

Reengineering Order Management

- Customer relationship management systems using corporate intranets and the Internet.
- Supplier-managed inventory systems using the Internet and extranets.
- Cross-functional ERP software for integrating manufacturing, distribution, finance, and human resource processes.
- Customer-accessible e-commerce Web sites for order entry, status checking, payment, and service.
- Customer, product, and order status databases accessed via intranets and extranets by employees and suppliers.

FIGURE 2.12

Examples of information technologies that support reengineering the order management processes.

To build or to buy? Software, that is. This is one of the most enduring, persistent questions in the world of IT. Should a company license (i.e., buy) a commercial application that will do 75 percent of what is needed, or should it develop its own applications that will support the requirements as closely as possible? The traditional answer has been that one buys to standardize—that is, to automate necessary but not strategic business processes—and builds to compete—that is, to support those core processes that make your company different from its competitors.

But things may be more complicated than that. In some cases, homegrown systems may currently be handling menial, less-than-strategic tasks, but switching costs make it difficult to replace them with commercial software. In other cases, packaged software may do exactly what the company needs, even if those needs are strategic in nature. Then, why develop your own?

Many IT executives will evaluate commercial software before even considering building their own. Buying commercial software as often as possible frees up resources for those times when you really, really need to build your own software. When making those decisions, it is important to understand the entire life cycle of software applications and not only the development stage. Many applications will last at least seven or eight years, and due to ongoing maintenance and improvements, 70 percent of the costs will be incurred after the software has been officially implemented. It thus seems that buying or building may be much more complicated than previously thought.

Consider financial services giant Visa. Due to a major emphasis on security, reliability, and privacy concerns of its customers, Visa has an IT organization that is historically biased toward building in-house. This is also due to the sheer size of their global financial network—when you are that large, there is really nobody else you can turn to; all other provider organizations are small in comparison, and the benefits are just not there. However, even an IT organization that traditionally builds can turn to commercial software—even open-source software, of all things—when the economics make sense. Infrastructure and tools are just an example.

“They work, and there is no competitive advantage to build,” says David Allen, a consultant who served as Visa’s CTO for three years. “Those systems are built at a scale because you’re leveraging the technology across many companies.” Further, the the company has embraced the availability of mature and reliable open-source tools, particularly in areas such as development, databases, and programming languages. “The combination of low-cost tools and having the source code available can be like getting the best of both worlds [of buying and building],” Allen says. “We have gotten as good if not better in deploying new services on open source as on commercially available software like Windows.”

To Build or to Buy—Is That Really the Question?

The best bet may be to put together all available data about business processes, assets and requirements, people, software, hardware, architecture, and compliance and present it with detailed alternatives—each with its advantages and disadvantages, benefits and consequences—to the business stakeholders, and let them make that decision. Inevitably, however, politics will raise its ugly head sooner or later.

SOURCE: Traylor, P. "To build or to buy IT applications?" *InfoWorld*, February 13, 2006.

BECOMING AN AGILE COMPANY

LO 2-4

We are changing from a competitive environment in which mass-market products and services were standardized, long-lived, information-poor, and exchanged in one-time transactions, to an environment in which companies compete globally with niche market products and services that are individualized, short-lived, information-rich, and exchanged on an ongoing basis with customers.

To be an **agile company**, a business must use four basic strategies. First, the business must ensure that customers perceive the products or services of an agile company as solutions to their individual problems. Thus, it can price products on the basis of their value as solutions, rather than their cost to produce. Second, an agile company cooperates with customers, suppliers, other companies, and even with its competitors. This cooperation allows a business to bring products to market as rapidly and cost-effectively as possible, no matter where resources are located or who owns them. Third, an agile company organizes so that it thrives on change and uncertainty. It uses flexible organizational structures keyed to the requirements of different and constantly changing customer opportunities. Fourth, an agile company leverages the impact of its people and the knowledge they possess. By nurturing an entrepreneurial spirit, an agile company provides powerful incentives for employee responsibility, adaptability, and innovation.

Figure 2.13 summarizes another useful way to think about agility in business. This framework emphasizes the roles that customers, business partners, and information technology can play in developing and maintaining the strategic agility of a company. Notice how information technology can enable a company to develop relationships

FIGURE 2.13

How information technology can help a company be an agile competitor, with the help of customers and business partners.

Type of Agility	Description	Role of IT	Example
Customer	Ability to co-opt customers in the exploitation of innovation opportunities • As sources of innovation ideas • As co-creators of innovation • As users in testing ideas or helping other users learn about the idea	Technologies for building and enhancing virtual customer communities for product design, feedback, and testing	eBay customers are its de facto product development team because they post an average of 10,000 messages each week to share tips, point out glitches, and lobby for changes
Partnering	Ability to leverage assets, knowledge, and competencies of suppliers, distributors, contract manufacturers, and logistics providers in the exploration and exploitation of innovation opportunities	Technologies facilitating interfirm collaboration, such as collaborative platforms and portals, supply chain systems	Yahoo! has accomplished a significant transformation of its service from a search engine into a portal by initiating numerous partnerships to provide content and other media-related services from its Web site
Operational	Ability to accomplish speed, accuracy, and cost economy in the exploitation of innovation opportunities	Technologies for modularization and integration of business processes	Ingram Micro, a global wholesaler, has deployed an integrated trading system allowing its customers and suppliers to connect directly to its procurement and ERP systems

SOURCE: V. Sambamurthy, Anandhi Bhaharadwaj, and Varun Grover, "Shaping Agility through Digital Options: Reconceptualizing the Role of Information Technology in Contemporary Firms," *MIS Quarterly*, June 2003, p. 246.

with its customers in virtual communities that help it be an agile innovator. As we will see repeatedly throughout this textbook, information technologies enable a company to partner with its suppliers, distributors, contract manufacturers, and others via collaborative portals and other Web-based supply chain systems that significantly improve its agility in exploiting innovative business opportunities.

In today's dynamic global business environment, forming a **virtual company** can be one of the most important strategic uses of information technology. A virtual company (also called a *virtual corporation* or *virtual organization*) is an organization that uses information technology to link people, organizations, assets, and ideas.

Figure 2.14 illustrates that virtual companies typically form virtual workgroups and alliances with business partners that are interlinked by the Internet, intranets, and extranets. Notice that this company has organized internally into clusters of process and cross-functional teams linked by intranets. It has also developed alliances and extranet links that form **interenterprise information systems** with suppliers, customers, subcontractors, and competitors. Thus, virtual companies create flexible and adaptable virtual workgroups and alliances keyed to exploit fast-changing business opportunities.

Virtual Company Strategies

Why do people form virtual companies? It is the best way to implement key business strategies and alliances that promise to ensure success in today's turbulent business climate. Several major reasons for virtual companies stand out and are summarized in Figure 2.15.

For example, a business may not have the time or resources to develop the necessary manufacturing and distribution infrastructure, personnel competencies, and information technologies to take full advantage of a new market opportunity in a timely manner. It can assemble the components it needs to provide a world-class solution for customers and capture the market opportunity only by quickly forming a virtual company through a strategic alliance of all-star partners. Today, of course, the Internet, intranets, extranets, and a variety of other Internet technologies are vital components in creating such successful solutions.

CREATING A VIRTUAL COMPANY

LO 2-4

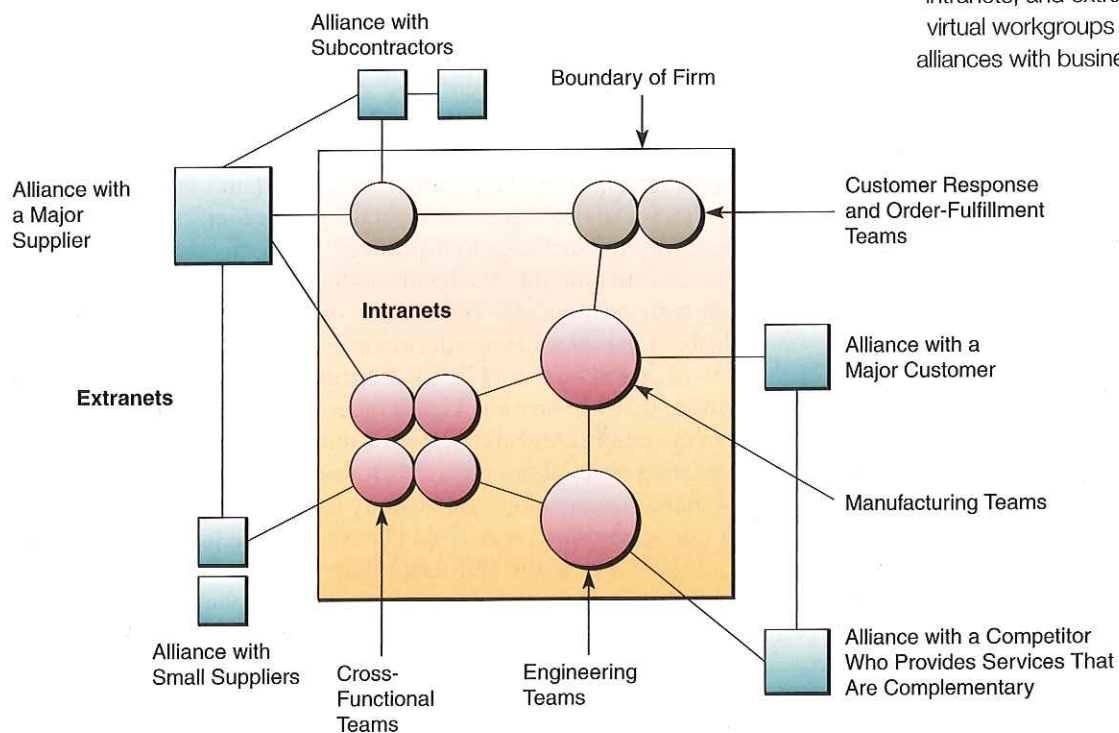


FIGURE 2.14

A virtual company uses the Internet, intranets, and extranets to form virtual workgroups and support alliances with business partners.

FIGURE 2.15

The basic business strategies of virtual companies.

Strategies of Virtual Companies
• Share infrastructure and risk with alliance partners.
• Link complementary core competencies.
• Reduce concept-to-cash time through sharing.
• Increase facilities and market coverage.
• Gain access to new markets and share market or customer loyalty.
• Migrate from selling products to selling solutions.

Sysco: Transforming a Company with the Help of IT

Sysco, headquartered in Houston, Texas, is a major distributor of food products to restaurants, schools, hospitals, and hotels and is also a provider of equipment and supplies to the hospitality and food service industries. Sysco employs approximately 45,000 with sales for the 2010 fiscal year surpassing \$37 billion. It operates more than 180 locations in the United States, Canada, and Ireland, from which it serves more than 400,000 customers. The company is organized into a series of large operating companies with geographical responsibilities, and a smaller group of specialty food companies that cater to particular segments of the market.

Sysco has embarked on a new project to standardize and unify business processes across its operating companies and distribution centers. The overarching goals of the effort are to increase efficiency and improve sales and marketing, as well as provide increased transparency through improved data management. Not surprisingly, IT is an integral part of this transformation.

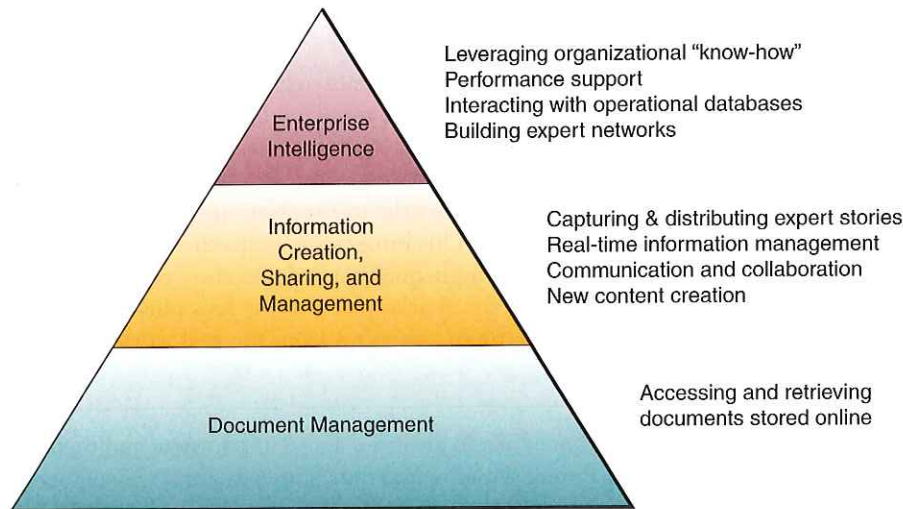
"This is more than an IT project—it is truly a business transformation," says Jim Hope, executive vice president. "Using the power of SAP as the foundation for our transformation, Sysco intends to improve productivity, retain and expand business with existing customers, and understand where market opportunities lie so we can do a better job attracting and pursuing new business."

The company chose SAP Business Suite and Business Objects business intelligence platforms as the centerpieces after a series of pilots and demonstrations convinced senior management this was the way to go. As everybody in IT knows, one of the most important keys to the success of this kind of large project is executive commitment. And so Sysco started by getting this first, and then figuring out the details later. "We're starting to pilot some of the customer-facing applications, and in particular, an improved ordering platform for our customers," said Mark Palmer, vice president of corporate communication. "So far, we're very happy with what we're seeing."

These "details" include a four-pronged approach focused on getting more and better information into the hands of their sales associates (Sysco's main point of contact with customers), a Web-based complete order management system that will also assist customers with personalized recommendations, a consolidated back office that will be shared by all affiliates, and standardized reporting across the company that will provide management with up-to-date information on all aspects of operations. And all this will be done with commercial software that will replace existing stand-alone systems that just could not deliver anymore.

"We have a tremendous opportunity to use technology to continue to sharpen our operations," says Twila Day, senior vice president and chief information officer. "SAP is the best technology provider to help us with our plans to integrate all of our software needs into a single platform, giving us the visibility required to efficiently manage our business end-to-end."

SOURCE: Schneider, I. "Sysco Taps SAP For BI, CRM," *InformationWeek*, May 6, 2010 and www.sysco.com, accessed May 9, 2011.



SOURCE: Marc Rosenberg, *e-Learning: Strategies for Delivering Knowledge in the Digital Age* (New York: McGraw-Hill, 2001), p. 70.

In an economy where the only certainty is uncertainty, the one sure source of lasting competitive advantage is knowledge. When markets shift, technologies proliferate, competitors multiply, and products become obsolete almost overnight, successful companies are those that consistently create new knowledge, disseminate it widely throughout the organization, and quickly embody it in new technologies and products. These activities define the "knowledge-creating" company, whose sole business is continuous innovation.

Many companies today can only realize lasting competitive advantage if they become knowledge-creating companies or learning organizations. That means consistently creating new business knowledge, disseminating it widely throughout the company, and quickly building the new knowledge into their products and services.

Knowledge-creating companies exploit two kinds of knowledge. One is *explicit knowledge*, which is the data, documents, and things written down or stored on computers. The other kind is *tacit knowledge*, or the "how-tos" of knowledge, which resides in workers. Tacit knowledge can often represent some of the most important information within an organization. Long-time employees of a company often "know" many things about how to manufacture a product, deliver the service, deal with a particular vendor, or operate an essential piece of equipment. This tacit knowledge is not recorded or codified anywhere because it has evolved in the employee's mind through years of experience. Furthermore, much of this tacit knowledge is never shared with anyone who might be in a position to record it in a more formal way because there is often little incentive to do so or simply, "Nobody ever asked."

As illustrated in Figure 2.16, successful knowledge management creates techniques, technologies, systems, and rewards for getting employees to share what they know and make better use of accumulated workplace and enterprise knowledge. In that way, employees of a company are leveraging knowledge as they do their jobs.

Making personal knowledge available to others is the central activity of the knowledge-creating company. It takes place continuously and at all levels of the organization.

Knowledge management has thus become one of the major strategic uses of information technology. Many companies are building **knowledge management systems** (KMS) to manage organizational learning and business know-how. The goal of such systems is to help knowledge workers create, organize, and make available important business knowledge, wherever and whenever it's needed in an organization. This information includes processes, procedures, patents, reference works, formulas, best practices, forecasts, and fixes. As you will see in Chapter 10, Internet and intranet Web

FIGURE 2.16

Knowledge management can be viewed as three levels of techniques, technologies, and systems that promote the collection, organization, access, sharing, and use of workplace and enterprise knowledge.

BUILDING A KNOWLEDGE-CREATING COMPANY

LO 2-5

KNOWLEDGE MANAGEMENT SYSTEMS

sites, groupware, data mining, knowledge bases, and online discussion groups are some of the key technologies that may be used by a KMS.

Knowledge management systems also facilitate organizational learning and knowledge creation. They are designed to provide rapid feedback to knowledge workers, encourage behavior changes by employees, and significantly improve business performance. As the organizational learning process continues and its knowledge base expands, the knowledge-creating company works to integrate its knowledge into its business processes, products, and services. This integration helps the company become a more innovative and agile provider of high-quality products and customer services, as well as a formidable competitor in the marketplace. Now let's close this chapter with an example of knowledge management strategies from the real world.

Goodwin Procter Makes a Strong Case for Knowledge Management

If anyone knows that time is money, it's an attorney. The 850 attorneys and their staff at Goodwin Procter LLP were spending too much time assembling documents and looking up information, which meant cases took more time than they should to proceed. The \$611 million law firm's eight offices used seven different applications to manage more than 2 terabytes of data for Goodwin Procter's more than 60,000 cases—close to 10 million documents. CIO Peter Lane wanted to integrate the data. Using Microsoft SharePoint, his team created the Matter Page System as a hub through which attorneys could access business data and client information.

What's more, the firm has been able to use the platform to share its notes and work in progress. It's now easy for an attorney to find a colleague who can help with a similar case. Matter Pages took a year to implement, but it immediately changed how Goodwin Procter's attorneys work.

When a client called with a question, finding the answer used to mean launching more than one application and looking up the data in different systems. Attorneys needed contact information, documents, billing information, and more. The process sometimes took hours.

"Now, instead of having to launch the different systems from the desktop, or the Web interface, or the document management system, we were able to pull all of this information into a one-stop-shop view for the users in our company," says Andrew Kawa, Goodwin Procter's development manager, who leads its system development efforts.

The system increases efficiency for the attorneys because they can find previous matters that they or others have worked on and gain extra information much more quickly than before. They spend less time researching and more time moving a case forward. The initial success of Matter Pages has Lane investigating new SharePoint features, such as wikis and blogs. He expects to deploy these new capabilities widely over the next few months.

For example, each matter has a wiki that is used to track notes, or other unstructured data that relates to it. These notes are open for editing by all users. Blogs tend to be used for discussions that are not case-specific, although when a matter or set of matters apply to the topic of the blog, users can add links to related cases.

"One of the IT goals is to take advantage of the new technology as it becomes available," Lane adds. With that goal in mind, says Lane, the Matter Pages System won't ever truly be completed. Currently, Kawa is looking to integrate Goodwin Procter's patent and trademark information with data about their patent applications from the U.S. Patent and Trademark Office. The integration would allow attorneys to retrieve real-time information on their pending patents and actions they need to take. "I don't think we will ever declare the project done or say we don't have to put any more time or effort in," he says.

SOURCE: Jarina D'Auria, "Goodwin Procter Makes Strong Case for Knowledge Management," *CIO.com*, August 1, 2008.



CenterPoint Properties— Reinventing a Company with the Help of IT

CenterPoint Properties is a large real estate company making the transition into a world-class provider of intermodal transportation and logistics solutions. Such a radical transformation in its business model requires major changes in all aspects of the organization, from capital structure and ownership to the underlying technologies needed to run the new business. And that is where IT comes in. The challenge for CenterPoint is how to best deploy new applications and functionality for a business model that is largely unique and innovative, while at the same time keeping the day-to-day aspects of the real estate business chugging along.

Early on, CenterPoint Properties realized that commercial software was not going to cut it, at least not completely. Although there is no shortage of good software on the market, most vendors typically focus on the more streamlined or commoditized part of the business: back-end processes. While those are certainly important, the company started looking for a solution that would provide all the functionality required by the new business model. "To be successful, we were going to have to buy what we could, develop what was unique and strategic, and then integrate it into a single system," says Scott Zimmerman, Chief Information Officer at CenterPoint. Out of this vision, the CUB System (CenterPoint's Universal Business System) was born.

Everyday real estate functions—the ones that are neither unique nor strategic—were addressed by implementing a leading real estate ERP package called Yardi. This allowed CenterPoint to benefit from a stable and well-tested platform that was very reliable and cost-efficient for the essential transactions that all real estate companies have to deal with, such as sending rent statements, writing and processing checks, and so on. Because the underlying technology on which Yardi was built (the Microsoft.NET framework) was compatible with CenterPoint's infrastructure, developers were able to tap into the functionality of Yardi directly from other parts of CUB, thus allowing multiple applications to communicate with each other without human intervention. This was not as straightforward as it sounds; it was necessary to fly back and forth to Yardi's offices in California, and have a number of distance meetings between developer teams. Nevertheless, the benefits outweighed those costs.

Today, large real estate projects are a team effort. Members of those teams may include CenterPoint employees—in Chicago or elsewhere—plus participants from the client company. Sometimes consultants to either of the two parties are also part of the team, and all of the various team members are likely to be geographically dispersed. In short, enabling collaboration is a key success driver for these efforts. To address this, CenterPoint developed a custom CRM (Customer Relationship Management) system on top of Microsoft's SharePoint 2007 platform. While SharePoint 2007 takes care of the "plumbing" (hosting Web sites, security and access issues, and storing all data), CenterPoint focuses on creating the tools they need. These include a separate Web site and blog for each different project that team members can use to keep updated about new developments; the Web site and blog also function as a central repository of project information that everyone can access anywhere at any time. Instant Messaging and e-mail are integrated so that all members are kept up-to-date on any new development in the project in their preferred way. The system also handles routing and approval of documents to the proper parties, as well as managing a digital library of all documents in the project—which are thus also available anytime, anywhere.

The old saying that real estate is all about "location, location, location" also holds true for CenterPoint. In order to take advantage of the most recent breakthroughs on GIS (Geographic Information Systems) technology, CUB integrates GIS functionality with Microsoft's Virtual Earth Web service. Executives can then analyze existing or potential properties by using maps and aerial images that are overlaid with demographic, market, census and economic data. These data can be rearranged to create maps exposing different aspects of the site, which are all color-coded. Examples include vacancy and rent levels, new sales and construction, sale prices in the area, population growth, age and income, and any other relevant market trends.

All of these pieces—and others still under development—are tied together by a common interface based on a mix of ASP.NET, AJAX and JavaScript. Having a single, unified "look and feel" for the application has contributed to greatly reduced training costs, as well as improved employee productivity. Indeed, the underlying goal behind the custom interface was to minimize the amount of searching

and clicking required before users could find what they were looking for. In CUB, 80 percent of the information is within one or fewer clicks of a mouse (fewer meaning that important data will be displayed in a pop-up window when a user hovers the pointer over an object). CUB also integrates RSS feeds so that users can get up-to-date information on important industry and market trends, and it implements enterprise search functionality in a single place: All data stores of the company can be searched with a single keyword search box at the top of the portal.

The key to this effort has been the ability (and willingness) to pick and choose the best technology for each job, and make them all work together. This best-of-breed approach provides CenterPoint with a unique set of applications well suited to their business needs; at the same time, the applications are highly modular and extensible for when those needs change—and they will change, that much is guaranteed. “CUB is less a story about implementing a single technology and more a case study of how to successfully integrate the best parts a given technology has to offer into a cohesive system using progressive design techniques and pragmatic analysis of problem domains to efficiently support a business strategy,” says Zimmerman.

While all of this was going on, CenterPoint Properties went private. In March 2006, the California Public Employees’ Retirement System (CalPers) agreed to purchase CenterPoint Properties. As the details of the deal were ironed out, one of the lead advisers to CalPers was not convinced: A relatively small Chicago firm with only a hundred employees would not be able to execute the vision that the executives had put in place—at least not in the time frame that was necessary for it to be successful. At that time, CenterPoint’s CEO asked the CIO to give a demonstration of CUB. That was all it took.

“Had CenterPoint not had the foresight to invest early in this system to support and drive our new business model, we wouldn’t have been able to go private and we’d be trading at \$25 per share [half of CalPers’ purchase price] like our competition instead of experiencing double-digit growth. It was the straw that broke the camel’s back,” says Mike Mullen, CEO.

CenterPoint has started to reap many of those benefits as CUB went online. The integrated nature of all data provided, as well as the efficient and automated processing of routine transactions in the background, has freed property managers to concentrate on the most value-added aspects of the business. Their productivity has markedly gone up, as well. Today, CenterPoint estimates its property managers are handling twice as much square footage as their counterparts in other real estate companies. Faster and more accurate decision making, coupled with increased deal volume per employee—both of which have been made possible by CUB—have had a major impact on business results. CenterPoint has increased the turnover rate for properties from five or six years to three, which doubled the transaction volume the company can handle from the properties in its portfolio. Since CUB was implemented, CenterPoint has increased its investment volume by 80 percent and grown at an annual rate of 15 to 20 percent without an increase in staff.

It is surprising how many companies have approached CenterPoint about purchasing or licensing CUB for their own internal use. Every time CenterPoint makes a sales pitch to a potential partner, they do a demonstration of CUB—pretty much like the one that convinced CalPers that CenterPoint was ready to make the vision a reality. Often this demonstration becomes the focus of attention, and follow-up calls ensue from other real estate executives. CenterPoint is now considering the possibility of licensing the software or, even further, acting as a service provider to other companies in the industry. None of these were on the radar when CUB was first proposed, but that is what happens when one company has a technology that is so far superior to anything else.

“While many things contributed to our success—the development of our new business plan, and our evolution into a private company—it was CUB that ultimately made our vision a reality,” says Paul Fisher, CenterPoint’s President. “Developing CUB was worth every penny.”

SOURCE: “CenterPoint Properties,” *Computerworld Honors Program Case Study*, www.centerpoint-prop.com, accessed May 9, 2011, and “Office Business Application at the Heart of Commercial Real-Estate Company’s Success,” *Microsoft Office System Customer Solution Case Study*.

QUESTIONS TO CONSIDER

1. To build or to buy is one of the central questions when it comes to provisioning technologies. How did CenterPoint choose what to buy and what to develop internally? What lessons can be synthesized from its approach that can be applied to other companies in the future?
2. What is your opinion on whether CenterPoint should possibly license CUB or act as a service provider? Do you think this would dilute CenterPoint’s competitive position? What are the advantages and disadvantages of moving forward with this idea?

- **Strategic Uses of Information Technology.** Information technologies can support many competitive strategies. They can help a business cut costs, differentiate and innovate in its products and services, promote growth, develop alliances, lock in customers and suppliers, create switching costs, raise barriers to entry, and leverage its investment in IT resources. Thus, information technology can help a business gain a competitive advantage in its relationships with customers, suppliers, competitors, new entrants, and producers of substitute products. Refer to Figures 2.3 and 2.5 for summaries of the uses of information technology for strategic advantage.
- **Building a Customer-Focused Business.** A key strategic use of Internet technologies is to build a company that develops its business value by making customer value its strategic focus. Customer-focused companies use Internet, intranet, and extranet e-commerce Web sites and services to keep track of their customers' preferences; to supply products, services, and information anytime or anywhere; and to provide services tailored to the individual needs of the customers.
- **Reengineering Business Processes.** Information technology is a key ingredient in reengineering business operations because it enables radical changes to business processes that dramatically improve their efficiency and effectiveness. Internet technologies can play a major role in supporting innovative changes in the design of work flows, job requirements, and organizational structures in a company.
- **Becoming an Agile Company.** A business can use information technology to help it become an agile company. Then it can prosper in rapidly changing markets with broad product ranges and short model lifetimes in which it must process orders in arbitrary lot sizes; it can also offer its customers customized products while it maintains high volumes of production. An agile company depends heavily on Internet technologies to help it respond to its customers with customized solutions, and to cooperate with its customers, suppliers, and other businesses to bring products to market as rapidly and cost effectively as possible.
- **Creating a Virtual Company.** Forming virtual companies has become an important competitive strategy in today's dynamic global markets. Internet and other information technologies play a key role in providing computing and telecommunications resources to support the communications, coordination, and information flows needed. Managers of a virtual company depend on IT to help them manage a network of people, knowledge, financial, and physical resources provided by many business partners to take advantage of rapidly changing market opportunities.
- **Building a Knowledge-Creating Company.** Lasting competitive advantage today can only come from the innovative use and management of organizational knowledge by knowledge-creating companies and learning organizations. Internet technologies are widely used in knowledge management systems to support the creation and dissemination of business knowledge and its integration into new products, services, and business processes.

These are the key terms and concepts of this chapter. The page number of their first reference appears in parentheses.

- | | | |
|---|--|--|
| 1. Agile company (64) | 8. Knowledge-creating company (67) | 12. Raise barriers to entry (55) |
| 2. Business process reengineering (61) | 9. Knowledge management system (67) | 13. Strategic information systems (49) |
| 3. Competitive forces (49) | 10. Leverage investment in IT (55) | 14. Value chain (59) |
| 4. Competitive strategies (53) | 11. Lock in customers and suppliers (54) | 15. Virtual company (65) |
| 5. Create switching costs (55) | | |
| 6. Customer value (57) | | |
| 7. Interenterprise information systems (65) | | |

review quiz

Match one of the key terms and concepts listed previously with one of the brief examples or definitions that follow. Try to find the best fit for answers that seem to fit more than one term or concept. Defend your choices.

- | | |
|---|--|
| _____ 1. A business must deal with customers, suppliers, competitors, new entrants, and substitutes. | _____ 9. A business finding strategic uses for the computing and telecommunications capabilities it has developed to run its operations. |
| _____ 2. Cost leadership, differentiation of products, and new product innovation are examples. | _____ 10. Information technology helping a business make radical improvements in business processes. |
| _____ 3. Using investments in technology to keep firms out of an industry. | _____ 11. A business can prosper in rapidly changing markets while offering its customers individualized solutions to their needs. |
| _____ 4. Making it unattractive for a firm's customers or suppliers to switch to its competitors. | _____ 12. A network of business partners formed to take advantage of rapidly changing market opportunities. |
| _____ 5. Strategies designed to increase the time, money, and effort needed for customers or suppliers to change to a firm's competitors. | _____ 13. Learning organizations that focus on creating, disseminating, and managing business knowledge. |
| _____ 6. Information systems that reengineer business processes or promote business innovation are examples. | _____ 14. Information systems that manage the creation and dissemination of organizational knowledge. |
| _____ 7. This strategic focus recognizes that quality, rather than price, has become the primary determinant in customers choosing a product or service. | _____ 15. Using the Internet and extranets to link a company's information systems to those of its customers and suppliers. |
| _____ 8. Highlights how strategic information systems can be applied to a firm's business processes and can support activities for competitive advantage. | |

discussion questions

- Suppose you are a manager being asked to develop computer-based applications to gain a competitive advantage in an important market for your company. What reservations might you have about doing so? Why?
- How could a business use information technology to increase switching costs and lock in its customers and suppliers? Use business examples to support your answers.
- How could a business leverage its investment in information technology to build strategic IT capabilities that serve as a barrier to new entrants into its markets?
- Review the Real World Challenge introduced in the chapter. In such a major transformative project where no one can really envision what the end product (or end company) will look like, how should organizations set out to create these technology-enabled solutions? What kind of approaches would work best? Worst?
- What strategic role can information play in business process reengineering?
- How can Internet technologies help a business form strategic alliances with its customers, suppliers, and others?
- How could a business use Internet technologies to form a virtual company or become an agile competitor?
- Consider the Real World Solution discussed in the chapter. Do you think CenterPoint Properties' success is the result of the new business model or the new technology deployed to support it (i.e., CUB)? Is it possible to distinguish one from the other? What are the implications for other companies as they seek to reinvent themselves in the future?
- Information technology can't really give a company a strategic advantage because most competitive advantages don't last more than a few years and soon become strategic necessities that just raise the stakes of the game. Discuss.
- MIS author and consultant Peter Keen says: "We have learned that it is not technology that creates a competitive edge, but the management process that exploits technology." What does he mean? Do you agree or disagree? Why?

1. End-User Computing

Skills Assessment

Not all programs are written by dedicated programmers. Many knowledge workers write their own software using familiar word processing, spreadsheet, presentation, and database tools. This textbook contains end-user computing exercises representing a real-world programming challenge. This first exercise will allow your course instructor to assess the class. Assess your skills in each of the following areas:

- Word processing:** Approximately how many words per minute can you type? Do you use styles to manage document formatting? Have you ever set up your own mail-merge template and data source? Have you created your own macros to handle repetitive tasks? Have you ever added branching or looping logic in your macro programs?
- Spreadsheets:** Do you know the order of operations your spreadsheet program uses (what does " $=5*2^2-10$ " equal)? Do you know how to automatically sort data in a spreadsheet? Do you know how to create graphs and charts from spreadsheet data? Can you build pivot tables from spreadsheet data? Do you know the difference between a relative and a fixed cell reference? Do you know how to use functions in your spreadsheet equations? Do you know how to use the IF function? Have you created your own macros to handle repetitive tasks? Have you ever added branching or looping logic in your macro programs?
- Presentations:** Have you ever used presentation software to create presentation outlines? Have you added your own multimedia content to a presentation? Do you know how to add charts and graphs from spreadsheet software into your presentations so that they automatically update when the spreadsheet data change?
- Database:** Have you ever imported data into a database from a text file? Have you ever written queries to sort or filter data stored in a database table? Have you built reports to format your data for output? Have you built forms to aid in manual data entry? Have you built functions or programs to manipulate data stored in database tables?
- File Management:** Can you store or locate a specific file on a particular storage device? If you receive an attachment on an e-mail, can you store it on your hard drive in a location where you can find it again? Can you create a specific folder for a group of related files, then

navigate to it when necessary, or direct someone else to that location?

- Internet:** Do you know how to navigate your way around the Internet? If someone gives you a specific URL, can you access that location? Do you know what a URL is? Can you modify your home page on your favorite Web browser? Do you know how to use an anti-virus program? Can you use the Status Bar to determine if a link is trying to spoof you to another site? E-mail is arguably the largest use of the Internet today. Can you send and receive e-mail, build a mailing list, and send and receive attachments?

2. Marketing: Competitive Intelligence

Strategic Marketing

Marketing professionals use information systems to gather and analyze information about their competitors. They use this information to assess their product's position relative to the competition and make strategic marketing decisions about their *product*, its *price*, its distribution (*place*), and how to best manage its *promotion*. Michael Bloomberg, founder of Bloomberg (www.bloomberg.com), and others have made their fortunes gathering and selling data about businesses. Marketing professionals find information about a business's industry, location, employees, products, technologies, revenues, and market share useful when planning marketing initiatives.

During your senior year you will find yourself in close competition for jobs. You can take the same intelligence-gathering approach used by professional marketers when planning how to sell your own skills. Use the following questions to help you prepare for your job search.

- Product:** Which business majors are presently in greatest demand by employers? Use entry-level salaries as the primary indicator for demand.
- Product:** Which colleges or universities in your region pose the greatest competitive threat to students with your major?
- Price:** What is the average salary for entry-level employees in your major and geographic region? Is salary your top concern? Why or why not?
- Place:** Which areas of the country are currently experiencing the greatest employment growth?
- Promotion:** What is your marketing plan? Describe how you plan to get your name and qualifications in front of prospective employers. How can the Internet help you get noticed?

3. Competing against Free

Wikipedia Faces Down Encyclopedia Britannica

The record and movie industries are not the only industries to find themselves affected by free access to their products. Encyclopedia Britannica faces challenges by a nonprofit competitor that provides its services without charge or advertising, Wikipedia.org. Wikipedia depends on volunteers to create and edit original content under the condition contributors provide their work without copyright.

Who would work for free? During its creation in the 19th century, the Oxford English Dictionary editors solicited word articles and references from the general public. In the 20th century, AOL.com found thousands of volunteers to monitor its chat rooms. Amazon.com coaxed more than 100,000 readers to post book reviews on its retail Web site. Outdoing them all in the 21st century, Wikipedia published its 1,000,000th English language article in March 2006. Wikipedia includes more than 2,000,000 articles in more than 200 languages, all created and edited by more than 4,800,000 million users.

Can Wikipedia compete on quality? Wikipedia provides its users with both editing and monitoring tools. This allows users to self-police. Wikipedia also uses voluntary administrators who block vandals, temporarily protect articles, and manage arbitration processes when disputes arise. A paper published by *Nature* in December 2005 evaluated 50 Wikipedia articles and found an average of four factual errors per Wikipedia article as compared with an average of three errors per article in the *Encyclopedia Britannica*. More significantly, Wikipedians (as the volunteers call themselves) corrected each error by January 2006. Alexa.com rated Wikipedia.com as the 17th most visited Web site on the Internet, while Britannica.com came in 2,858th place (Yahoo and Google ranked in first and second place).

Wikipedia has already built on its success. In addition to offering foreign language encyclopedias, it also provides a common media archive (commons.wikimedia.org), a multilingual dictionary (www.wiktionary.org), and a news service (www.wikinews.org).

One of the latest Wikipedia projects is Wikiversity, a Web site devoted to free learning, Web education, open educational resources, and collaborative learning communities (www.wikiversity.com).

- How does the Wikimedia Foundation meet the criteria for an agile company?
- How does the Wikimedia Foundation meet the criteria for a virtual company?

- How does the Wikimedia Foundation meet the criteria for a knowledge-creating organization?
- How would you recommend that Encyclopedia Britannica adapt to this new threat?
- How does Wikiversity compare as an educational resource to traditional colleges and schools? How would a degree earned online from wikiversity.com be viewed compared with a degree earned in a traditional learning environment? What learning resources are at Wikiversity that you can use to further your education right now?

4. Knowledge Management

Knowing What You Know

Employees often receive a great deal of unstructured information in the form of e-mails. For example, employees may receive policies, announcements, and daily operational information via e-mail. However, e-mail systems typically make poor enterprise-wide knowledge management systems. New employees don't have access to e-mails predating their start date. Employees typically aren't permitted to search others' e-mail files for needed information. Organizations lose productivity when employees spend time reviewing and organizing their e-mail files. Lastly, the same information might be saved across thousands of different e-mail files, thereby ballooning e-mail file storage space requirements.

Microsoft's Exchange server, IBM's Domino server, and Interwoven's WorkSite, along with a wide variety of open standard Web-based products aim to address an organization's need to share unstructured information. These products provide common repositories for various categories of information. For example, management may use a "Policy" folder in Microsoft Exchange to store all of its policy decisions. Likewise, sales representatives may use a "Competitive Intelligence" database in IBM's Domino server to store information obtained during the sales process about competing products, prices, or marketplace rumors. WorkSite users categorize and store all of their electronic documents in a large, searchable, secured, common repository. Organizations using these systems can secure them, manage them, and make them available to the appropriate personnel. Managers can also appoint a few specific employees requiring little technical experience to manage the content.

However, these systems cannot benefit an organization if its employees fail to contribute their knowledge, if they fail to use the system to retrieve information, or if the system just isn't available

where and when needed. To help managers better understand how employees use these systems, knowledge management systems include usage statistics such as date/time, user name, reads, writes, and even specific document access information.

Research each of these products mentioned above and answer the following questions:

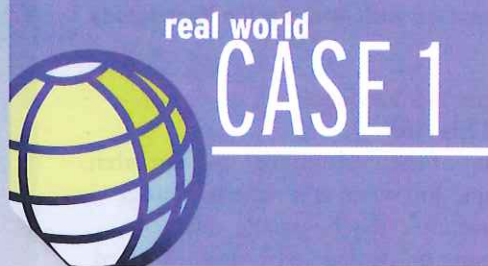
- a. What steps might a manager take to encourage his or her employees to use the organization's knowledge management system?
- b. Should managers set minimum quotas for system usage for each employee? Why or why not?
- c. Aside from setting employee usage quotas, how might an organization benefit from knowledge management system usage statistics?

5. Crowd-Sourcing Ad Reviews

Do You Like This Ad?

Marketers dream of their ads going viral, but what works, what flops, and when is it time to change approaches? Facebook may be on the verge of turning advertising on its head with its automated user feedback system. Read CNNTech's article *How Facebook killed (most) spam* (<http://bit.ly/fE5NMS>), and then answer the questions below:

- a. List each type of user-generated feedback Facebook automatically monitors.
- b. How do the users benefit?
- c. How do advertisers benefit?
- d. How does Facebook benefit?
- e. In your opinion, what obstacles will competitors have to overcome to compete with Facebook's approach to managing advertising?



How to Win Friends and Influence Business People: Quantify IT Risks and Value

CIO Tim Schaefer thinks words do matter.

He looked at the words IT used inside Northwestern Mutual Life, and felt they sent exactly the wrong message about IT's role in meeting business goals. So, over the last 18 months, these words are out: IT costs, internal customers, IT leaders, Alignment, IT systems, and "IT and the business." In are these: IT investments, external customers, business leaders, integration, service levels, IT assets, and "our business."

"We came to realize we ourselves were building the wall. We were distinguishing ourselves from the rest of the company," says Schaefer. "We were somehow different. We had all this special knowledge. So this whole concept of black box, and the gap in the relationship, we came to realize was of our own doing." As part of a broader change of IT strategy and culture, Schaefer has asked the top 150 leaders in IT to commit to being business leaders, not IT leaders.

Symbolic, semantics, and a whole lot of hoo-hah? Sure—if IT continued to behave exactly the same way it always has. At Northwestern Mutual, a life insurance and investment company with more than \$155 billion in assets, IT has not. IT started by working very hard to put a real value on IT assets. Although the process is ongoing, Schaefer says the company now knows it has IT assets worth "somewhere north of \$3 billion." It can talk about service levels in terms business units care about—that causing problems in the underwriting process costs \$11,000 an hour in lost productivity, and problems that keep the field force from using their client management tools costs \$25,000 an hour.

Schaefer's goal is to get IT systems to be viewed as a business asset, with a value every bit as real as the buildings and land the company owns. Getting there requires a portfolio approach to all of its IT assets. That's not a project portfolio approach many IT teams have, but an investment portfolio with the same type of processes the company uses to manage holdings in stocks, bonds, real estate, or private equity. Instead of considering whether to buy, hold, or sell assets, though, the IT asset portfolio assesses IT systems and applications through a framework called TIME: Tolerate, Invest, Migrate, or Eliminate.

Putting a value on an IT asset isn't easy. Northwestern Mutual's IT team does so by working hand-in-hand with

the business units that rely on them. How many more employees would it take to process claims if the software system used for that didn't exist? What's the replacement cost? What's the cost per hour to the business if it goes down? Getting an asset value is only the first step, though. All these factors go into whether and how to invest more into that asset. "If we don't do the right things with these \$3 billion worth of assets, we're not going to optimize the value," Schaefer says.

This asset-and-investment philosophy drives what IT projects the company puts money behind. Lots of companies have a technology strategy committee that helps guide IT spending, and Northwestern Mutual Life does too. "We're transitioning them into an investment management board," Schaefer says. Northwestern Mutual Life has a number of boards to guide its investment into financial asset classes on behalf of policyholders—boards that set broad strategy for where the best opportunities are for return in those categories. Discussions in the technology strategy committee are moving to that same thinking.

From that process, they've targeted specific high-return investment opportunities for technology. For example, technology that reduces barriers of time and space is on that list. Northwestern Mutual's network includes more than 7,000 financial representatives, and those in the Western U.S. states cover massive territory. Yet they're obligated to meet with clients regularly, to make sure they're recommending suitable investments. A video link that lets a Colorado-based representative do live meeting conversations with his three clients in Wyoming in a half-day instead of three days on the road offers a measurable value. There's another word that matters to Schaefer, which fits this financial discussion: partner. Of course, IT wants to be considered a partner with business units on projects, but it has a clear definition for that: IT shares the business risk and benefits, including financial, from IT investments. "We should feel as bad when they aren't meeting their objectives as they do," he says.

Conventional wisdom, decades worth of IT project failures, and less-than-desirable outcomes tell us that every tech-related investment—from a massive SAP ERP rollout to a small CRM deployment—comes with some amount of risk. In fact, according to Forrester Research VP and

principal analyst Chip Gliedman, “of all investments within an organization, investment in IT is generally assumed to have the most risk associated with it. Yet, it is surprising that IT investment has traditionally received the least amount of attention when it comes to risk management.”

Since 2003, when the software and equipment components of the U.S. GDP took their largest fall in 15 years, most CEOs have viewed technology as a cost, not an investment. Although budgets have expanded during the past few years, the growth rates have been modest, and most of the money has gone toward fortifying financial systems, while front-office systems have ranked the lowest. Companies, having neglected the customer far too long in their technology investments, are likely to start feeling the effect as frustrated customers go elsewhere. Customers’ frustration will grow all the more when they deal with clunky corporate systems after years of enjoying tremendous innovation in the consumer technology they use.

The contrast is a direct result of treating technology as a cost. This viewpoint has preserved an older set of technologies that weren’t built for the Internet. Many large enterprises are now realizing that without investment in new systems, no new wave of productivity improvement is possible. How to manage this new wave of investment, and keep costs under control, however, is still baffling to even the best of them.

The process of risk measurement has been “confounding decision makers within IT for some time,” Gliedman asserts. As a result, companies rely on weak qualitative analysis that only loosely ties to enterprise-application project outcomes, he says. Gliedman breaks down IT risk factors into two categories: implementation and impact risks. Implementation-based risks relate to areas such as project size (“the larger the project, the higher the level of uncertainty about the outcome”) and the technology and vendor (will they both deliver on the intended benefits?). Impact-based risks include cultural, training, and managerial factors that can all significantly affect any project’s outcome and benefits.

“While the risk analysis cannot on its own point to the best course of action, it can provide the additional shading

to management so that the eventual decision is an informed one,” Gliedman notes. “Likewise, expectations can be set properly, avoiding overly rosy ROI projections that will lead to inevitable disappointment.”

Most IT departments today could use help in the ongoing struggle to align IT with the business, and vice versa. Business executives are frustrated by application uptime challenges and their significant costs to the company’s bottom line, although IT isn’t fully aware of that. The business side is also not at all excited about long-term enterprise projects. As a consequence of both, business executives are feeling animosity toward IT.

Providing more risk transparency to the Mahogany Row on all IT projects could be a huge win for IT departments right now.

One more thing about the words IT uses. Schaefer and his leadership team made a deliberate choice not to rename the IT department to become the business technology department, even though that’s their mindset. They worried that a name change might sound superficial to the business units. Instead, they focused on how they talk about IT every day. The message alone doesn’t mean a thing if the IT team doesn’t act differently, by valuing IT assets and then optimizing them. But the message does matter, because it very likely reflects how IT thinks about its role in the business and how business units perceive IT. And it’s critical to changing the culture of the organization.

Schaefer has an advantage in getting the company to think and talk about IT as a financial asset. Assets, investments, and returns are the natural language at Northwestern Mutual, as a financial services company. But it is not a stretch for nonfinancial IT organizations to embrace this framework and to put hard values on IT assets.

“Listen to the words you use,” Schaefer advises.

SOURCE: Chris Murphy, “Global CIO: What’s IT Worth? Northwestern Mutual Life CIO Knows,” *InformationWeek*, March 8, 2010; Thomas Wailgum, “How to Win CFO Friends and Influence Business People: Quantify IT Investment Risk,” *CIO.com*, April 22, 2009; and Bob Suh, “Gearing Up for Recession: Technology as an Investment, not a Cost,” *Computerworld*, March 14, 2008.

CASE STUDY QUESTIONS

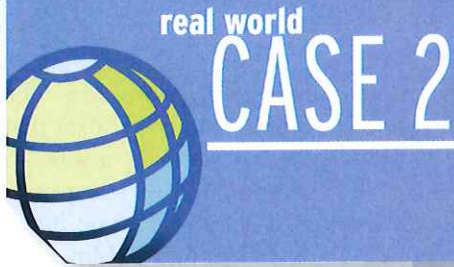
1. By changing the way his group talks about IT investments, CIO Tim Schaefer is trying to change the way the rest of the company sees IT. Why do you think this is necessary? What would be the prevailing mindset about IT in his company, such that he needs to do something about it? Provide some examples of how IT may be regarded in this organization.
2. Chip Gliedman of Forrester Research breaks down IT risks into implementation and impact considerations.

Why do you think these are so difficult to manage? What makes IT investments different from investments in other areas of a company?

3. Do you agree with the notion that IT investments can be treated in the same manner as financial investments, and similarly quantified by putting a dollar value to them? Why or why not? Would your answer change depending on the type of IT investment under consideration?

REAL WORLD ACTIVITIES

1. Do you agree with the approach and metrics employed by Northwestern Mutual to value their IT investments? Can you think of alternative ways, and how those might stack up against those discussed in the case? Break into small groups with your classmates to discuss the pros and cons of alternative approaches to valuing the impacts of IT in a company.
2. Go online and search for examples of IT projects that have been successful, and those that have failed. Make a list of the different factors that seem to influence the outcome of these implementations. Can you group them into the categories discussed in the case? Which seem to be the most important? Prepare a presentation to share your findings.



For Companies Both Big and Small: Running a Business on Smartphones

In early 2006, San-Antonio, Texas-based CPS Energy, the nation's largest municipally owned energy provider, was by all accounts riding the road to riches. The company had the highest bond ratings of any such utility provider. Its workforce and customer base in general expressed satisfaction. And most importantly, it was profitable. In other words, there were no external signs that the company was about to launch a technology program that would redefine the way it did business and reshape its workforce of roughly 4,000.

There weren't external signs, but for those in the know, including Christopher Barron, CPS Energy's vice president and chief information officer, it couldn't have been more clear that a change was imminent—and that the future of the company might depend on it. "We had a much larger workforce than a business our size maybe should have," Barron says.

Barron looked at other companies with large mobile workforces like its own, companies like UPS and FedEx, and saw a huge disparity in the way his business was operating. For instance, specific CPS workers had little or no access to IT systems and resources while away from the office or warehouse. They were often required to visit work sites or customer locations to diagnose issues or suggest fixes before reporting back to the appropriate departments or parties, which would then initiate the next step of the resolution process. That could mean dispatching additional workers, and the whole ordeal could take days.

"If we kept with the amount of manual labor that it took for us to accomplish that work, we would not be in the position to be competitive in the future," Barron says. From this realization, the company's Magellan Program was born.

Barron and his colleagues envisioned the Magellan Program as a way to better mobilize and connect its traditionally siloed workforce to the people and systems they needed to do their jobs. The goals of the program: Extend CPS's networking infrastructure, build its own secure Wi-Fi networks in offices and warehouses, and deploy smartphones and custom mobile applications to all CPS staffers who didn't currently have a laptop or other mobile device. For Barron, the first and most significant challenge in deploying smartphones to such a large user base was getting executive buy-in. "One of our biggest headaches has been, and continues to be, the perception that the technology brings little to the table other than e-mail, and it costs a lot," Barron says.

"For a CIO to try to eliminate all the resistance from a senior executive might take forever," Barron says. "So rather than try to get to the execs and mollify all their fears about cost, usage and safety, we've gone to specific groups, engineers, line workers, office workers, and because it's so cheap we've been able to give the devices out on 'experimental basis.' There's so much value in these handheld devices and two or three applications that they prove themselves," he says. "You just have to get them into the hands of the people that actually need to use them in order to demonstrate that."

Three innovative ways CPS staffers employ their smartphones are as digital cameras at work sites, as GPS tracking mechanisms, and as emergency notification receivers. In the past, CPS might have had to dispatch a small group of "generalist" workers to a service call to make sure the correct person was there. Today, a single worker can visit a site, take a photo of a damaged piece of equipment or infrastructure, and then send it back to headquarters or the office. Then an expert diagnoses the issue and sends along instructions to fix the problem or dispatches the appropriate worker—who's available immediately via voice, e-mail, and SMS text via smartphone.

"The Magellan Program, through the use of smartphones and other technology, has or will empower all employees, no matter what work they perform, to become part of the greater company's 'thought network'," Barron says. "Each person is now like a node in our network." The company is also seeing significant gains in supply chain efficiency related to Magellan and the smartphone deployment, he says. For instance, smartphones help speed up the purchase order process, because in the past a specific person or group of people needed to be onsite to approve orders. Now the approvers can be practically anywhere with cellular coverage. The company's supply chain buyers can also visit warehouses to work with the people who actually order parts, leading to faster order times, and more proactive supply chain management overall. In just one year, the time it takes to close purchasing and procurement deals decreased by more than 65 percent. Also, inventory levels were reduced by more than \$8 million dollars since the Magellan Program began.

Additionally, both employee and customer satisfaction levels are up, Barron notes, due to the fact that staffers now have more access to corporate systems and information and feel closer to the business. Because CPS can now resolve more customer issues with fewer processes, they've reduced

the time it takes to complete most service calls, leading to happier customers. In fact, the company received the highest score in J.D. Power and Associates 2007 Gas Utility Residential Customer Satisfaction Survey.

The technology, however, is no longer the exclusive purview of large companies with significant IT budgets, at least not anymore. Lloyd's Construction in Eagan, Minnesota, might not seem as though it needs flashy phone software. The \$9-million-a-year demolition and carting company has been run by the same family for the past 24 years. Lloyd's takes down commercial and residential buildings, then hauls them away. What could be more simple?

That is, if wrangling 100 employees, 30 trucks, and more than 400 dumpsters can be called simple. Coordinating those moving parts is crucial to growing the business—and to saving the sanity of Stephanie Lloyd, 41, who has run the company for the past four years. Until recently, Lloyd's used a hodgepodge of spreadsheets, paper ledgers, and accounting software on company PCs to keep track of its workers and equipment. To make matters worse, the company used radios to coordinate with its workers on the job, and the more cell phone towers that came online in Minnesota, the worse Lloyd's radio reception got. It was time, the Lloyds decided, to drag their company into the 21st-century world of smartphones.

Lloyd's considered a half-dozen mobile-productivity software suites before settling on eTrace, which happened to come from a company called GearWorks based just across town. Not only was GearWorks local, but its software worked on Sprint Nextel's i560 and i850 phones, which are aimed at the construction industry. Lloyd's had already started buying these push-to-talk phones to wean workers from their dying radios. Immediately, there were troubles with technophobic staff. Employees had to be guided up a steep learning curve in order to master even basic features on their new phones. For 18 months the two systems ran side by side: eTrace as it was phased in, and the old paper-and-pencil system as it was phased out. Accounting inconsistencies quickly crept in.

And eTrace gave rise to a delicate labor problem. The software featured integrated mapping and travel data that showed the real-time locations of all company assets. To their chagrin, the Lloyds discovered that those assets were spending too much time parked outside the same lunch spots—ones that were not on prescribed routes. Lloyd was sympathetic to workers' needs for breaks—"we've all worked demolition here," she says—but quickly clamped down on unauthorized ones.

GearWorks' CEO says the challenges Lloyd's faced are to be expected. "All these products operate under the ominous pendulum of challenge and opportunity," says Todd Krautkremer, 47. "But our software does a good job of letting the customer control that rate of change in the business."

Once the deployment dust had settled, the savings became clear. The company employs 12 drivers, 22 foremen, and seven office workers who use 41 phones running eTrace. The company buys an unlimited data package for each phone, which totals about \$4,000 a month. Add other networking charges, and Lloyd's spends about \$50,000 a year for a complete business, accounting, and communications solution. Before eTrace, the company paid an accountant 40 hours a week to do the books. Now that person comes in one day a week for six hours, saving roughly \$1,000 a week.

Data entry and job logging by the dispatcher and foremen, Lloyd says, is roughly 1½ times faster than paper and radio. More efficient routing has cut fuel costs by about 30 percent. And employees have stopped making unauthorized stops. Lloyd estimates a net improvement in performance of 10 percent to 12 percent, or roughly \$1 million for 2007—not a bad return on \$50,000.

"It really does work," she says.

SOURCE: Jonathan Blum, "Running an Entire Business from Smartphones," *FORTUNE Small Business*, March 12, 2008; and Al Sacco, "How Smartphones Help CPS Energy Innovate and Boost the Bottom Line," *CIO Magazine*, July 11, 2008.

CASE STUDY QUESTIONS

1. In which ways do smartphones help these companies be more profitable? To what extent are improvements in performance coming from revenue increases or cost reductions? Provide several examples from the case.
2. The companies described in the case encountered a fair amount of resistance from employees when introducing smartphone technologies. Why do you think this happened? What could companies do to improve the reception of these initiatives? Develop two alternative propositions.
3. CPS Energy and Lloyd's Construction used smartphones to make existing processes more efficient. How could they have used the technology to create new products and services for their customers? Include at least one recommendation for each organization.

REAL WORLD ACTIVITIES

1. In addition to the companies featured in the case, others like FedEx and UPS, which have large mobile workforces, heavily use mobile communication technologies. What other companies could benefit from these innovations? Go online and research uses of smartphones in industries different from the ones reviewed here. Prepare a report to share your findings.
2. Use the Internet to research the latest technological developments in smartphones, and imagine how those could be used by companies to deliver value to customers and shareholders.