consumers had to visit their bank to conduct financial transactions, they can now manage credit card, checking, or savings accounts online using **online banking** or pay their bills using **electronic bill pay** services. Likewise, many banks created **mobile banking** apps for checking account balances or initiating transactions. Large banks like Chase, Citibank, USAA, Capital One, and Charles Schwab offer mobile check deposit apps, allowing customers to deposit a check by simply taking a picture of the check with a smartphone's camera. Increasing digital density has also had a large impact on payment services as well as the development of *cryptocurrencies*; we will discuss these later in the chapter.

In addition to online banking, **online brokerage** has seen steady growth over the past several years. For example, many people turn to sites such as MSN Money, Yahoo! Finance, or CNN Money to get the latest information about stock prices, firm performance, or mortgage rates, and use online brokerage firms such as Interactive Brokers to buy or sell stocks. Further, most large online brokerage services offer trading apps for various smartphone platforms. In addition, many stock markets and foreign exchange markets around the world now use electronic trading, such that traders from around the world can trade without having to be at the market's physical location. Further, electronic trading greatly increases trading speed and reduces transaction costs.

FINTECH. **Fintech** (financial technology) refers to technologies that support activities in the financial sector. Often, fintech is associated with companies (often startups) that use technologies in innovative ways to disrupt activities in the financial sector; many fintech startups focus on specific types of interactions, segments, or business processes. Whereas traditional banks provide a wide range of services, fintech companies typically focus on one service, and do this very well. For example, successful fintech startups range from crowdfunding platforms such as Indiegogo or Kickstarter to online-only banks such as N26, mobile payment processors such as Square, peer-to-peer lenders such as Prosper and Lending Club, small-business lenders such as Behalf, or digital investment managers such as FutureAdvisor. Another fintech innovation is the use of artificial intelligence for providing investment advice or managing financial portfolios. However, many of the innovative services provided by fintech startups are not captured by traditional financial regulations. Therefore, many innovations in the fintech sector will necessitate changes in regulation of financial services and public policy, often on a global scale; likewise, for organizations and individuals alike, managing risks becomes paramount, especially when dealing with players who are not established in the market. On the other hand, incumbent banks now must decide how to compete or collaborate with these fintech companies. Increasingly, rather than competing with such services, traditional banks such as Bank of America, JP Morgan Chase, or Wells Fargo collaborate with fintech startups such as the payments network Zelle to enhance their portfolio of services, and provide APIs for customers and other companies to exchange data and provide other value-added services.

Business-to-Consumer E-Commerce

Technological forces are driving business, lowering barriers to entry and leveling the playing field, allowing small and large businesses from around the globe to sell products to a global customer base. For small companies, this opens up vast opportunities. Unlike in international sports tournaments such as the Ironman World Championship, where athletes first have to compete locally to qualify for the big event, online businesses can "participate in the world championships" (i.e., compete on a global scale) right from the start. Companies are exploiting the capabilities of the web to reach a wider customer base, offer a broader range of products, and develop closer relationships with customers by striving to meet their unique needs.

While it is beneficial for many small companies to access a global marketplace, this also means that every company participating in a market faces increased competition, and companies must strategically position themselves. Before the internet, retailers (except for catalog merchants) operated solely using traditional physical stores; today, this approach is referred to as **brick-and-mortar business strategy**. Companies following this strategy solely operate physical locations such as retail stores and do not offer their products or services online. The advent of the web has enabled companies to move beyond their physical location and engage in the online

COMING ATTRACTIONS

The AI Hedge Fund

For many years, hedge funds and money managers have relied on statistical models to improve their trading strategies. Trained in a variety of mathematical disciplines, specialists called "quants" use historical data and other sources of information to develop sophisticated models. However, these models tend to be highly complex and can be challenging to update and adapt to changing market conditions. To speed up the process of developing and refining these models, several startup hedge funds are turning to techniques from artificial intelligence (AI).

The field of AI is vast and varied. Many different approaches have been developed in attempts to emulate the intelligence and capabilities of humans (see Chapter 6, "Enhancing Business Intelligence Using Big Data, Analytics, and Artificial Intelligence"), with some being very successful and others less so. Recent innovations in the sub-discipline of machine learning have led to widespread practical application; in particular, improvements in genetic algorithms (where many approaches are tried out and only the best survive) and deep learning (where multiple layers of neural networks are trained simultaneously) have enabled applications such as improved image and voice recognition and processing—Siri, Cortana, and Alexa are but a few examples.

Typically, machine learning algorithms bring together data from many sources and use historical outcome information to train and improve their models. Whereas humans can operate in a similar way, the difference is that the machines can consider hundreds of thousands, even millions, of possibilities, evaluate them automatically, and then choose the ones that generate the best outcomes. The settings that led to the better outcomes, called "parameters," can then be fed back into the models for another iteration of improvement. While the resulting models can be extremely complex, the question is how to design the models such that the parameters and outcomes are useful for making trading decisions. Critics doubt that, in the long run, the new machine learning based funds will be any better at this than existing players, but recent evidence suggests otherwise. It seems that the performance of the machines is finally surpassing traditional hedge funds, mainly due to massive computing power and the machines' capacity to rapidly adjust to market conditions. However, believers in AI-based trading foresee other issues. As AI-based trading is expected to level the playing field, in the long run, everyone is likely to have access to the same intelligence. Yet if everyone is having access to the same intelligence, how could anyone outperform the market?

Based on:

Friedman, B. (2019, August 30). The rise of the machines: AI funds are outperforming the hedge fund benchmark. *Preqin*. Retrieved June 10, 2020, from https://www.preqin.com/insights/research/blogs/the-rise-of-the-machines-ai-funds-are-outperforming-the-hedge-fund-benchmark

Lee, J. (2019, November 13). Little-known data wizards take on the pros at new AI hedge fund. *Bloomberg*. Retrieved June 10, 2020, from https://www.bloomberg.com/news/articles/2019-11-13/a-quant-two-data-guys-and-a-brevan-howard-linked-ai-hedge-fund

Porzecanski, K. (2019, July 2). JPMorgan commits hedge fund to AI in technology arms race. *Bloomberg*. Retrieved June 10, 2020, from https://www.bloomberg.com/news/articles/2019-07-02/jpmorgan-to-start-ai-hedge-fund-strategy-in-technology-arms-race

sales of goods and services, or **e-tailing**. In the most extreme form of e-tailing, companies follow a **click-only business strategy** and only conduct business electronically in cyberspace. These firms (sometimes called **virtual companies**) have no physical store locations, allowing them to focus purely on EC. An example of a click-only company is the online retailer Amazon, which does not have a physical storefront in the classic sense. In e-business terminology, click-only companies are sometimes called "pure play companies," focusing on one very distinct way of doing business; other firms, such as the bookseller Barnes & Noble, choose to utilize the internet to extend their traditional offline retail channels. These firms employ a **click-and-mortar business strategy** approach (also referred to as a **bricks-and-clicks business strategy**). The three general approaches are depicted in Figure 4.4.

THE CLICK-AND-MORTAR STRATEGY. The greatest impact of the web-based EC revolution has occurred in companies adopting the click-and-mortar approach. Click-and-mortars continue to operate their physical locations and have added an EC component to their business activities. With transactions occurring in both physical and virtual environments, it is imperative that click-and-mortars learn how to exploit commercial opportunities in both domains. Conducting physical and virtual operations presents special challenges for these firms, as business activities must be tailored to each of these different environments in order for the firms to compete effectively (e.g., differential pricing or shipping and inventory management can suddenly become huge concerns for companies selling physical products). Traditionally, a company would

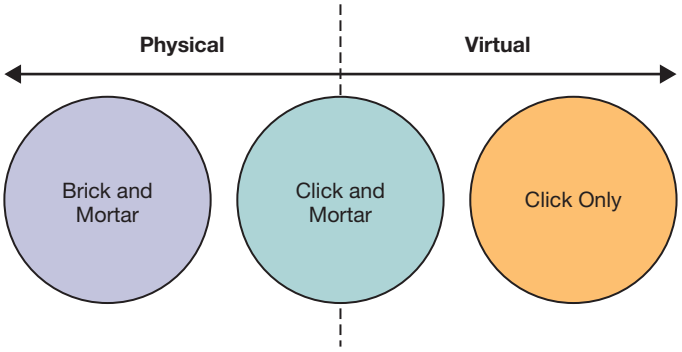


FIGURE 4.4
General approaches to conducting commerce.

only offer its customers a single channel, be it the physical retail store, a catalog, or an online store. As companies grew, many started using a multichannel approach, offering the customer different (independent) touchpoints, such as a retail store and a catalog (a concept referred to as **multichannel retailing**). Increasingly—and especially due to the proliferation of mobile devices—transactions take place *across* multiple environments, a concept referred to as **cross-channel retailing**. For example, in-store pickup refers to situations where a customer orders a product online and picks it up in a retail store; similarly, customers may evaluate products offline and purchase the products through the retailer's website. Finally, **omni-channel retailing** entails providing seamless, simultaneous interactions using different channels, such that a customer does not interact with a single channel but with the brand as a whole (see Figure 4.5). For example, a shopper in a retail store of electronics retailer Best Buy can scan a QR code to receive more information or product reviews, which are located on Best Buy's mobile site. Likewise, **sales beacons**—Bluetooth devices that can detect proximate smartphones and send messages—have become a widely used way to send marketing messages or personalized coupons to the mobile phones of in-store shoppers.

No matter which approach click-and-mortars pursue, they face various challenges due to increasing IS complexity. Design and development of complex computing systems are required to support each aspect of the click-and-mortar approach, especially when attempting to offer seamless experiences across channels.

THE CLICK-ONLY STRATEGY. Click-only companies can often compete more effectively on price because they do not need to support the physical aspects of the click-and-mortar approach. Thus, these companies can reduce prices to rock-bottom levels (although a relatively small click-only firm may not sell enough products and/or may not order enough from suppliers to be

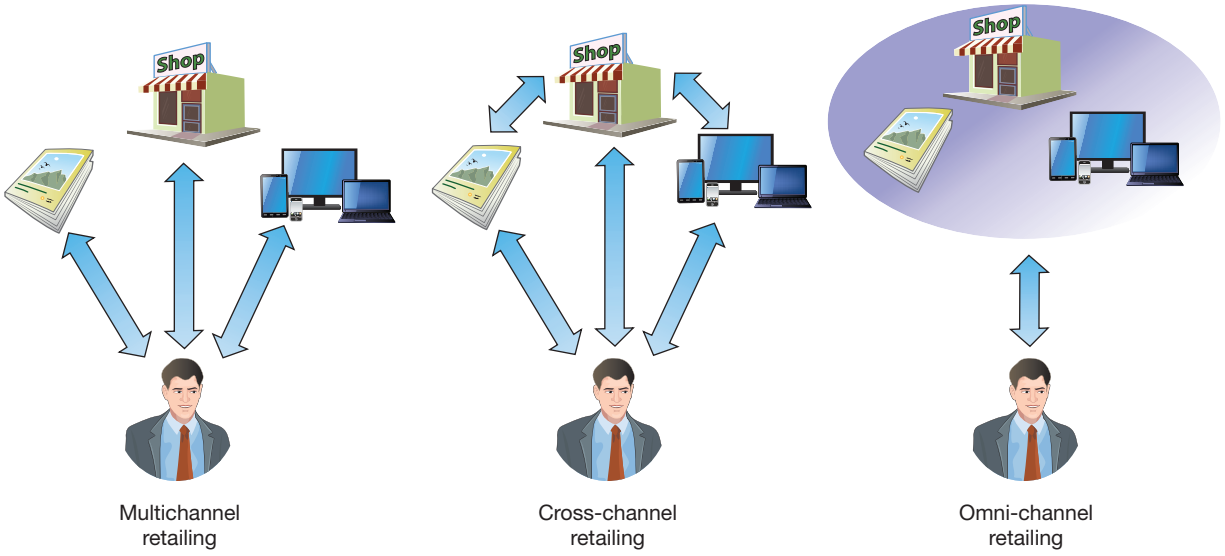


FIGURE 4.5
Supported by information systems, companies can interact with their customers using various touchpoints.