CHAPTER 1

Disruptive IT Impacts Companies, Competition, and Careers

CHAPTER OUTLINE

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Introduction

The more digital technology advances, the more it is almost instantly integrated into our daily lives. Many managers and entrepreneurs recognize the need to integrate digital technology into their products and services. For example, it has been estimated that 78% of business
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leaders expect their organizations to be a digital business by 2020. Outdated and complex application architectures with a mix of interfaces can delay or prevent the release of new products and services, and maintaining these obsolete systems absorbs large portions of the information technology (IT) budget.

Companies such as Uber, Airbnb, Shyp, TaskRabbit, and other participants in the on-demand economy are leveraging IT to create exciting new business models and revolutionize the way workers, businesses, and customers interact and compete. Peter Hinssen, a well-known business author, university lecturer, and digital consultant, described the change in digital technology as follows:

Technology used to be nice. It used to be about making things a little bit better, a little bit more efficient. But, technology stopped being nice: it’s disruptive. It’s changing our business models, our consumer markets, our organizations. (MacIver, 2015)

As businesses continue to join the on-demand economy, IT professionals must constantly scan for innovative new technologies to provide business value and help shape the future of the business. For example, smart devices, mobile apps, sensors, and technology platforms—along with increased customer demand for digital interactions and on-demand services—have moved commerce in fresh new directions. We’ve all heard the phrase “there’s an app for that” and that kind of consumer thinking is what drives the on-demand economy.

Business leaders today need to know what steps to take to get the most out of mobile, social, cloud, big data, analytics, visualization technologies, and the Internet of Things (IoT) to move their business forward and enable new on-demand business models. Faced with opportunities and challenges, managers need to know how to leverage IT earlier and more efficiently than their competitors.

A goal of this book is to empower you to improve your use and management of IT at work by raising your understanding of IT terminology, practices, and tools and developing your IT skills to transform you into an informed IT user. Throughout this book, you will learn how digital technology is transforming business and society in the on-demand economy as the IT function takes on key strategic and operational roles that determine an enterprise’s success or failure. You will also be provided with an in-depth look at IT trends that have immediate and future capacity to influence products, services competition, and business relationships. Along the way, we’ll describe many different ways in which IT is being used and can be used in business and provide you with some of the terminology, techniques and tools that enable organizations to leverage IT to improve growth, performance, and sustainability.

In this opening chapter, you will learn about the powerful impacts of digital technology on people, business, government, entertainment, and society that are occurring in today’s on-demand economy. You will also discover how leading companies are deploying digital technology and changing their business models, business processes, customer experiences, and ways of working. We will present examples of innovative products, services, and distribution channels to help you understand the digital revolution that is currently shaping the future of business, the economy and society and changing management careers. And, we’ll explain why IT is important to you and how becoming an “informed user” of IT will add significant value to your career and overall quality of life.
Case 1.1 Opening Case

Uber and Airbnb Revolutionize Business Models in the On-Demand Economy

If you’ve used Uber or Airbnb, then you have participated in the on-demand economy where speed, convenience, and simplicity are key factors in consumer behavior and purchasing decisions. Michael Boland, author of What’s Driving the Local On-Demand Economy, explains that as consumers, “We’re being conditioned to expect everything on-demand as the mobile device increasingly becomes the remote control for the physical world” (Boland, 2015). For example, the majority of consumers who tap an Uber app to get a ride would not consider dialing an 800 number for a taxi. With all transactions performed by apps and automated processes, the entire process from hailing to paying for a ride is slick, quick, and easy, without cash or credit cards.

Tech Platforms Enabled On-Demand Services to Take Off

Decades of technological innovation have given us smartphone apps, mobile payment platforms, GPS and map technology, and social authentication. These technologies are being used to build the infrastructure needed for on-demand services. This infrastructure—also referred to as a technology platform or technology stack—supports the exchange and coordination of staggering amounts of data. The term technology stack reflects the fact that the platform is made up of multiple layers (stacks) of hardware, software, network connectivity, and data analytics capabilities.

In many consumer markets today, companies that do not have iPhone or Android apps or technology platforms that support the exchange of goods and services—no matter how useful their website—may find themselves losing their competitive edge.

On-Demand Economy Requires a New Business Model

Uber and Airbnb are popular examples of companies that developed on-demand business models to transform slow-to-innovate industries. A simple definition of business model is the way a company generates revenue and makes a profit. On-demand business models provide real-time fulfillment of goods and services, which have attracted millions of users worldwide. This model fits best when speed and convenience matter the most. The ground transportation, grocery, and restaurant industries are examples of hyper-growth categories in the on-demand world. Forward-thinking companies are reshaping these industries.

Uber Business Model

Uber disrupted the taxi industry with a workforce that is essentially any person with a smartphone and a car. Location-aware smartphone apps bring drivers and passengers together, while in-app accounts make the cashless payment process effortless. By simply opening the Uber app and pressing the middle button for several seconds (a long press), customers can order a ride to their current location, selecting the kind of car they want. Payment is automatically charged to the credit card on file with receipts via email.

The Uber concept developed in response to taxi scarcities. It started on a snowy Paris night in 2008 when the two founders could not get a cab. They wanted a dead-simple app that could get them a car with a tap. On June 1, 2015, the entrepreneurs celebrated Uber fifth anniversary and announced that the company had grown into a transportation network covering 311 cities in 58 countries in North and South Americas, Europe, Africa, Asia Pacific, and the Middle East.

Uber has invested in new and developing technologies and partnerships. The company partnered with Carnegie Mellon University to build robotic cars and new mapping software. In March 2015, Uber purchased deCarta, a 40-person mapping start-up to reduce its dependence on Google maps.

Airbnb Business Model

Another disruption to a traditional industry occurred when Airbnb blindsided the hotel industry. Airbnb allows anyone with a spare apartment or room—even if only for a day—to run their own bed and breakfast by giving them a technology platform to market themselves to a global market. By 2016, the Airbnb site had over 1.5 million listings in 190 countries and 34,000 cities. Over 40 million guests have used Airbnb worldwide. For comparison, Hilton, InterContinental, and Marriott, the largest hotel chains in the world, have less than 1 million rooms each.

Uber and Airbnb do not own inventory. Instead, they scale up (expand) by improving their ability to acquire and match customers and service providers.
CHAPTER 1
Disruptive IT Impacts Companies, Competition, and Careers

1.1 Doing Business in the On-Demand Economy

The on-demand economy is revolutionizing commercial activities in businesses around the world. The businesses in this new economy are fueled by years of technology innovation and a radical change in consumer behavior. As companies become more highly digitized, it becomes more and more apparent that what companies can do depends on what their IT and data management systems can do. For over a decade, powerful new digital approaches to doing business have emerged. And there is sufficient proof to expect even more rapid and dramatic changes due to IT breakthroughs and advances.

In market segment after market segment, mobile communications and technology stacks make it financially feasible for companies to bring together consumers and providers of products and services. These capabilities have created the on-demand economy. As Ev Williams, cofounder of Twitter says,

"The internet makes human desires more easily attainable. In other words, it offers convenience. Convenience on the internet is basically achieved by two things: speed, and cognitive ease. If you study what the really big things on the internet are, you realize they are masters at making things fast and not making people think."
The proliferation of smartphone-connected consumers, simple and secure purchase flows, and location-based services are a few of the market conditions and technological innovations that are propelling the explosion of on-demand services.

Just as the rapid growth of online-only Amazon and eBay transformed retail, the even faster growth of app-driven companies, like Uber, Airbnb, and Grubhub, has disrupted the taxi, hotel, and restaurant markets. As you read in the opening case, in six short years, Uber changed the taxi industry as it rose from start-up to the world’s most valuable private technology company, and Airbnb tackled the fiercely competitive hotel market and attracted more than 60 million customers to become the third most valuable venture-capital-backed company in the world. Another example is Grubhub who became No. 1 in online food ordering, controlling over 20% of that $9 billion market. What today’s successful technology businesses have in common are platform-based business models. Platforms consist of hardware, software, and networks that provide the connectivity for diverse transactions, such as ordering, tracking, user authentication, and payments. These business models are designed to serve today’s on-demand economy, which is all about time (on-demand), convenience (tap an app), and personalized service (my way). For example, millennials want the ease of online payment over cash and insist on efficiency for all aspects of their lives, including shopping, delivery, and travel.

Key strategic and tactical questions that determine an organization’s profitability and management performance are shown in Figure 1.2. Answers to each question require an understanding of the capabilities of mundane to complex IT, which ones to implement and how to manage them.

![Figure 1.2](Turban11e_c01.indd) Key strategic and tactical questions.

**Growth of the On-Demand Economy**

Whether it is ease of scheduled deliveries or the corresponding time savings, the growth of the on-demand economy is a product of its alignment with consumers’ growing appetite for greater convenience, speed, and simplicity. A recent survey reported that 86.5 million Americans have used the services of at least one on-demand start-up company (Chriss, 2016).

The growth of the on-demand economy demonstrates the high level of interest consumers have in on-demand services from dog walking to laundry services, short-term home rentals, massages, and truck hauling. Although just applying a mobile app to an existing service will not ensure a company’s success, IT is a vital and integral part of the all businesses that are part of the on-demand economy.
Low Cost of Entry One of the reasons that the on-demand economy has taken off is that it is easier than ever to become an on-demand business. Companies like Dispatch, a software-as-a-service company, allow entrepreneurs to move into the on-demand world quickly and inexpensively. For example, Atlantic Fitness, a fitness equipment repair service company, moved into the on-demand economy using Dispatch, and Handyman Connection, a 20-year-old home repair service company, is using Dispatch’s platform to compete with Handy, an on-demand service for house cleaning that has raised $60 million in venture capital.

Digital Business Models

The on-demand economy is driving the transformation of traditional business models to digital business models to serve customers what they want and where they want it.

Business models are the ways enterprises generate revenue or sustain themselves. Digital business models define how businesses make money via digital technology. Companies that adopt digital business models are better positioned to take advantage of business opportunities and survive, according to the Accenture Technology Vision 2013 report (Accenture, 2013). Figure 1.3 contains examples of new technologies that destroyed old business models and created new ones.

The ways in which market leaders are transitioning to digital business models include the following:

- **NBA talent scouts rely on sports analytics and advanced scouting systems** NBA talent scouts used to crunch players’ stats, watch live player performances, and review hours of tapes to create player profiles. Now software that tracks players’ performance has changed how basketball and soccer players are evaluated. For example, STATS’ SportVU technology is revolutionizing the way sports contests are viewed, understood, played, and enjoyed. SportVU uses six palm-sized digital cameras that track the movement of every player on the court, record ball movement 25 times per second, and convert movements into statistics. SportVU produces real-time and highly complex statistics to complement the traditional play-by-play. Predictive sport analytics can provide a 360-degree view of a player’s performance and help teams make trading decisions. Sports analytics bring about small competitive advantages that can shift games and even playoff series.

- **Dashboards keep casino floor staff informed of player demand** Competition in the gaming industry is fierce, particularly during bad economic conditions. The use of manual spreadsheets and gut-feeling decisions did not lead to optimal results. Casino operators facing pressure to increase their bottom line have invested in analytic tools, such as
To address these issues, IT leaders said they need to focus on relationships, meet more frequently with top management, and spend significant amounts of time with functional leaders, customers, and suppliers. Companies also need to emphasize finding, keeping, and developing IT talent and on improving IT to improve business performance. These findings point to one clear message—IT in the on-demand economy is about meeting customer needs.

Tangam’s Yield Management solution (TYM). TYM is used to increase the yield (profitability) of blackjack, craps, and other table games. The analysis and insights from real-time apps are used to improve the gaming experience and comfort of players.

Today, a top concern of well-established corporations, global financial institutions, born-on-the-Web retailers, and government agencies is how to design their digital business models in order to

- Deliver an incredible customer experience
- Turn a profit
- Increase market share
- Engage their employees

In the digital (online) space, the customer experience must measure up to the very best the Web has to offer. Stakes are high for those who get it right—or get it wrong. Forrester research repeatedly confirms there is a strong relationship between the quality of a firm’s customer experience and loyalty, which, in turn, increases revenue (Schmidt-Subramanian et al., 2013).

### IT’s Role in the On-Demand Economy

According to the 2016 survey conducted by the Society of Information Management (SIM), 1,213 IT leaders (including 490 chief information officers (CIOs)) from 801 companies reported companies that are more highly digitized and tightly connected are putting a greater emphasis on the strategic use of IT to enhance growth and improve performance. As a result, IT priorities and spending are changing (Kappelman et al., 2017).

A review of the top 10 IT management priorities reported in the survey results is shown in Table 1.1. Along with business-IT alignment and security, Table 1.1 clearly demonstrates a need for companies to focus on strategic and organizational priorities such as innovation, IT and business agility, speed of IT delivery, and business productivity and efficiency.

<table>
<thead>
<tr>
<th>IT Management Issues</th>
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<tbody>
<tr>
<td>1    Technology Alignment with the Business</td>
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<tr>
<td>2    Security, Cybersecurity &amp; Privacy</td>
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<td>3    Innovation</td>
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<td>4    IT Agility &amp; Flexibility</td>
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<td>5    Business Agility &amp; Flexibility</td>
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<td>6    Business Cost Reduction &amp; Controls</td>
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<td>7    IT Cost Reduction &amp; Controls</td>
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<td>8    Speed of IT Delivery &amp; IT Time to Market</td>
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<tr>
<td>9    Business Strategic Planning</td>
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<tr>
<td>10   Business Productivity &amp; Efficiency</td>
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Adapted from Kappelman et al. (2017).

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IT Business Objectives

Now, more than ever, IT must be responsive to the needs of consumers who are demanding a radical overhaul of business processes in companies across diverse industry sectors. Intuitive interfaces, around-the-clock availability, real-time fulfillment, personalized treatment, global consistency, and zero errors—this is the world to which customers have become increasingly accustomed. And, it’s not just about providing a superior user or customer experience—when companies get it right, they can also offer more competitive prices because of lower costs, better operational controls, and open themselves up to less risk.

According to Chirantan Basu of Chron (Basu, 2017), to stay abreast of the ever-changing business landscape and customer needs, IT today must concentrate on the following six business objectives:

1. **Product development**  From innovations in microprocessors to efficient drug-delivery systems, IT helps businesses respond quickly to changing customer demands.
2. **Stakeholder integration**  Companies use their investor relations websites to communicate with shareholders, research analysts, and others in the market.
3. **Process improvement**  An ERP system replaces dozens of legacy systems for finance, human resources, and other functional areas, to increase efficiency and cost-effectiveness of internal business processes.
4. **Cost efficiencies**  IT allows companies to reduce transaction and implementation costs, such as costs of duplication and postage of email versus snail mail.
5. **Competitive advantage**  Companies can use agile development, prototyping, and other systems methodologies to bring a product to market cost-effectively and quickly.
6. **Globalization**  Companies can outsource most of their noncore functions, such as HR and finance, to offshore companies and use ICT to stay in contact with its global employees, customers, and suppliers 24/7.

Every technology innovation triggers opportunities and threats to business models and strategies. With rare exceptions, every business model depends on a mix of IT, knowledge of its potential, the requirements for success, and, equally important, its limitations.

Questions

1. What precipitated the on-demand economy?
2. How is IT contributing to the success of the on-demand economy?
3. List the six IT business objectives.
4. What are the key strategic and tactical questions that determine an organization’s profitability and management performance?
5. What is a business model?
6. What is a digital business model?
7. Give two examples of how companies are transitioning to digital business models.
8. What factors are driving the move to digital business models?

1.2 Business Process Improvement and Competitive Advantage

Given that a company’s success depends on the efficiency of its business processes, even small improvements in key processes can have significant payoff. All functions and departments in the enterprise have tasks they need to complete to produce outputs, or deliverables, in order to meet their objectives.
Before you can begin to improve something, you have to understand what it is you are improving. We'll start by defining a business process, looking at its characteristics, and then exploring ways in which a business process can be improved either incrementally or radically through Business Process Reengineering.

What Is a Business Process?

Business processes are series of steps by which organizations coordinate and organize tasks to get work done. In the simplest terms, a process consists of activities that convert inputs into outputs by doing work.

Examples of common business processes are as follows:

- **Accounting**  Invoicing; reconciling accounts; auditing
- **Finance**  Credit card or loan approval; estimating credit risk and financing terms
- **Human resources (HR)**  Recruiting and hiring; assessing compliance with regulations; evaluating job performance
- **IT or information systems**  Generating and distributing reports and data visualizations; data analytics; data archiving
- **Marketing**  Sales; product promotion; design and implementation of sales campaigns; qualifying a lead
- **Production and operations**  Shipping; receiving; quality control; inventory management
- **Cross-functional business processes**  Involving two or more functions, for example, order fulfillment and product development

Three Components of a Business Process  Business processes have the three basic components shown in Figure 1.4. They involve inputs, activities, and deliverables.

Processes can be formal or informal. Formal processes are documented and have well-established steps. Order taking and credit approval processes are examples. Routine formal processes are referred to as standard operating procedures (SOPs). An SOP is a well-defined and documented way of doing something. An effective SOP documents who will perform the tasks; what materials to use; and where, how, and when the tasks are to be performed. SOPs are needed for the handling of food, hazardous materials, or situations involving safety, security, or compliance. In contrast, informal processes are typically undocumented, have inputs that may not yet been identified, and are knowledge-intensive. Although enterprises would prefer to formalize their informal processes in order to better understand, share, and optimize them, in many situations process knowledge remains in people’s heads.

Processes range from slow, rigid to fast-moving, adaptive. Rigid processes can be structured to be resistant to change, such as those that enforce security or compliance regulations. Adaptive processes are designed to respond to change or emerging conditions, particularly in marketing and IT.

Improving Business Processes

Designing an effective process can be complex because you need a deep understanding of the inputs and outputs (also known as deliverables), how things can go wrong, and how to prevent
things from going wrong. For example, Dell had implemented a new process to reduce the time that tech support spent handling customer service calls. In an effort to minimize the length of the call, tech support’s quality dropped so much that customers had to call multiple times to solve their problems. The new process had backfired—increasing the time to resolve computer problems and aggravating Dell customers.

The importance of efficient business processes and continuous process improvement cannot be overemphasized. Why? Because 100% of an enterprise’s performance is the result of its processes. Maximizing the use of inputs in order to carry out similar activities better than one’s competitors is a critical success factor (CSF). Poorly designed, flawed, or outdated business processes waste resources, increase costs, cause delays, and aggravate customers. For example, when customers’ orders are not filled on time or correctly, customer loyalty suffers, returns increase, and reshipping increases costs. The blame may not be employee incompetence, but a flawed order fulfillment process.

Don’t Automate, Obliterate!

In today’s on-demand economy, incrementally improving a business process isn’t always sufficient to create the type of change required. Instead, radical changes need to occur to meet higher customer expectations. To do this, companies have to go beyond simply automating an existing process. They must reinvent the entire business process, including reducing the number of steps required, eliminating documents, developing automated decision-making, and dealing with regulatory and fraud issues. Operating models, skills, organizational structures, and roles need to be redesigned to match the reinvented processes. Data models should be adjusted and rebuilt to enable better decision-making, performance tracking, and customer insights.

Leading organizations have come to recognize that it can take a long time to see the benefits of traditional large-scale projects that migrate all current processes to digital and sometimes they don’t work. Instead, successful companies are reinventing processes, challenging everything related to an existing process and rebuilding it using cutting-edge digital technology. For example, rather than creating technology tools to help back-office employees type customer complaints into their systems, leading organizations create self-serve options for customers to type in their own complaints.

Business Process Reengineering (BPR)  The process by which these types of radical process change can be achieved is referred to as business process reengineering (BPR), its slogan is “Don’t automate, obliterate!” (Hammer and Champy, 2006). Consisting of eight stages, shown in Figure 1.5, BPR proposes that simply applying IT to a manual or outdated process does not always optimize it. Instead, processes need to be examined to determine whether they are still necessary. After unnecessary processes are identified and eliminated, the remaining ones are redesigned (or reengineered) in order to automate or streamline them. Next, the new process is implemented and put into operation and its performance is evaluated. Finally, the process is reassessed over time to continually improve it.

The goal of BPR is to eliminate unnecessary, non-value-added processes, and simplify and automate the remaining processes to significantly reduce cycle time, labor, and costs. For example, reengineering the credit approval process cuts time from several days or hours to minutes or less. Simplifying processes naturally reduces the time needed to complete the process, which also cuts down on errors.

After eliminating waste, technology can enhance processes by (1) automating existing manual processes; (2) expanding the data flows to reach more functions in order to make it possible for sequential activities to occur in parallel; and (3) creating innovative business processes that, in turn, create new business models. For instance, consumers can scan an image of a product and land on an e-commerce site, such as Amazon.com, selling that product. This process flips the traditional selling process by making it customer-centric.

You will read more about optimizing business processes and role of business process management (BPM) role in the alignment of IT and business strategy in Chapter 13.
Gaining a Competitive Advantage

Understanding trends that affect the new ways business is being done and getting in front of those trends by changing adding, deleting, and changing existing business processes gives organizations an important competitive advantage over their competitors. Helping a company gain, maintain, and sustain a competitive advantage in the market is a very important function of IT. In business, as in sports or politics, companies want to win—customers, market share, and position in the industry. Basically, this requires gaining an edge over competitors by being first to take advantage of market opportunities, providing better customer experiences, offering unique products or services, or convincing customers why your business is a more attractive alternative than your competitors.

Influential industry leaders cite “new competition” as their largest business challenge. Once an enterprise has developed a competitive edge, it can only be sustained by continually pursuing new and better ways to compete. Maintaining a competitive advantage requires forecasting trends and industry changes and figuring out what the company needs to do to stay ahead of the game. It demands continuously tracking competitors and their future plans and promptly taking corrective actions. Competitiveness depends heavily on IT agility and responsiveness. The benefit of IT agility is that it enables organizations to take advantage of opportunities faster or more effectively.

Closely related to IT agility is flexibility. For example, mobile networks are flexible—able to be set up, moved, or removed easily, without dealing with cables and other physical requirements of wired networks. Mass migration to mobile devices from PCs has expanded the scope of IT beyond traditional organizational boundaries—making location practically irrelevant.

IT agility, flexibility, and mobility are tightly interrelated and fully dependent on an organization’s IT infrastructure and architecture, which are discussed in Chapter 2.

With mobile devices, applications, platforms, and social media becoming inseparable parts of work life and corporate collaboration and with more employees working from home, the result is the rapid consumerization of IT. IT consumerization is the migration of consumer

Competitive advantage is an edge that enables a company to outperform its average competitor.

Agility means being able to respond quickly.

Responsiveness means that IT capacity can be easily scaled up or down as needed, which essentially requires cloud computing.

Flexibility means having the ability to quickly integrate new business functions or to easily reconfigure software or applications.
technology into enterprise IT environments. This shift has occurred because personally owned IT is as capable and cost–effective as its enterprise equivalents. IT at Work 1.1 demonstrates how FitBit has maintained a competitive advantage with its fitness tracker.

As evidenced by the mergers of Grubhub/Seamless in food delivery and Handybook/Exec in home services, consolidation will accelerate as competition grows. This trend is underscored in the following examples:

- Collaboration of complementary, noncompetitive businesses will become commonplace as a means to collectively educate consumers about the benefits of on-demand services, increase awareness, and provide added value to core users. These range from cross-promotions similar to that of Instacart/Washio to close partnerships such as that of WunWun/Gett.
- Legacy providers in hospitality, transportation, and other Fortune 500s will “partner with” or “acquire” more innovative on-demand companies. Ken Chenault, Chairman and CEO of American Express, conceded in their annual report, “Our industry is being redefined by many forces, including the continued revolution in online and mobile technologies, which is transforming commerce and society.” Given the emerging influence of on-demand services, Amex launched a partnership with Uber earlier this year. American Express was able to get a foot in the door by allowing customers to earn 2× points for its spend on Uber with an American Express credit card.
- As on-demand businesses solve for the current technological and logistical challenges, design will increasingly become one of the most meaningful forms of competitive advantage. Creating a memorable, frictionless user interface is the next battleground for addressing consumers’ insatiable appetite for greater simplicity and convenience. Scott Belsky points out, “A new cohort of design-driven companies are adding a layer of convenience between us and the underlying services and utilities that improve our lives. This could change everything.”


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**IT at Work 1.1**

**FitBit: Smart, Connected Device Transforms Competition and Promotes Sustainability**

In the first year of its existence, FitBit sold 100,000 devices. At the time, there were countless weight loss and exercise programs, plans, and gimmicks. But smart, connected wearable activity trackers were virtually nonexistent. Five years later, FitBit managed to take the title biggest selling manufacturer of wearable tech when it sold a whopping 21 million devices in 1 year. It still holds that title today.

**Vision: Simple Approach Plus Smart Device**

FitBit was launched in San Francisco, California, by Eric Friedman and James Park. These entrepreneurs took a basic approach to personal health and fitness—eating right and keeping active. Their vision was to develop a smart device that would motivate users to be more active, eat a well-rounded diet, and ultimately become healthier.

Throughout the day, FitBit logs data about the wearer’s activities, including the number of steps taken, distance travelled, calories burned, and what needs to be done to reach a personal daily goal, for example, walking 2 miles. FitBit’s internal memory can store at least a week of activity data.

One of FitBit’s competitive strengths is the app that is accessible from a smartphone. Users can sync FitBit devices and view their online profile, activity levels, and sleep patterns on dashboards that display on more than 150 mobile devices, including iOS, Android, and Windows Phone products. This compatibility maximizes the number of friends and family in each user’s network to share performance stats. It also motivates and increases user retention.

**First Class Fitness**

A smart wearable product that fits effortlessly into users’ life styles launched an industry and made FitBit a market leader. In the second quarter of 2015 (2Q15), FitBit shipped 4.4 million units, up 159% from the same quarter a year ago (2Q14) and held 24.3% global market share. Second in line was Apple with 3.6 million units shipped in 2Q15 and 19.9% global market share. Thanks to the technology that enabled FitBit and the company’s growing reputation, Friedman and Park are likely to be in business for a long time.

**IT at Work Questions**

1. How did FitBit manage to take the title of biggest selling manufacturer of wearable technology and sustain it?
2. What could other companies who produce fitness trackers challenge FitBit in the marketplace?
3. What other features do you think consumers would like FitBit to incorporate into its fitness tracker to further improve it? How would consumers and FitBit benefit from these improvements?

Software Support for BPM

The purpose of business process management (BPM) is to help enterprises become more agile and effective by enabling them to better understand, manage, and adapt their business processes. Vendors, consulting and tech firms offer BPM expertise, services, software suites, and tools.

BPM software is used to map processes performed either by computers or manually—and to design new ones. The software includes built-in templates showing workflows and rules for various functions, such as rules for credit approval. These templates and rules provide consistency and high-quality outcomes. For example, Oracle’s WebLogic Server Process Edition includes server software and process integration tools for automating complex business processes, such as handling an insurance claim.

But, BPM initiatives can be extremely challenging, and in order to be successful, BPM requires buy-in from a broad cross section of the business, the right technology selection, and highly effective change management processes.

**Questions**

1. What is a business process? Give three examples.
2. What is the difference between business deliverables and objectives?
3. List and give examples of the three components of a business process.
4. Explain the differences between formal and informal processes.
5. What is an SOP?
6. What is the purpose of BPM?

### 1.3 IT Innovation and Disruption

Digital technology creates new markets, businesses, products, and careers. As digital changes the way consumers and retailers buy and sell products, companies must adapt and innovate to ensure their product offerings, platforms, technologies, and search options cater to these changing needs.

**Social–Mobile–Analytics–Cloud (SMAC) Model**

We are in the era of social-mobile-analytics-cloud (SMAC) computing that is reshaping business strategies and day-to-day operations (Figure 1.6).
The cloud consists of huge data centers accessible via the Internet and forms the core by providing 24/7 access to storage, applications, and services. Handhelds and wearables, such as FitBit, Pebble, and the Apple Watch, and their users form the edge. Social channels connect the core and edge. The SMAC integration creates the technical and services infrastructure needed for digital business. This infrastructure makes it possible to meet the expectations of employees, customers, and business partners given that almost everyone is connected (social), everywhere they go (mobile), gets the information they need (analytics), and has 24/7 access to products and services (cloud).

Here are three examples of SMAC’s influence:

1. **Powerful social influences impact advertising and marketing** Connections and feedback via social networks have changed the balance of influence. Consumers are more likely to trust tweets from ordinary people than recommendations made by celebrity endorsements. And, negative sentiments posted or tweeted can damage brands.

2. **Consumer devices go digital and offer new services** The Nike+ FuelBand wristband helps customers track their exercise activities and calories burned. The device links to a mobile app that lets users post their progress on Facebook.

3. **eBay’s move to cloud technology improves sellers’ and buyers’ experiences** The world’s largest online marketplace, eBay, moved its IT infrastructure to the cloud. With cloud computing, eBay is able to introduce new types of landing pages and customer experiences without the delay associated with having to buy additional computing resources.

The balance of power has shifted as business is increasingly driven by individuals for whom mobiles are an extension of their body and mind. They expect to use location-aware services, apps, alerts, social networks, and the latest digital capabilities at work and outside work. To a growing extent, customer loyalty and revenue growth depend on a business’s ability to offer unique customer experiences that wow customers more than competitors can.

**Technology Mega Trends**

For 21st-century enterprises, connectivity, big data and analytics, and digitization are technology mega trends that cannot be ignored. Business breakthroughs and innovation would be impossible without them. They also mark the difference between outdated 20th-century business models and practices and those of today’s on-demand economy.

The most influential IT mega trends driving digital transformation of companies in the on-demand economy are discussed next.

**Connectivity** Companies need to connect with consumers and business partners across multiple channels and devices using digital platforms that consist of hardware (mobile apps), networks (social media), (embedded sensors), and cloud computing.

For example, rather than run applications or programs from software stored on a computer or server owned by the company, cloud computing allows companies to access the same kinds of applications through the Internet. Major business cloud computing providers include Amazon Web Services (AWS), Cisco Powered, Dell Cloud Solutions, Google Cloud, IBM Cloud Solutions, and Teradata Cloud. One of the many benefits of cloud is that it provides the flexibility to acquire or expand connectivity and computing power as needed for operations, business transactions, and communication.

Expanded connectivity supports smart products, which have the ability to sense, process, report, and take corrective action, such as smart clothing, watches, phones, to smart buildings and smart cities. This IoT is becoming a driving force in the on-demand economy.

Connectivity pushes other sub trends, like big data, to create market opportunities for new products and services, such as social sentiment analysis, open innovation, new insurance business models, and micro personalized marketing and medicines. Big data is one of the many disruptive technologies that are impacting people, processes, and profits.
Big Data and Data Analytics  There is no question that the increasing volume of data can be valuable, but only if they are processed and available when and where they are needed. The problem is that the amount, variety, structure, and speed of data being generated or collected by enterprises differ significantly from traditional data. Big data are what high-volume, mostly text data are called. Big data stream in from multiple channels and sources, including the following:

- Mobile devices and machine-to-machine sensors embedded in everything from airport runways to casino chips (Later in this chapter, you will read more about the IoT.)
- Social content from texts, tweets, posts, blogs
- Clickstream data from the Web and Internet searches
- Video data and photos from retail and user-generated content
- Financial, medical, research, customer, and business-to-business transactions.

Big data are 80% to 90% unstructured. Unstructured data do not have a predictable format like a credit card application form. Huge volumes of unstructured data flooding into an enterprise are too much for traditional technology to process and analyze quickly. Big data tend to be more time-sensitive than traditional (or small) data. Data collected from social, mobile, and other channels are analyzed to gain insights and make smart decisions that drive up the bottom line. Machine-generated data from sensors and social media texts are main sources of big data.

Big data has been one of the most disruptive forces businesses have seen in a long time. But when an enterprise harnesses its data and is able to act on analytic insights, it can turn the challenges into opportunities.

Digitization  Across industries, companies are attempting to transform their disconnected or disjointed approaches to customers, products, services, and operating models to an always-on, real-time, and information-rich marketplace. Some leaders are redesigning their capabilities and operating models to take full advantage of digital technologies to keep step with the “connected” consumer and attract talent. Others are creating qualitatively new business models—and tremendous value—around disruptive digital opportunities. In doing so, these companies secure not only continued relevance but also superior returns.

Digitization often requires that old wisdom be combined with new skills, for example, by training a merchandising manager to program a pricing algorithm and creating new roles, such as user-experience designer. The benefits of digitizing processes, through business process reengineering, are huge. By digitizing information-intensive processes, costs can be cut by up to 90% and turnaround times improved by several orders of magnitude.

Examples span multiple industries. For example, one bank digitized its mortgage application and decision process, cutting the cost per new mortgage by 70% and slashing time to preliminary approval from several days to just one minute. A telecommunications company created a self-serve, prepaid service where customers could order and activate phones without back-office involvement. A shoe retailer built a system to manage its in-store inventory that enabled it to know immediately whether a shoe and size was in stock—saving time for customers and sales staff. An insurance company built a digital process to automatically adjudicate a large share of its simple claims.

In addition, replacing paper and manual processes with software allows businesses to automatically collect data that can be mined to better understand process performance, cost drivers, and causes of risk. Real-time reports and dashboards on digital-process performance enable managers to address problems before they get out of control. For example, quality issues in a company’s supply chain can be identified and remedied more rapidly by monitoring customer buying behavior and feedback in digital channels.

Machine-to-Machine Technology  Sensors can be embedded in most products. Objects that connect themselves to the Internet include cars, heart monitors, stoplights, and appliances. Sensors are designed to detect and react, such as Ford’s rain-sensing front wipers that use an advanced optical sensor to detect the intensity of rain or snowfall and adjust wiper speed
Internet of Things (IoT) refers to a set of capabilities enabled when physical things are connected to the Internet via sensors.

Accordingly, **Machine-to-machine (M2M) technology** enables sensor-embedded products to share reliable real-time data via radio signals. M2M and the Internet of Things (IoT) are widely used to automate business processes in industries ranging from transportation to health care. By adding sensors to trucks, turbines, roadways, utility meters, heart monitors, vending machines, and other equipment they sell, companies can track and manage their products remotely.

When devices or products are embedded with sensors, companies can track their movements or monitor interactions with them. Business models can be adjusted to take advantage of what is learned from this behavioral data. For example, an insurance company offers to install location sensors in customers’ cars. By doing so, the company develops the ability to price the drivers’ policies on how a car is driven and where it travels. Pricing is customized to match the actual risks of operating a vehicle rather than based on general proxies—driver’s age, gender, or location of residence. Table 1.2 lists a number of opportunities for improvement through the application of embedded physical things.

**TABLE 1.2 Improvement Opportunities from Embedded Sensors**

<table>
<thead>
<tr>
<th>Industry Sector</th>
<th>Application</th>
<th>Payoff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil and gas</td>
<td>Exploration and development rely on extensive sensor networks placed in the earth’s crust. Sensors can produce accurate readings of the location, structure, and dimensions of potential fields</td>
<td>Lower development costs and improved oil flows</td>
</tr>
<tr>
<td>Health care</td>
<td>Sensors and data links can monitor patients’ behavior and symptoms in real time and at low cost allowing physicians to more precisely diagnose disease and prescribe treatment regimens</td>
<td>Reduce hospitalization and treatment costs by $1 billion per year in the United States</td>
</tr>
<tr>
<td>Retail</td>
<td>Sensors can capture shoppers’ profile data stored in their membership cards to help close purchases</td>
<td>Additional information and discounts at point of sale</td>
</tr>
<tr>
<td>Farming</td>
<td>Ground sensors can take into account crop and field conditions and adjust the amount of fertilizer that is spread on areas that need more nutrients</td>
<td>Reduction in time and cost</td>
</tr>
<tr>
<td>Advertising</td>
<td>Billboards can scan people passing by, assessing how they fit consumer profiles, and instantly change displayed messages based on those assessments</td>
<td>Better targeted marketing campaigns; flexibility; increased revenues</td>
</tr>
<tr>
<td>Automotive</td>
<td>Systems can detect imminent collisions and take evasive action, such as automatic braking systems</td>
<td>Potential accident reduction savings of more than $100 billion annually</td>
</tr>
</tbody>
</table>

**Lessons Learned from Companies Using Disruptive Technologies**

Those companies who have adapted to change by exploiting digital technology and software are outperforming their peers. According to a survey conducted by CA Associates, companies who have turned the way they use technology from being a cost center and operational function to being a genuine competitive differentiator are reaping the benefits. Many reported doubling their revenue growth, experiencing a higher profit by a factor of 2.5 and increasing new business-based revenue by a factor of 1.5 (Vaughn-Brown, 2014). The five factors to which companies attribute these benefits can be summed up in the following Lessons Learned:

1. **Exploit the power of software**  Become “app-centric” and extend core business functions to include software development.

2. **Develop, deliver, disrupt—quickly!**  Embrace agile development techniques and broadly implement DevOps.

3. **Boost speed and efficiency with automated programming interfaces (APIs)**  Take a managed approach to use APIs for building full-function Web applications (particularly mobile apps) and for integrating back-office systems.
4. **Leverage third-party innovation**  Take a more managed approach to use APIs for integrating third-party services into applications and enable external developer access to systems and data.

5. **Maximize returns with smarter IT investments**  Get smarter at assessing and prioritizing IT investments to maximize return on investment and put portfolio management in place to prioritize and track IT programs.

Business opportunities and challenges presented by today’s technology innovations are on an unprecedented scale. **Cloud services**, big data, mobility, digitization, and the IoT are likely to disrupt many industries and shake up competitive positions.

Innovation is necessary for any company that wants to remain relevant, retain customers, and increase profits. Increased competition, expanded global markets, and empowered customers define today’s on-demand business environment.

### Questions

1. What are the benefits of cloud computing?
2. What is M2M technology? Give an example of a business process that could be automated with M2M.
3. Describe the relationships in the SMAC model.
4. What impacts is the SMAC model having on business?
5. Why have mobile devices given consumers more power in the marketplace?
6. Explain why connectivity is important in today’s on-demand economy.
7. In what ways is IT disrupting business?

### 1.4 IT and You

Today, IT and information systems touch nearly all aspects of our lives. IT is a part of our social life, our work, and every business process, and it is no longer the sole responsibility of the IT department. Just think about much of your day you spend interacting with technology—your iPad, PC, and smartphone. It has been reported that the average American checks his/her phone 46 times every day! That’s an increase of 35% over the 33 looks per day reported in a similar study just one year earlier. Aggregated across the 185 million American smartphone users, that’s 8 billion “looks” per day (Eadicicco, 2015).

IT impacts the way you work, the way you learn, the way you communicate and socialize and the way you entertain yourself. Today, success in any field, be it health care, marketing, finance, accounting, law, education, sports, entertainment, etc. requires much more than a cursory knowledge of IT. IT is and will remain the foundation of the global economy and is especially important in the on-demand economy.

### On-Demand Workers

A recent survey of on-demand economy (Chriss, 2016) in the United States and online talent recruiters reported an increase in people working in the on-demand economy who are enjoying a new way of working. Other facts and stats from the survey reveal the U.S. On-Demand workforce as a community of 45 million workers, the majority of whom are younger, optimistic, and urban-based (Table 1.3).

The survey also revealed that fewer and fewer people are looking for traditional employment. For example, 91% like the control over where, when, and how they work that the on-demand jobs offer them. The motivation for most is not to replace a traditional job, but to earn supplemental income (Table 1.4).
The data also shows a strong entrepreneurial drive behind people choosing on-demand work. Just over one-third of respondents owned full- or part-time business and approximately one quarter reporting they are working in the on-demand economy to build a business. This entrepreneurial spirit is reflected in the ways that on-demand worker are compensated. While the 40-hour workweek is still alive and well, sources of income have changed. Instead of one paycheck, on-demand workers typically receive their income from three different sources:

1. On-demand work
2. Contracting and consulting
3. Running a business

**Changes in Work Status** While the on-demand economy provides positive opportunities, it can also offer limited benefits and inferior infrastructure. Take, for example, the “contractor” model that companies like Uber use. Initially, Uber set the standard for on-demand business by labeling its drivers “independent contractors” and essentially claiming that all of its 160,000 drivers were self-employed. This pushed many of the costs of doing business onto the independent contractors’ shoulders and deprived them of baseline labor protections such as worker’s compensation, social security contributions, minimum wage, and discrimination protections.

This business model also allowed companies using the Uber model to sidestep federal, state, and county taxes and insurance premiums and undercuts competitors that used a traditional W-2 hiring model. However, not all on-demand businesses use the Uber model.

Some companies treat their workers as employees from the start, while others have switched to the W-2 model and both approaches are reaping benefits. Shyp CEO Kevin Gibbon posted on LinkedIn that the move to employee status was “an investment in a longer-time relationship with our couriers, which we believe will ultimately create the best experience for our customers.” After moving to the W-2 model, Shyp had only 1 out of 245 employees quit and customer complaints decreased at the package delivery company. And Instacart, a food shopping and delivery service, offered its shoppers the option to convert to part-time employees so they could offer training to ensure a consistent customer experience and greater customer satisfaction (National Employment Law Project, 2016).

Regardless of their work status, it would appear that overall on-demand workers are highly satisfied with their work environment, perhaps because it fits a unique need. Intuit’s on-demand economy survey reported the following:

- 70% of on-demand workers are satisfied with their work.
- 81% plan to continue working with the same provider over the next year.
- 63% are happier to be working in the on-demand economy.

Overall, on-demand workers are forward-looking, eager to embrace new opportunities, and want to take charge of their careers.

---

**TABLE 1.3 Profile of U.S. On-Demand Workers**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial situation had improved over the past year</td>
<td>23 million</td>
</tr>
<tr>
<td>Expected their financial situation to improve over the coming year</td>
<td>28.8 million</td>
</tr>
<tr>
<td>Under 35 years of age</td>
<td>23 million</td>
</tr>
<tr>
<td>Live in urban areas</td>
<td>18.45 million</td>
</tr>
</tbody>
</table>

**TABLE 1.4 Motivation to Work in the On-Demand Economy**

<table>
<thead>
<tr>
<th>Motivation</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earn supplemental income</td>
<td>63</td>
</tr>
<tr>
<td>Create and control their own schedule</td>
<td>46</td>
</tr>
<tr>
<td>Turned to on-demand work because they couldn’t find another traditional job</td>
<td>11</td>
</tr>
</tbody>
</table>
IT Adds Value to Your Performance and Career

Whether you join the ranks of the on-demand workers, or choose to stay in a traditional job, IT can greatly enhance your performance at work and the ways you move through your career path.

Staying current in emerging technologies affecting markets is essential to the careers of knowledge workers, entrepreneurs, managers, and business leaders—not just IT and CIO.

In the current marketplace, organizations are finding it particularly difficult to find qualified IT Talent, as illustrated in IT at Work 1.2.

IT at Work 1.2

Scott Zulpo Is Facing Stiff Competition

He’s adding a senior project manager, a network analyst, and a help desk worker to his 55-member IT staff at BCU, a Vernon Hills, Illinois-based credit union where he is vice president of IT.

And, Zulpo will need to add even more people to keep up with an increasing demand for tech-driven innovations.

“The challenge is twofold—first finding talent, and then determining if that talent has the skills, experience and personality to thrive in the position,” says Zulpo, who’s mindful that “the cost and impact of not hiring an ‘A’ player is huge.”

Zulpo has his work cut out for him. He’s hiring at time when very few IT professionals are out of work. Consequently, competition for tech talent is fierce. The unemployment rate for tech workers is about 2%, according to reports on recent data from the U.S. Bureau of Labor Statistics (Bureau of Labor Statistics, 2016).

And, Zulpo isn’t the only one who’s having a difficult time finding good IT talent. Many of his fellow IT leaders are seeking the same skills. Computerworld’s Forecast 2017 survey of 196 IT professionals found that both project management and technical support were among the top 10 most sought-after skills among companies that plan to recruit in the new year.

“The IT labor market is still very hot. The candidate is very much in the driver’s seat,” says Jason Hayman, market research manager for IT staffing firm TEKsystems.

Hayman cites a government report that estimates that 500,000 to 1 million IT jobs go unfilled every year, but notes that some analysts say the figure is closer to 2 million. He says there’s a classic supply-and-demand scenario working here, with demand for talent far exceeding supply.

The takeaway is that there are not enough IT workers!


IT at Work Questions

1. What are two reasons why Zulpo had trouble finding qualified IT talent?
2. What position was Zulpo trying to fill?
3. What methods would you recommend to Zulpo help him in his efforts to recruit new IT personnel?

IT as a Career

Fueled by corporate growth, systems expansion, need for competitive or unique services to increase business and security initiatives, companies are increasing their IT hires. Companies need new tech hires who have a background in both technology and business and who can articulate IT’s value in meeting business goals. In particular, companies are seeking IT employees with skills in programming, application development, technical support, security, cloud, business intelligence, Web development, database administration, and project management.

According to the U.S. Department of Labor (2016), IT job growth is estimated at 12% from 2014 to 2024, faster than the average for all other occupations. This means about 488,500 new jobs. The median annual wage for computer and IT occupations was $81,430 in May 2015, which was considerably higher than the median annual wage of $36,200 for all other occupations. Here are some common IT jobs and their activities:

**IT managers**  Play a vital role in the implementation and administration of digital technology. They plan, coordinate, and direct research on the computer-related activities of firms. In consultation with other managers, they help determine the goals of an organization and then implement technology to meet those goals.

**Chief technology officers (CTOs)**  Evaluate the newest and most innovative technologies and determine how they can be applied for competitive advantage. CTOs develop technical standards, deploy technology, and supervise workers who deal with the daily IT issues of the firm. When innovative and useful new ITs are launched, the CTO determines implementation strategies, performs cost–benefit or SWOT analysis, and reports those strategies to top management, including the CIO.
just stand in the corner sipping your drink—and you probably leave conference reception and realizing you don’t know anyone. So you had expected. A LinkedIn manager said, “It was like arriving at a not making connections with other members at the rate executives were inviting their friends and colleagues to join, but they were less than 8 million members. Goldman noticed that existing members, provider of workforce management solutions in the cloud, transformed LinkedIn. At the time Goldman joined, LinkedIn had can be found by studying Jonathan Goldman, the person who transformed LinkedIn. At the time Goldman joined, LinkedIn had less than 8 million members. Goldman noticed that existing members were inviting their friends and colleagues to join, but they were not making connections with other members at the rate executives had expected. A LinkedIn manager said, “It was like arriving at a conference reception and realizing you don’t know anyone. So you just stand in the corner sipping your drink—and you probably leave early.” Goldman began analyzing the data from user profiles and looked for patterns to predict whose networks a given profile would land in. While most LinkedIn managers saw no value in Goldman’s work, Reid Hoffman, LinkedIn’s cofounder and CEO at the time, understood the power of analytics because of his experiences at PayPal. With Hoffman’s approval, Goldman applied data analytics to test what would happen if a member were presented with names of other members they had not yet connected with, but seemed likely to know. He displayed the three best new matches for each member based on his or her LinkedIn profile. Within days, the click-through rate on those matches skyrocketed and things really took off. Thanks to this one feature, LinkedIn’s growth increased dramatically.

**Career Insight 1.1**

**Data Scientists Analyze Business Data for Actionable Business Intelligence**

Online postings searches for data scientist are outpacing the number of job postings by more than 20% and the large business consulting firm, Price-Waterhouse-Cooper, recently announced they would be adding more than 1,000 data scientists during the next 2 years.

Big data, analytics tools, powerful networks, and greater processing power have contributed to growth of the field of data science. According to Glassdoor data (glassdoor.com, 2017), the median annual salary for data scientists in the United States is $113,436 and experienced data scientists who manage teams of 5 to 10 people are earning more than $250,000 per annum.

But, it’s not just about the money—data scientists enjoy what they do. The job is interesting, spanning many different aspects of the organization and in some cases involves analyzing community outreach programs supported by organizations.

**What Does a Data Scientist Do?**

Enterprises need people who are capable of analyzing and finding insights in data captured from a range of sources, including customer transactions, click streams, sensors, social media, log files, and GPS plots. Their mission is to unlock valuable and predictive insights that will influence business decisions and spur a competitive advantage. According to Gregg Gordon, VP of the Big Data practice group at Kornos, provider of workforce management solutions in the cloud,

> It’s not sitting in a room all day – we take our work and apply it to customer problems. We’re working and interacting with customers on a daily basis talking about real problems, then attempting to replicate, model and solve them.

An interesting example of what a data scientist can achieve can be found by studying Jonathan Goldman, the person who transformed LinkedIn. At the time Goldman joined, LinkedIn had less than 8 million members. Goldman noticed that existing members were inviting their friends and colleagues to join, but they were not making connections with other members at the rate executives had expected. A LinkedIn manager said, “It was like arriving at a conference reception and realizing you don’t know anyone. So you just stand in the corner sipping your drink—and you probably leave early.” Goldman began analyzing the data from user profiles and looked for patterns to predict whose networks a given profile would land in. While most LinkedIn managers saw no value in Goldman’s work, Reid Hoffman, LinkedIn’s cofounder and CEO at the time, understood the power of analytics because of his experiences at PayPal. With Hoffman’s approval, Goldman applied data analytics to test what would happen if a member were presented with names of other members they had not yet connected with, but seemed likely to know. He displayed the three best new matches for each member based on his or her LinkedIn profile. Within days, the click-through rate on those matches skyrocketed and things really took off. Thanks to this one feature, LinkedIn’s growth increased dramatically.

**Artist or Scientist?**

The most successful—and sought-after—data scientists possess a combination of analytical skills, technical prowess and business acumen needed to effectively analyze massive data sets while thinking critically and shifting assumptions on the fly, ultimately transforming raw intelligence into concise and actionable insights.

The LinkedIn example shows that good data scientists do much more than simply try to solve obvious business problems. Creative and critical thinking are part of their job—that is, part analyst and part artist. They dig through incoming data with the goal of discovering previously hidden insights that could lead to a competitive advantage or detect a business crisis in enough time to prevent it. Data scientists often need to evaluate and select those opportunities and threats that would be of greatest value to the enterprise or brand.

**Questions**

1. What types of IT career have the most potential in the current hiring market?
2. What factors does Zulpo take into consideration when he’s evaluating job applicants?
3. Why is IT a major enabler of business performance and success?
4. Explain why it is beneficial to be an informed user of IT.
5. Do you think IT job prospects are strong? Explain.

**Sources:** Darrow (2015), Marr (2016), U.S. Department of Labor (2016), and Bureau of Labor Statistics (2016).
IT Job Prospects  In 2017, only 2% of all IT workers are unemployed. Workers with specialized technical knowledge and strong communications and business skills, as well as those with an MBA with a concentration in an IT area, will have the best prospects. Job openings will be the result of employment growth and the need to replace workers who transfer to other occupations or leave the labor force (Bureau of Labor Statistics, 2016).

Dow Chemical set up its own social network to help managers identify the talent they need to carry out projects across its diverse business units and functions. To expand its talent pool, Dow extended the network to include former employees and retirees.

Other companies are using networks to tap external talent pools. These networks include online labor markets such as Amazon Mechanical Turk and contest services such as InnoCentive that help solve business problems.

- Amazon Mechanical Turk is a marketplace for work that requires human intelligence. Its Web service enables companies to access a diverse, on-demand workforce.
- InnoCentive is an “open innovation” company that takes R&D problems in a broad range of areas such as engineering, computer science, and business and frames them as “challenge problems” for anyone to solve. It gives cash awards for the best solutions to solvers who meet the challenge criteria.

Becoming an Informed IT User

Knowing how best to use IT and how and when to interact with IT personnel, and they with you, will help you perform better at home and at work and enable you to become an informed user of technology.

The department or functional area that handles the collection, processing, storing, analysis and distribution of information using a computer-based tool can be referred to by many names—some companies refer to it as information technology (IT), while others refer to it as information systems (IS), management information systems (MIS), IT support, IT services or computer information systems (CIS). Whatever the name, its purpose is the same—to support a company’s information needs by developing, operating, securing, and maintaining one or more information systems.

To become an informed IT user, you will learn how the six components of an information system—hardware, software, procedures, people, networks, and data—interact to provide you with the information that you need, when you need it, and in the format you need. These components will be discussed in detail in Chapter 2.

By reading this book, you will become an informed user and you gain more value from IT to improve your performance and widen your career opportunities. For example, you will learn to

- Understand how using IT can improve organizational performance
- Understand how and why IT can benefit organizational growth
- Understand how business can use IT to enhance the customer experience
- Use how companies use IT to analyze business data and offer important insights
- Be able to offer input into the development and use of IT
- Be able to recommend and select IT applications at work
- Know how to find emerging technologies to make radical improvement in business processes
- Understand how IT can facilitate teamwork and improve individual productivity
- Appreciate the importance of ethical behavior when using IT and explain the associated risks and responsibilities
- Foster your entrepreneurial tendencies to start your own on-demand business.
**Key Terms**

- agility 11
- barriers to entry 23
- big data 15
- business model 3
- business process 9
- business process management (BPM) 13
- business-to-business 15
- chief technology officers (CTOs) 19
- cloud computing 14
- cloud services 17
- competitive advantage 11
- critical success factor (CSF) 10
- cross-functional business process 9
- customer experience 7
- cycle time 22
- dashboards 12
- data analytics 3
- data science 20
- deliverables 9
- digital business model 7
- digitization 15
- flexibility 11
- informed user 21
- Internet of Things (IoT) 16
- IT consumerization 11
- IT project managers 20
- machine-to-machine (M2M) technology 16
- mega trends 14
- objectives 8
- on-demand economy 4
- productivity 7
- responsiveness 11
- social, mobile, analytics and cloud (SMAC) 13
- standard operating procedures (SOPs) 9
- SWOT analysis 19
- unstructured data 15
- wearable technology 12

**Assuring Your Learning**

**Discuss: Critical Thinking Questions**

1. Why are businesses experiencing a digital transformation?
2. More data are collected in a day now than existed in the world 10 years ago. What factors have contributed to this volume of data?
3. Assume you had no smartphone, other mobile device, or mobile apps to use for 24 hours. How would that mobile blackout disrupt your ability to function?
4. Name three highly disruptive digital technologies. Give an example of one disruption for each technology.
5. Why are enterprises adopting cloud computing?
6. What is the value of M2M technology? Give two examples.
7. Starbucks monitors tweets and other sources of big data. How might the company increase revenue from big data analytics?
8. Select three companies in different industries, such as banking, retail store, supermarket, airlines, or package delivery, that you do business with. What digital technologies does each company use to engage you, keep you informed, or create a unique customer experience? How effective is each use of digital technology to keeping you a loyal customer?
9. Describe two examples of the influence of SMAC on the financial industry.
10. What is the potential impact of the IoT on the health-care industry?
11. Why does reducing the cycle time of a business process also help to reduce errors?
12. Research firm Gartner defines competitive advantage as a difference between a company and its competitors that matters to customers. Describe one use of M2M technology that could provide a manufacturer with a competitive advantage.
13. What IT careers are forecasted to be in high demand? Explain why.
14. Why or how would understanding the latest IT trends influence your career?

**Explore: Online and Interactive Exercises**

1. Research the growing importance of the IoT. Find two forecasts of its growth. What do they forecast?
2. Go to “9 Successful Digital Disruption Examples” on the IT Business Edge website. Close the pop-up to view the slideshow and read the descriptions of each of the ways in which technology is disrupting our lives. Answer the following questions:
   a. Which of the following disruptions resonated best with you and your lifestyle? Explain.
   b. Which of the disruptions was most surprising to you? Why?
   c. Rank order the disruptions in their order of importance to you? Write a short report explaining your rankings.
Analyze & Decide: Apply IT Concepts to Business Decisions

1. A transportation company is considering investing in a truck tire with embedded sensors. Outline the benefits of this investment. Would this investment create a long-term competitive advantage for the transportation company?

2. Visit the website of UPS (ups.com), Federal Express (fedex.com), and one other logistics and delivery company.
   a. At each site, describe what information is available to customers before and after they send a package?

Case 1.2

Business Case: The Internet of Things Comes to the NFL

People love sports statistics and the more the better. Responding to this customer demand, the NFL increased the quality and quantity of statistics available to coaches and fans with radio frequency identification (RFID) chips.

Player RFID Project

When the 2015 National Football League played its first game in New England, each player was equipped with a set of RFID sensors. Each sensor, about the size of a quarter, is embedded in players’ shoulder pads and emits a unique radio frequency. Every stadium used by the NFL is equipped with 20 receivers to pick up the RFID signals and pinpoint every player on the field. It also records speed, distance traveled, acceleration in real time, and the direction the player is facing.

The NFL plans to use the data it collects to power an Xbox One and Windows NFL apps to allow fans to call up stats for each player tied into the highlight clips posted on the app. The data will also be fed to broadcasters, leveraged for in-stadium displays, and provided to coaching staff and players.

“We’ve always had these traditional NFL stats,” says Matt Swensson, senior director of Emerging Products and Technology at the NFL. “The league has been very interested in trying to broaden that and bring new statistics to the fans. Along the way, there’s been more realization about how the data can be leveraged to make workflow more efficient around the game.”

Zebra Technologies Software Vendor

The NFL’s technology partner in its IoT push was Zebra Technologies of Lincolnshire, Illinois.

Zebra was well known for its manufacturing and selling marking, tracking and printing technologies such as thermal barcode label and receipt printers, RFID smart label printer/encoders, and card and kiosk printers. As it moved into IoT and M2M applications, Zebra launched its MotionWorks Sports Solution, which powers the NFL IoT initiative. Zebra was able to develop RFID tags that blink up to 85 times per second to track motion of athletes in subseconds. Then it had to find a customer for the product—so it turned to the biggest fish in the pond—the NFL. Zebra trialed the tags by equipping more than 2,000 players, 18 NFL stadiums and officials, markers, and pylons. Over the course of the season, more than 1.7 billion sets of XY player coordinates were measured, transmitted, and stored during the games. Every stadium was connected to a command station in San Jose, California, that controls when the data are collected, where they are sent, and stores them in the cloud.

The Need for the Right People

An important lesson that Zebra learned is that generic data scientists weren’t sufficient to gain insight into the data. Zebra needed football experts. “When you look at analytics in football, you really need people. We had to go out and hire football people. The analytics from manufacturing weren’t the same as the analytics from football. We could see correlations in the data that seemed important and then found out they weren’t. We had to bring in people that had the football expertise who could say ‘Look, this is why it matters,’” said Jill Stelfox, Zebra Technologies Vice President and General Manager, Location Solutions.

The latest development in this IoT initiative is its integration with NFL’s fantasy football offerings.

Questions

1. Why did NFL equip its players with RFID tags?
2. What factors contributed to the success of the IoT initiative at the NFL?
3. What other types of IoT applications can you think of that could be used in sports stadiums?
Case 1.3

Video Case: Knowing More and Doing More

Teradata is a leading provider of big data and data analytics solutions. In a video, Teradata explains that when you know the right thing to do, you can do more of what truly matters for your business and your customers. Visit Teradata’s website, search for and view the video entitled “Manufacturing: What Would You Do If You Knew?” (the video runs for 1:26 minutes).

Questions
1. What did you learn from the video?
2. What is the value of knowing more?

References

Boland, M. "What's Driving the Local on Demand Economy?" BIA/Kelsey blog, May 5, 2015.
Chriss, A. “How the On-Demand Economy Is Reshaping the 40 Hour Work Week.” 2016.