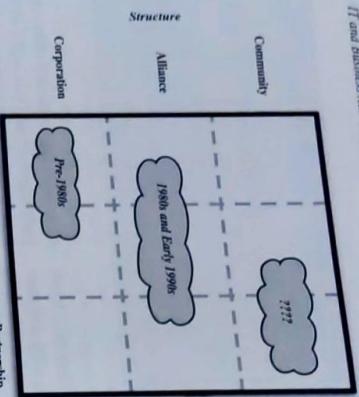


FIGURE B1.1

Impact of IT on Industry Structure and Relationships



Transactions involve the simple exchange of goods, services, and payments, usually during a specific time period and with limited interaction or information sharing between the parties involved. In *contractual relationships* the products or services to be provided by each party and the length of the relationship are well defined at the start of the relationship and are clearly documented. The formal "terms of the contract" become the basis for coordinating and controlling the exchange of goods, services, payments, and information throughout the length of the contract. *Partnerships* are required when the activities to be jointly managed are complex, uncertain, and critical to the success of the firms involved. Partnerships require shared goals, complementary expertise and skills, and integration of activities across organizational boundaries. The exchange of goods and services is ongoing, and the interactions and relationships must adapt to the changing priorities of the parties involved. Partnerships often require significant investments in systems and people for carrying out, coordinating, and controlling shared activities.

Figure B1.1 summarizes these two perspectives and shows the evolution of business networks during the latter half of the twentieth century. As you will see in later chapters, IT played an important role in this evolution.

Chapter 2

IT Impact on Business Models¹

Today's Chief Information Officers (CIOs) must enable the organization to meet its strategic goals and to envision goals that were never before possible.

Farber et al. 2008²

Long considered a tool to automate back-office activities—for example, payroll and accounts receivable—only recently has IT become an important tool for defining new strategic opportunities and building the capabilities needed to execute them. However, a huge proportion of IT investments fail to deliver their intended return each year. In the United States alone, this number is estimated at 40 percent. This phenomenon becomes even more significant when we consider that, on average, companies spend nearly 5 percent of revenues on IT.³ On a worldwide basis in 2007, CIOs invested about \$435 billion in computer equipment, \$352 billion in communications equipment, and \$336 billion in software, of which about two-thirds was for packaged software. In addition, CIOs across the globe spent \$488 billion on IT services and outsourcing, plus nearly \$660 billion on IT staff costs. Although IT investment growth is projected to slow in 2008, spending on IT services continues to grow and, in certain regions of the world, double-digit growth is the norm across all IT spending categories.⁴

This chapter presents a framework for analyzing IT impact on a company's business model. We begin by presenting a general framework that can be used to analyze the impact of an IT-enabled business initiative on business strategy and capabilities. The chapter provides numerous examples of companies that are using IT to transform their industry and company and ends with questions executives can use to assess the business model impacts of IT.

¹ Portions of this chapter are based on material developed by Professor Lynda M. Applegate for executive programs offered at Harvard Business School. Permission to reprint must be obtained from author.

² M. Farber, "The Visionary CIO: Strategy and Business," Booz-Allen Research Report (downloaded from www.strategy-business.com), p. 2.

³ Forrester's Business Technographics® November 2004, United States, SMB Benchmark Study found that enterprises spend an average of 4.9% of revenues on IT. Averages for specific industries range between 1% and 8%.

⁴ A. Bartels, E. Daley, and H. Lo, "Global IT 2008 Market Outlook" Forrester Research, February 11, 2008.

Analyzing IT Impact

As you recall, the business model of a firm defines the alignment of a company's strategy with its environment and with the capabilities required to execute strategy and deliver value to all stakeholders.⁵ Increasingly, IT has become central to designing and evolving a company's business model and value proposition. Given that a company's business model links decisions executives make to business performance, it also serves as a useful tool for analyzing the impact of IT on business performance and for framing IT investment decisions. The IT Impact Map describes the impact of IT along the two key dimensions of business model performance: strategy and capabilities.

- *IT impact on strategy* defines the role that IT plays in determining product, market, business network, and boundary positioning. It seeks to explain the mechanisms through which IT drives differentiation, sustainable advantage, and the development of proprietary assets. It also identifies the impact of IT on defining the growth path of the company over time.
- *IT impact on capabilities* defines the role that IT plays in building the capabilities needed to execute strategy. These capabilities include processes and infrastructure, people and partners, organization and culture, and leadership and governance. It is important to note that these capabilities may be located inside an organization or may be dispersed over a network of business partners. As such, it is important to analyze business network capabilities (for example, end-to-end processes and governance systems) and not just those located within the walls of an organization.

The IT Impact Map can be used to analyze the impact of a single project or it can be used to analyze a series of projects through which a company evolves its strategy over time. See Figure 2.1 for examples of how two companies have used IT to transform their business models.

Between 1994 and 2001, IBM spent significant effort reengineering and then centralizing its internal processes—starting with back-office processes (e.g., payroll, purchasing, and benefits management) and then proceeding to core operating processes such as supply chain management and new product development. These reengineered processes and internal shared services capabilities served as the foundation for launching IBM's Business Process Outsourcing (BPO) practice within its Global Services business unit. Thus, in addition to significant cost savings achieved through its reengineering efforts during the 1990s, IBM was also able to drive significant revenue growth from new service offerings that built on its internal IT-enabled business processes. Indeed, by 2002, IBM's Global Services business accounted for nearly 45 percent of the company's revenues and, by 2005, the percentage had grown to 52 percent. Today, IBM's Global Services business unit is one of three core businesses through which the company executes its strategy.⁶ Its BPO practice is now

⁵ L. M. Applegate, "Crafting Business Models Online Tutorial," Available from HBS Publishing, 2008.

⁶ See the IBM 2007 Annual Report and the company Web site www.ibm.com/itechnologyservices for more information on IBM's Global Services. Also see Applegate, et al., "IBM's Decade of Transformation: Turnaround to Growth," Harvard Business School Publishing (No. 805-130), revised April 2008. This case is reprinted at the end of Module 1 of this book.

FIGURE 2.1
IT Impact Map

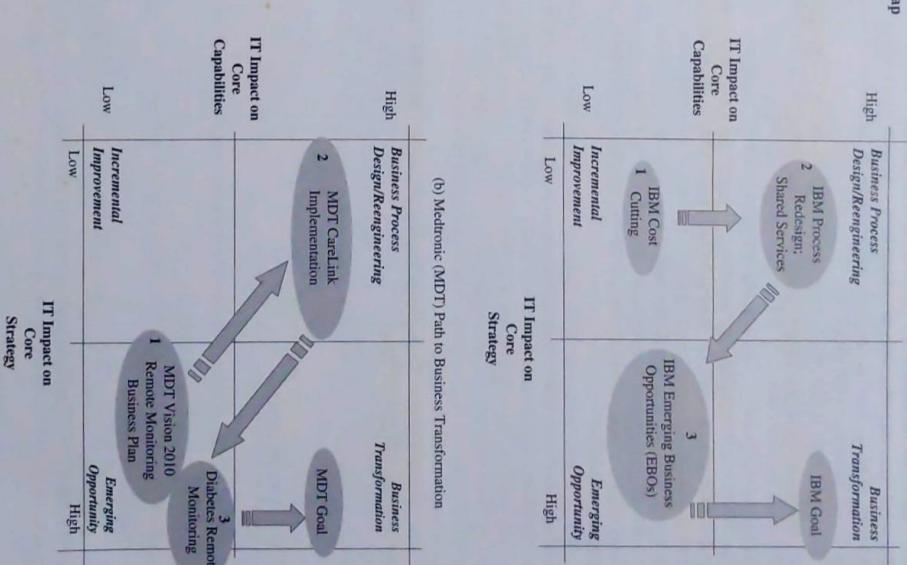


TABLE 2.1 Categories of IT Impact

IT Impact Category	Description
Local Improvements	Goal: Use IT to improve local operating performance Business Sponsors: Local managers, teams, and individuals Business Value: Reduce costs and improve local operating performance
Functional Support Processes (e.g., payroll, budgeting); IT support for team project or business intelligence for a local decision	Risk and Uncertainty: Low to moderate; loss of focus on strategic goals; scope creep Project Investment and Management: Local budgeting and management (may be ad hoc)
Business Process Design/Reengineering	Goal: Use IT to improve end-to-end operating processes Business Sponsors: Business unit and shared services leaders (may include suppliers, customers, or partners) Business Value: Reduce costs, decrease cycle time, improve organizational or extended enterprise operating performance, and automate implementation
Sample Projects: Remote monitoring service offering; launch of shared services offering; ERP or sales force automation implementation	Risk and Uncertainty: Moderate to high; business and technology complexity and volatility; organizational change; often require integration of new capabilities with existing capabilities
Process Reengineering:	Project Investment and Management: Corporate budgeting; steering committee with formal milestone reviews; change control processes and systems
Emerging Opportunities	Goal: Pursue business opportunities that enable launch of new products or businesses or entry into new markets
Sample Projects: Remote monitoring service offering; information-based product offerings	Business Sponsors: Executive committee or business unit leadership, new venture/emerging technology or business
Business Transformation	Business Value: Grow revenues and launch new businesses; enter high growth industries and markets
Sample Projects: Global services business supports core product business; interactive online business sells or supports physical service offerings or products	Risk and Uncertainty: High; new business models often involve new capabilities and may involve new technologies
Sir Winston Churchill⁷	Project Investment and Management: Staged commitments and investments based on milestones; fund "experiments" and business plans; new venture risk management
Jeff Immmons, a pioneering expert on new venture creation, described the search for opportunity as the "heart of the entrepreneurial process." ⁸ "An opportunity has the	Goal: Transform your organization and industry, differentiate strategy, and develop proprietary assets
J. Timmons, New Venture Creation: Entrepreneurship for the 21st Century (New York: McGraw Hill, 1995), pp. 3–11.	Business Sponsors: Board, executive committee; strong project leadership
⁷ See L. M. Applegate, "Medtronic Vision 2010," Harvard Business School Publishing (No. 807-052), www.medtronic.com for more information on Medtronic.	Business Value: Enable sustained capital efficient profitable growth, improve market share, and deliver sustainable competitive advantage
⁸ Quotations are from Famous Quotations, (www.famous-quotations.com; downloaded July 2004).	Risk and Uncertainty: High; new business models often require new capabilities, and may involve new technologies; organizational change; often require integration of new business models with existing business
⁹ J. Timmons, <i>New Venture Creation: Entrepreneurship for the 21st Century</i> (New York: McGraw Hill, 1995), pp. 3–11.	Project Investment and Management: Integrated with corporate strategy; board oversight with formal milestone reviews by executive committee; change control processes and systems

qualities of being attractive, durable, and timely," he continued, "and it must be anchored in a product or service that creates or adds value for the buyer or the end user." Paul Macder, founder and managing general partner of the Boston-based venture capital firm, Highland Capital Partners, explained the criteria he uses to evaluate opportunities:¹⁰

"When we invest in [early-stage start-up] businesses, [we always ask]: Is this a compelling proposition? Do we have a real shot at being first in the market? . . . Is this a compelling enough business that people are going to be drawn to it, [initially employees and] managers and ultimately customers? Are there barriers to entry that we can erect so that when other people see our good ideas, they don't pile in? Finally, can we build it with a reasonable amount of capital in a reasonable period of time?" If the answers to those questions are satisfactory, we'll typically fund it.

As can be seen from the above quotes, while the search for opportunities often begins with a creative idea-generation process, opportunity identification requires a more analytically driven evaluation of the viability of the business model.

Questions that executives can use as they search for ways to leverage IT to drive business model strategy are presented below. Chapter 3 discusses the role of IT in transforming business model capabilities.

- Can IT change the basis of competition?
- Can IT change the nature of relationships and the balance of power in buyer-seller relationships?
- Can IT build barriers to entry?
- Can IT raise switching costs?
- Can IT add value to existing products or services or create new ones?

Can IT Change the Basis of Competition?

At its core, IT is used to *automate activities*—whether they take place inside an organization or across its boundaries. But, as it automates, IT can also be used to both *inform* and to *transform*.

In the 1950s and 1960s, when IT was first introduced for commercial use, the primary target of IT applications was to automate routine, information-intensive back-office transactions (e.g., payroll processing, accounting, and general ledger postings). The primary goal was to increase efficiency and productivity. Businesses quickly learned to apply these same benefits to front-office activities that involved transactions with suppliers, distributors, customers, and other value chain participants. But the impact of IT increased dramatically when businesses learned to use it, not just to automate, but also to inform and transform—especially across business boundaries. A streamlined and integrated value chain helped eliminate redundancies, reduce cycle time, and achieve even greater efficiency and productivity. Information, a by-product of automation, also enabled executives, employees, partners, and other stakeholders to better understand fast-cycled operations. Moreover, timely—even real-time—information could be used to drive new benefits, including improved coordination and control; personalized products and services; enhanced strategic positioning and differentiation

of existing products and services; and, finally, the creation of IT-enabled products and services that attracted new market participants and generated new revenue streams.

American Hospital Supply Corporation (AHSC) and American Airlines (AA) were two early examples of how IT could be used to reengineer core operating processes and transform the basis of competition.¹¹ The story began during the late 1960s when an entrepreneurial sales manager at AHSC created a system that enabled hospital purchasing clerks to order supplies across telephone lines using punch cards and primitive card-reading computers. At about the same time, enterprising sales managers at AA were also paving new ground by giving large travel agencies computer terminals that allowed them to check airline schedules posted within American's internal reservation systems. Indeed, from these entrepreneurial actions grew two legendary strategic IT applications that changed the basis of competition in their respective industries.

Both AHSC and AA built their strategic systems upon internal systems that were originally designed to automate back-office transaction processing. AHSC, for example, first installed computers to manage internal inventory and order processing activities, and AA used computers to manage their internal reservation process. In both cases, the value of these early systems came from the ability to structure, simplify, standardize, and coordinate internal operations, thus reducing cost and cycle time while also ensuring consistency. But, once they had streamlined and structured activities inside the firm, both AHSC and AA recognized that they could allow customers to self-serve without fear of reducing quality. Because each firm had built its systems using proprietary technology, AHSC and AA owned the platforms upon which business was conducted—and they also owned the information flowing from the automated transaction systems. This information enabled executives and frontline workers to coordinate and control activities whether they took place inside the firm or outside. And, by harnessing the power of the information, both firms were able to differentiate existing services and to offer new information-based services to customers.

The benefits of conducting business online were so great that AHSC gave hospitals the card readers required to do business electronically and taught hospital supply clerks how to use them. AHSC even helped hospital personnel redesign their internal purchasing processes to fit with the new online process. AA did the same thing when it gave travel agents computer reservation terminals. Neither AHSC nor AA charged their customers for the computer equipment or the training. Why? The benefits to AHSC and AA from online purchasing, whether it was hospital supplies or seats on an airplane, more than offset the cost of giving away the terminals. For example, by 1985, AHSC saved over \$11 million per year through online ordering and generated \$4 to \$5 million per year in additional revenue.

The AHSC and AA examples demonstrate how two firms used IT to fundamentally alter the basis of competition in their respective industries. This occurred when executives implemented strategies that radically changed both the cost structure for the industry and, at the same time, differentiated product/service offering and strategic positions, causing massive shifts in market share and demand.

¹⁰ Interview with Paul Macder by Professor Lynda Applegate, March 14, 2000.

¹¹ See J. L. McKenney, and D. G. Copeland, *Waves of Change* (Boston: HBS Press, 1995); and L. M. Applegate, "Electronic Commerce," in *The Technology Management Handbook*, ed. Richard C. Dorf (Englewood Cliffs, NJ: CRC Press, 1999), for an in-depth discussion of the evolution of early strategic systems.

Charles Schwab provides a more recent example of how a firm built upon existing capabilities and technology infrastructure to radically transform its industry—in this case financial services. Founded in 1975, Schwab accomplished this feat, not once, but twice. Initially, Schwab executives placed a bet that a growing number of individual investors would prefer to save money and time by using low-cost local branch office brokerage services rather than high-priced full-service brokers. Committed management system that quickly became the channel of choice for Schwab customers. In the mid-1990s and early 1990s, Schwab pioneered online trading capabilities—well before the Internet simplified adoption. Indeed, by 1997, revenues for Schwab's discount brokerage business—a new market segment that Schwab had started, built, and dominated for over 20 years—had reached US\$2.3 billion.

When the commercial Internet appeared in the mid-1990s, Schwab was poised again to segment the market. Already, routine customer service requests (quotes, balances, positions) had migrated from Schwab branches to the call center and, to a lesser extent, to its proprietary online service. Indeed, at the time it launched its Internet online brokerage in January of 1998, only 5 percent of routine customer service was handled at a brokerage office—with the majority handled by phone. The Web-based service provided access to offline and online brokerage services for a single fee of \$29.95 per trade (compared to an average \$80 per trade for full-service brokerage commissions). Within less than one year, sales were up 19 percent. And since the online self-service business dramatically lowered costs, profits were also up 29 percent.

Today, new "born digital" firms like Google and Amazon.com and established players like Boeing and IBM are pushing the boundaries of how IT can be used to transform business strategy and capabilities. In so doing, they are redefining the basis of competition in a wide range of industries.¹²

Can IT Change the Nature of Relationships and the Balance of Power in Buyer-Seller Relationships?

As mentioned above, AHSC rose to power within the hospital supply industry by streamlining channels, dramatically decreasing cost, improving order accuracy, and streamlining the supply chain between suppliers (e.g., Johnson & Johnson, Baxter, and Abbott) and hospital buyers. Initially, AHSC used traditional offline processes to buy supplies from manufacturers and to store them in AHSC-owned warehouses. But, once it succeeded in getting a large number of customers to buy online, AHSC sought to further streamline the supply chain. Sensing they were at risk of being excluded from the market and lacking the money, expertise, and time to respond, suppliers succumbed to the pressure to put their catalogs online and join the electronic market. Once electronic links to suppliers had been established, AHSC customers could order directly from supplier inventory, which enabled further reductions in cost and cycle time for all members of the online market.

¹² Both Amazon.com & Boeing are discussed in cases located at the end of this module. Readers can learn more about how Google is using IT to transform its industry in the Harvard Business School case (No. 806-105).

Customers encouraged this channel consolidation. While they recognized the value of a multivendor marketplace, they were unwilling to put up with the problems of using multiple different supplier systems to conduct business. Within a short time, AHSC became a powerful supply chain services provider within the hospital supply industry, controlling both the physical and information channels for conducting business. In fact, this neutral, third-party distributor created such a significant shift in the balance of power toward the channel that, in 1985, it was bought by Baxter Healthcare Corporation, a hospital supplier in the industry. A few years later, responding to pressure from market participants, Baxter was forced to spin out the supply chain exchange to ensure neutrality.

Initially, many believed that the Internet might similarly shift power from suppliers (e.g., manufacturers and service providers) to channel players (e.g., wholesalers, distributors, and retailers) and buyers. Indeed, during the late 1990s, Internet-based channel players flooded the market in an attempt to gain the position of power in this new online channel.

By 2004, however, many of the independent Internet marketplaces were struggling or had closed. As neutral, independent channel players faltered, established players rushed in—initially to defend their turf and later to drive efficiencies as the economy worsened. Once again, the health care industry provided an excellent view into the continued impact of IT on the changing nature of relationships and shifting power dynamics.

In March 2000, five of the largest health care suppliers—Abbott, Baxter, GE Medical, Johnson & Johnson, and Medtronic—launched the Global Healthcare Exchange, LLC (GHX).¹³ GHX promised to eliminate inefficiencies in every step in the health care supply chain, from placing orders to tracking delivery. These inefficiencies accounted for an estimated \$11 billion in unnecessary purchasing costs.¹⁴ The five founding companies supplied over 70 percent of all products and services purchased by hospitals and did business with over 90 percent of potential buyers. Within months of the announcement of GHX's formation, more than half of the emerging independent health care Internet marketplaces disappeared as venture capital investors pulled back their funding and support in recognition that chances for success were slim given plummeting stock markets and the eroding economy.

Consolidation of the industry continued as the majority of the health care marketplace joined forces with GHX. By mid-2003, GHX's board of directors and investors included representation by the largest buyers, distributors, and suppliers in the health care industry. As one of only two remaining large online supply chain marketplaces, GHX enabled over 1,400 health care buyers and distributors to transact over \$2 billion in business with over 100 suppliers. In 2006, GHX purchased Neoforma, its last remaining health care supply chain competitor, and the industry moved to a neutral shared services platform.

¹³ For a thorough discussion of GHX, see L. M. Applegate, "Global Healthcare Exchange," Harvard Business School Publishing (No. 804-002). Also see M. L. Applegate, "Building Inter-Firm Collaborative Community: Uniting Theory and Practice," in *The Firm as Collaborative Community: Reconstructing Trust in the Knowledge Economy*, ed. C. Heckscher, and P. Adler, 2006.

¹⁴ R. Winslow, "Baxter International, Others Plan Net Concern for Hospital Purchases," *The Wall Street Journal Interactive*, March 30, 2000.

¹⁵ Both Amazon.com & Boeing are discussed in cases located at the end of this module. Readers can learn more about how Google is using IT to transform its industry in the Harvard Business School case (No. 806-105).

The GHX case provides a rare glimpse into the evolution of relationships and power dynamics within an industry as key participants in a business network worked together to drive efficiencies for all. When the Internet burst on the scene, it was initially believed that power would shift to independent channel players as they disintermediated traditional buyer-supplier relationships and sought ways to consolidate and traditional buyers regained power and sought ways to consolidate and established players regained power as independent shared services view had shifted as established players had come full circle or by an independent provider—owned by the industry (e.g., GHX or Nasdaq) or by an independent provider (e.g., Google, Amazon.com, or eBay)—provide the online platform and trusted vendor (e.g., Google, Amazon.com, or eBay)—provide the online platform and trusted vendor (e.g., Google, Amazon.com, or eBay)—provide the online platform and trusted vendor (e.g., Google, Amazon.com, or eBay)—provide the online platform and trusted vendor concerns about the increasing power and ambitions of independent online platform and shared service providers such as Google.

Can IT Build Barriers to Entry?

Companies erect entry barriers by offering attractive products and services at a price and level of quality that competitors cannot match. Entry barriers can also be erected when companies possess assets and specialized expertise that would be costly, time consuming, and difficult to duplicate. Before the rise of the commercial Internet, first movers like ABSC and AA spent hundreds of millions of dollars over decades to establish a dominant position within electronic markets. The sheer magnitude of the investment and expertise required to build and operate proprietary networks, transaction systems, and databases created significant barriers to entry. For example, American Airlines and archival United Airlines each spent hundreds of millions of dollars during the late 1970s and early 1980s to build the proprietary networks and computer systems required to launch and run online customer reservation systems. By the time other airlines recognized the opportunity—and threat—they were forced to tie into these two dominant online channels or risk being cut off from customers.

Over time, however, these technology-based advantages decreased. The more sustainable advantage came from second-order barriers to entry created when companies exploited the value of information generated by the technology and leveraged proprietary capabilities and assets to continuously innovate and evolve business strategy. Second-order barriers to entry were also erected by leveraging a loyal and engaged community of suppliers, customers, and partners that did business using a company's proprietary digital infrastructure and assets.

Initially, many believed that the overall impact of Internet technologies would be to lower entry barriers for all players in online markets.¹⁵ This belief arose from the fact that Internet technologies dramatically lowered the cost of creating and participating in electronic markets. In addition, the shared, nonproprietary nature of the Internet made it easy for market participants to link to a shared, nonproprietary platform for conducting business online and, more importantly, to sever ties with one firm and link to another.

After more than a decade of use, we have seen that the Internet's low cost and ease of penetration decrease the benefits to any one participant unless people within an organization are able to:

- Build proprietary capabilities that are not easily replicable.
- Create a large, loyal community that remains committed and engaged despite the availability of seemingly comparable alternatives.

As we saw in the past, these capability and community barriers provide a sustainable entry barrier—even within open, standard electronic markets. In most cases, we see that incumbent firms with large investments in proprietary infrastructure and channels to market are at a particular disadvantage relative to new entrants when attempting to create and quickly deploy second-order barriers to entry.

Amazon.com, one of the most celebrated new entrants of the dot-com era, provides an example of how new technology can lower entry barriers in an established industry. But, as we will see, while entry barriers were initially low, Amazon's initial online retail business model required the company to take ownership of physical inventory. This, in turn, required significant investments in building an online offline retail infrastructure. While building and deploying the infrastructure delayed profitability, the company eventually found ways to capitalize on the infrastructure it had built, the community it had connected, and what it had learned, turning a profit during fourth quarter 2001—and building significant barriers to subsequent entry.

In July 1995, Jeff Bezos, Amazon's CEO and founder, launched his online bookstore from a 400-square-foot warehouse (about the size of a one-car garage) with only a few personal computers and a high-speed connection to the Internet. The company quickly became the number one online bookstore. Just two years after launch, sales had reached \$148 million and the number of customers exceeded 2 million.

During its third year, Amazon executives demonstrated that the initial success in quickly dominating the online book market could be repeated. During the summer and fall of 1998, Amazon opened new online music and video "stores" and achieved the number one position in online music sales within four months and the number one position in online video sales within a record 45 days.

At this point, Amazon's success was due to the fact that the Internet had lowered entry barriers to the detriment of established players. But there was a deeper lesson here. Established competitors, such as Barnes & Noble, Borders, and Bertelsmann (in Europe), were not blind to Amazon's early success; they invested heavily but were unable to catch up. Why? Many erroneously believed that Amazon's dominance came from its first-mover advantage. While this was important, in other instances first movers were quickly crushed. CDNow, for example, was overtaken by Amazon.com in short order.

The secret to Amazon's success in entering and dominating multiple industries was the capabilities that it built behind its Web site to execute strategy. During 1999 and 2000, Amazon executives spent over US\$400 million building a sophisticated, Web-based order fulfillment capability that enabled the company to fulfill orders for over 31 million units during the six-week 2000 holiday period from mid-November to the end of December. Over 99 percent of orders arrived on time.

¹¹ M. Porter, "Strategy and the Internet," *Harvard Business Review*, March 2001.

74 Module One IT and Business Advantage Like the success stories from the 1980s, the automated transaction infrastructure generated valuable information that, in Amazon.com's case, was fed into a sophisticated business intelligence infrastructure that allowed executives and employees at all levels to develop a real-time understanding of the dynamics of the marketplace and the needs of individual consumers and business customers. Amazon employees used the insights gained to coordinate internal operations—not only inside the firm but also across organizational boundaries to personalize its online services in a way that understanding of customer preferences to feed valuable information to suppliers. designed to be easy to use by individuals with little to no background in finance or technology enabled Amazon to develop powerful barriers to entry that, to date, competitors have been unable to match. In Bezos' words:

The number of loyal customers increased quickly and, by late 2000, over 25 million people shopped on Amazon. These proprietary capabilities (which united people and technology) enabled Amazon to develop powerful barriers to entry that, to date, competitors have been unable to match. In Bezos' words:

Amazon.com's platform includes its brand, customers, technology, distribution capability, Amazon.com's platform with a passion for innovation and serving deep e-commerce expertise, and a great team with a "tipping point," where this platform allows us to launch new e-commerce businesses faster, with a higher chance of success, and a clearer path to scale experience, a lower incremental cost, a higher chance of success,¹⁶

By mid-2001, however, many wondered whether these proprietary assets would be enough. After the rapid decline in the price of Internet stocks during 2000 and the loss of investor confidence in online business models, the company found that sources of financing had dried up. Amazon executives altered the company's strategy and business model away from a dependence on retail product sales and toward a services model in an effort to attain profitability more quickly. This new strategy paralleled the approach used by AIGSC and AA during the 1980s to shift from selling products to selling capabilities and expertise. The Amazon.com case, at the end of this module, tells this fascinating story and highlights the role of proprietary IT-enabled capabilities and assets in transforming organizations and industries.

Can IT Raise Switching Costs?

To provide a sustainable source of revenues, an IT system should ideally be **easy to start using but difficult to stop using**. Customers drawn into the system through a series of increasingly valuable enhancements should willingly become dependent on the system's functionality. Once use of the system becomes ingrained within day-to-day activities, switching to another system becomes difficult and costly.

In the past, when proprietary technologies were the norm, switching costs were high because switching usually required buying into different proprietary networks and systems owned and operated by another online service provider. As a result, first movers such as American Airlines in the travel industry, American Hospital Supply in the hospital supply industry, or Wal-Mart in the retail industry were able to hold customers and suppliers hostage. On the public Internet, however, the cost of a simple connection is relatively low and the technologies required to participate are not

proprietary. As a result, switching costs are often substantially reduced. For example, the cost to a customer of switching from shopping at Amazon.com to shopping at Barnes & Noble's online store is merely a few keystrokes' effort. Easy switching also makes for easy price comparisons, which led many to believe that it would be difficult to achieve strong customer loyalty.

While there appears to be a certain inevitability to this logic, savvy executives (for example, Scott Cook at Intuit) have identified ways to exploit the power of the Internet to increase, rather than decrease, switching costs. Launched in 1983, Intuit provided low-cost financial services software (Quicken, TurboTax, and QuickBooks) that were designed to be easy to use by individuals with little to no background in finance or technology. Initially, the products "hooked" the user by providing a much simpler and easier way to complete time-consuming and repetitive tasks. By also providing a simple way to store personal information, which would have to be re-entered if a customer switched to a different product, the company kept users hooked over time. This strategy enabled Intuit to quickly become the market leader for individual and small business financial software with over 80 percent market share across its product line and over 90 percent retention rates. Throughout the 1990s, the company continued to maintain this position despite aggressive competition by software giant Microsoft. A decade after launching its first software product, the company launched an online financial services portal, Quicken.com, to complement and extend its packaged software offerings. By linking its Internet business to the company's traditional desktop software, Intuit was able to transition users from its desktop product line to a less costly Internet product line while also offering an even easier to use and more useful set of services. By 2001, consumers and small business owners could pay bills and bank online, calculate and pay taxes, and manage a portfolio of investments. Small business owners could also manage payroll, inventory, and customer accounts, could purchase supplies. As these features were added to the service, and as customers benefited from their ease of use and convenience, switching became more difficult. Changing an online bill paying service, for example, involved setting up relationships between the new service and each company to be paid.

Intuit used the lessons learned from its successful software business to guide the launch and evolution of its Internet business. Careful attention was paid to creating a service offering that provided a unique value proposition for customers and that hooked users to its offering by providing a simple and easy-to-use way to complete time-consuming and repetitive tasks. And, once users invested the effort to store personal information and to set up online transaction relationships, it became much harder to switch. Using these principles, within less than one year of launch, Intuit's online version of its TurboTax software gained over 80 percent market share in the highly competitive market for online tax preparation and filing.

Can IT Add Value to Existing Products or Services or Create New Ones?

In addition to lowering cost, improving quality, and changing power dynamics, IT can also add value to existing products or services and create new ones. Indeed, over the past few decades, the information content of existing products has increased markedly. For example, by 2000, there were more computer chips in a late-model car than

were in the entire U.S. Department of Defense in 1960. Today, computer chips control everything from a car's internal air temperature to the braking system, and they also provide valuable information to service mechanics and auto manufacturers to guide after-sales service and future product design. Most importantly, consumers can now tap into on-board computers, like General Motors' Onstar service, to get driving directions, make dinner reservations, contact police and rescue personnel, and even open the car door to retrieve keys inadvertently left inside. In fact, Nick Tredenick, technology analyst for Gilder Publishing, predicted that, by 2028, 99 percent of processors will be dedicated to embedded applications.¹⁷

Information-enabled products and services possess some very interesting properties. First, information is reusable. Unlike physical products, information can be "sold" without transferring ownership and "used" without being consumed. As one Internet business executive observed: "I sell information to you, and now you own it. Yet I still own it, and we both can use it." Second, information is easily customized. The same information can be presented in different forms (e.g., text, graphics, video, audio) and in varying levels of detail. It can be combined with information from other sources to communicate different messages and to create new products and services. Third, information-based products and services possess an inherent "time value." As the speed of business accelerates, the time value of information increases.

Boeing's launch of its 787 Dreamliner demonstrates the power of embedded IT to create what the company termed its "e-Enabled Advantage."¹⁸ Planes in the Dreamliner fleet are equipped with networks and on-board computers that make it possible for them to serve as "flying Internet hubs." Specialized hardware, middleware, and applications connect the cockpit and cabin flight crews with all on-ground communication and data networks and systems. This "brain on the plane" manages and routes enormous quantities of real-time data input and output within the airplane and between the airplane and the outside world. Leveraging this core infrastructure, a suite of IT applications has been developed that integrates each aspect of flight operations and forms the foundation for new services offerings that generate new revenue streams and create value for Boeing and its customers, suppliers, and partners. Examples of the systems and services included as part of Boeing's e-Enabled advantage are:

- The Airplane Health Management in-flight monitoring system provides real-time information on airplane operations, diagnostics, and maintenance to pilots, airport ground personnel, airline management, and Boeing engineers and executives.
- The Boeing Electronic Flight Bag provides pilots and flight crews with integrated solutions for managing information and communicating with maintenance, scheduling, and a wide range of other service providers in the air and on the ground.

¹⁷ Nick Tredenick presentation at the Embedded Systems Conference, April 2008.

¹⁸ L. Applegate, J. Vauchet, M. Yatz, and C. Schneiter, "Boeing's e-Enabled Advantage," Harvard Business School Publishing (No. 806-106), 2006. Also see Nolan et al., "Boeing 787: The Dreamliner," Harvard Business School Publishing (No. 303-101).

The Portable Maintenance Aid provides mechanics and engineers with real-time information and diagnostic and monitoring systems to resolve technical issues at the work site, in the hangar, in the office, or on the flight line, and to troubleshoot airplanes in minimum time.

Integrated resource planning and supply chain software enables Boeing to provide hosted airline materials management for the industry. This has resulted in improved service level reliability, lower parts costs, lower inventory, and streamlined logistics, while also enabling Boeing to leverage its supplier partnerships for improved asset management and supply chain functionality throughout the airline industry.

Hosted Operations Control enables Boeing to provide airline customers and partners with a full suite of flight planning, logistics, and real-time operations control services.

Business intelligence information and tools are available to operations personnel and executives at Boeing, its airline customers, and the myriad suppliers and partners that make up the airline business network.

MyBoeingFleet.com, a portal available to airplane owners, operators; Maintenance, Repair, and Overhaul operators (MROs); and other third parties, provides direct and personalized access to information essential to the operation of Boeing-delivered aircraft.

- In-flight entertainment and communication systems provide passengers with access to video, audio, and Internet services.

To leverage its e-Enabled Advantage and deliver its new service offerings, Boeing needed new capabilities—so too did its customers, suppliers, and other members of the airline business network. Boeing built these capabilities by acquiring several high-growth airline industry software companies (e.g., Jeppesen) and by launching a Solutions Consulting business staffed with consultants, decision scientists, and information specialists with deep airline industry, technology, and business expertise. Teams of consultants worked with airline operation teams to identify opportunities to use Boeing's e-Enabled Advantage to create value for Boeing and its customers, suppliers, and partners. Sophisticated analytical models of end-to-end airline operations were built and those models, which simulated "as is" and "to be" operating processes and performance, enabled Boeing consultants and its airline partners to identify opportunities to reduce costs and improve performance that would translate to bottom-line financial performance improvements. For example, Boeing demonstrated to one airline customer how e-Enabling could help reduce fleet delays and create \$225 million value over 10 years. "The process helps Boeing establish a jointly owned value proposition with our customers. This makes us a partner rather than a supplier," said a Boeing project director for its Aviation Services Value Analysis Consulting practice. Scott Carson, who in 2008 was president and CEO of Boeing Commercial Airlines, commented: "Whatever we do in e-Enabling will never be the sole reason that people buy Boeing airplanes. But it will certainly help create a preference for Boeing airplanes in the marketplace."¹⁹

¹⁹ These quotes are from L. M. Applegate, et al., "Boeing's e-Enabled Advantage," Harvard Business School Publishing (No. 806-106), p. 11.

Sources of IT Risk

There are two key categories of risk that must always be considered when launching new business initiatives designed to evolve or transform a company's business model.

Strategic risk:

The following questions can be used to assess the impact of IT on strategic risk.

1. Can emerging technologies disrupt our current business model by enabling new business models with decidedly superior economics?
2. Can IT lower entry barriers, change industry power dynamics, or increase competitive intensity?
3. Can IT trigger regulatory action?

Project risk:
The following questions can be used to assess the impact of IT on project risk.

1. Is the project larger than our typical project?
2. How much uncertainty is there in the project? Do we know the requirements for key deliverables at the start of the project or are these requirements still evolving? (Note: Strategic uncertainties concerning market adoption, product design, or the availability of resources may influence both project and strategic risk.)
3. Do we have experience with the technology (or technologies)? If new technologies are involved, are they new to the world or just new to us?
4. Do we have the resources (time, money, talent, information) needed to implement the project?
5. Do we have the sponsorship and buy-in from key stakeholders?
6. Is the organization (including the extended enterprise and industry) ready to implement and use what we deliver?

While the Boeing case describes opportunities for creating business value by embedding IT in physical products and services, it is also possible to alter or even completely transform some products from analog to digital. For example, by 2008 books, magazines, music, videos, and games were often created, delivered, and used in a purely digital form. As mentioned earlier, these digital assets possess unique economic properties. Indeed, once information, interactions, and transactions are in digital form, they can be leveraged to increase business insight, to create new products and services, and to add value to existing ones.

The Management of Risk

While the above examples highlight the role of IT in pursuing new business opportunities, the importance of risk cannot be overlooked. Interestingly, the more successful a company is, the easier it is to forget about risk. "It's in good times that managers need to be most watchful for signs of impending danger," warns Bob Simons.²⁰ "[Success] has an uncanny way of setting a company up for trouble, if not impending attack. And, not just from outside sources such as competitors and regulators, but, just as important, from within the organization itself." While the earlier sections of this chapter focused on the impact of IT and the search for opportunities, this final section discusses IT impact on strategic risk. The text box entitled "Sources of IT Risk" provides an overview of the key categories of risk that must be addressed. Module 2 discusses approaches to managing project risk.

²⁰ R. Simons, "How Risky Is Your Company?" *Harvard Business Review*, May–June 1999, p. 85.

Summary

Exploiting IT opportunities requires vision, sound execution, and the ability to respond quickly. It also requires imagination—and a lot of creativity. This chapter presents frameworks and approaches for analyzing the strategic impact of IT projects and the role that IT plays in a company. The following questions can be used to assess IT impact, opportunities, and risks.

1. What is the business impact of IT projects currently underway in your organization? Do you have the right project sponsorship and implementation approach based on the level of impact and degree of uncertainty and risk? Identify the impact profile of the portfolio of projects in your organization. Are you focusing your resources (money, people, and time) on the right types of projects based on the strategic goals of your organization?
2. What are the opportunities for using IT to improve business model performance?
 - a. Change the basis of competition?
 - b. Change the nature of relationships and the balance of power among buyers and suppliers?
 - c. Build or reduce barriers to entry?
 - d. Increase or decrease switching costs?
 - e. Add value to existing products and services, create new ones, or enter new markets?
3. Are you identifying and managing IT risk?

The problems during the second project were traced to the fact that the executives had failed to change the way the newly streamlined and integrated processes were aligned with control, authority systems, and incentives. As a result, the real-time business intelligence and early warning systems needed to make decisions and take actions in these faster time frames were not in place. Opportunities were missed and problems went undiscovered.

Frito-Lay executives learned important lessons from the series of problems they encountered. "I don't think any of us fully appreciated how highly leveraged and integrated our business truly was until the abortive attempt at accelerating new product development," the CEO explained. "The problems were so abrupt and severe that it made a lasting impression on all of us. Two major lessons came from this situation. First, it became very clear that we needed to recast our vision for change as an enterprise-wide initiative rather than just a change within a specific function. Despite our functional organization, our operations were highly integrated. We couldn't make a change in one area without causing problems somewhere else. Second, we became aware that, as we sped up our processes, we needed to provide much more timely information to the people on the line who were being asked to respond more quickly within a much more complicated and less structured role. Finally, we needed to create a new management structure that would bring functional managers together as teams, which we called area operating teams, and provide them with the authority and accountability to coordinate and control these end-to-end processes."

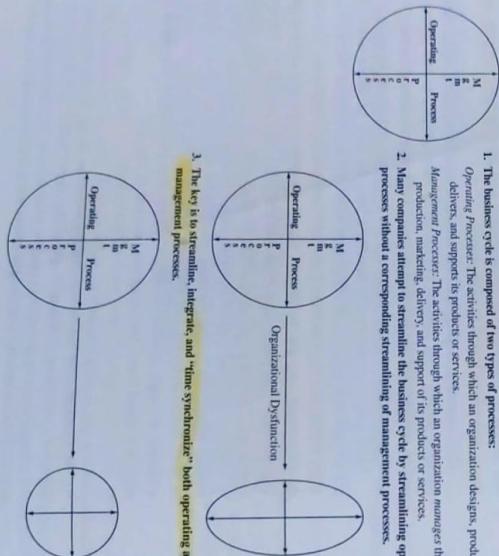


FIGURE 3.3
Streamlining
Operating and
Management
Processes

Source: © 2005 Lynda M. Applegate

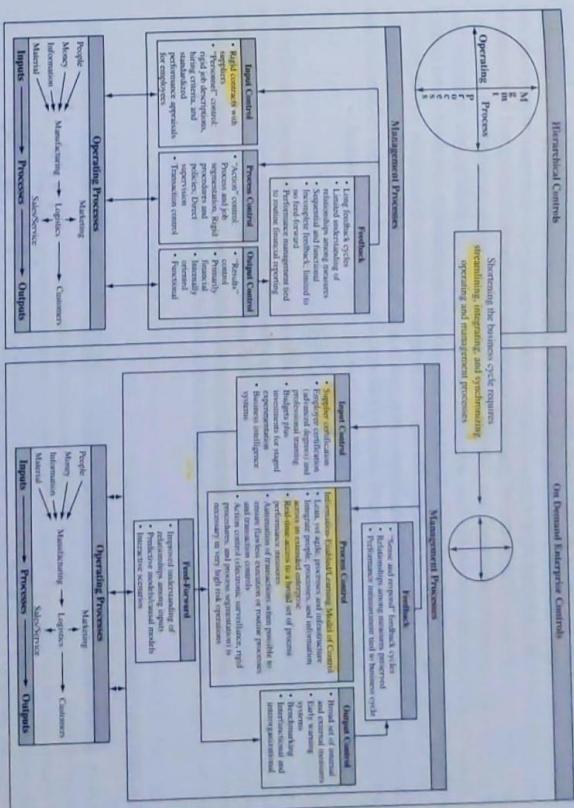


FIGURE 3.4 Redefining Control Systems

Source: © 2005 Lynda M. Applegate

When attempting to build the capabilities to sense and respond quickly and effectively, executives like those at Frito-Lay are finding that it is important to recognize that organizational control is determined by two tightly integrated sets of processes. Operating processes are the series of activities that define how a firm designs, produces, distributes, markets, sells, and supports its products and services. Management processes are activities that define strategic direction and coordinate and control operations. As executives attempt to respond to a much faster business cycle, both operating and management processes must be—not only streamlined—but also integrated and synchronized to the cycle time of the business (see Figure 3.3).

As the Frito-Lay CEO learned, the ability to share information and perspective, while also providing much faster-cycled control systems, is critical for synchronizing operating and management processes (see Figure 3.4). More recently, Con-Way, Inc. has turned to IT to enable the real-time sense and respond organization and control systems needed to ensure it can respond quickly while maintaining control of its global network.²⁵ In February 2005, when Jacqueline Baretta was appointed CIO of this \$4.2

²⁵ Learn more about Con-Way's award winning IT systems on the 2008 CIO 100 Web site at <http://www.cio.com/cio100/detail/1817> and on the company Web site's June 2, 2008 Press Release.