

wouldn't report an item as out of stock, so the analyst's numbers would look good on paper. To prevent further gaming the system, Target's IT team built a tool that reported when the system was turned on or off and determined whether there was a legitimate reason for it to be turned off (for example, if an item was seasonal.) The analysts were denied access to these controls.

In 2014 Target's IT staff was finally able to install an automatic verification tool to catch bad data before they could enter SAP. The system wouldn't allow a purchase order to proceed until an employee entered product code data that were correct. The problem was that the verification tool was deployed too late. On January 15, 2015, Target Canada announced it was filing for bankruptcy protection. The company had already spent \$7 billion on expanding into Canada and was not projected to show a profit until 2021 at the earliest. All of Target Canada's 133 stores were closed, and 17,600 employees lost their jobs.

Sources: David Gewirtz, "Billion Dollar Mistake: How Inferior IT Killed Target Canada," *ZDNet*, February 11, 2016; Joe Castaldo, "The Last Days of Target," *www.canadianbusiness.com*, accessed February 12, 2016; *www.target.com*, accessed March 1, 2016; and Marc Wulfsberg, "The Aftermath of Target Canada's Collapse," *Canadian Grocer*, March 10, 2015.

CASE STUDY QUESTIONS

- 9-13** How important was supply chain management for Target Canada? How did it relate to its business model? Explain your answer.
- 9-14** Identify all the problems Target Canada encountered that prevented it from becoming a successful retailer. What were the management, organization, and technology factors that contributed to these problems?
- 9-15** How much of Target Canada's problems were technology based? Explain your answer.
- 9-16** How responsible was management for Target Canada's problems? Explain your answer.
- 9-17** What things should Target Canada have done differently to be successful?

MyMISLab

Go to the Assignments section of your MyMISLab to complete these writing exercises.

- 9-18** What are three reasons a company would want to implement an enterprise resource planning (ERP) system and two reasons it might not want to do so?
- 9-19** What are the sources of data for analytical CRM systems? Provide three examples of outputs from analytical CRM systems.

take a long time—often three to five years—and many millions of dollars. Target wanted to go live with SAP in only two years. This was exceedingly, if not unrealistically, ambitious, but management thought using consultants from Accenture who were highly experienced in SAP implementations would speed things up.

In 2012, once Target began ordering items for its pending Canadian launch, items sourced overseas with long lead times were stalled. Products weren't fitting into shipping containers as expected, and tariff codes were missing or incomplete. Other items weren't able to fit properly onto store shelves. The data used by Target's supply chain software was full of flaws, and the system required correct data to function properly and ensure products moved as anticipated. Product dimensions were in inches, not centimeters, or entered in the wrong order. Sometimes the wrong currency was used. Important information was missing, and there were numerous typos.

Target's rush to launch pressured suppliers to enter data quickly into SAP for roughly 75,000 different products. The data had to either be imported from other systems or entered from scratch. A record for a single item might have dozens of fields to fill out, such as fields for the manufacturer, the model, the dimensions, the weight, and how many units can fit into a shipping case. Much of the data were entered incorrectly. Widths were entered instead of lengths, and prices and item descriptions were entered incorrectly as well. Young merchandising assistants in charge of obtaining the details from suppliers were often not experienced enough to challenge vendors on the accuracy of the product information they provided. Information in Target's system was estimated to be only 30 percent accurate, compared with an accuracy rate of 98 to 99 percent for similar data in U.S. firms.

It also turned out that Manhattan, the company's software for running its warehouses, did not communicate well with SAP. For example, an employee at headquarters might have ordered 1,000 toothbrushes but mistakenly entered into SAP data that the shipment would be packaged as 10 boxes of 100 toothbrushes each. But the shipment might actually be configured differently as four large packages containing 250 toothbrushes each. Target's distribution system would treat this shipment as if it didn't exist and couldn't process the information. It would identify the shipment as a "problem area." These kinds of problems crop up at any warehouse, but at Target Canada, they occurred way too often.

Target had purchased a sophisticated and highly regarded system from JDA Software for supply chain forecasting and replenishment. However, this software typically requires years of historical data before it can provide accurate sales forecasts. Lacking such data to feed the system, Target's buying team instead used wildly optimistic projections, which assumed Canadian store sales from the start would be as high as operational stores in the United States even though Target Canada was not yet that well established.

Adding to Target Canada's system woes, the point-of-sale (POS) system was not working properly. Terminals for cash payments took too long to boot up and sometimes froze, items wouldn't scan, the self-checkout stations gave incorrect change, or the POS system would not provide the correct price. Target Canada had purchased POS software from an Israeli company called Retailix. Unlike SAP, Retailix is not an industry standard. It is believed that Target chose this software package because of touted capabilities for processing payments on mobile devices. Target Canada didn't have time to replace this software and kept going with all these bugs.

By fall of 2013, Target's three distribution centers were overflowing with goods. Target had to rent additional storage facilities to accommodate the inventory overflow, making it even more difficult to track down items. Target stores might end up with too much of some products and too little of others. The auto-replenishment system, which kept track of what a store had in stock, wasn't functioning properly, either. Target Canada's system required data about the exact dimensions of every product and every shelf in order to calculate whether employees needed to fill an empty rack. Much of the data were still incorrect, so the system couldn't make accurate calculations. The auto-replenishment system performed so badly that Target shut off the system at its three test stores and had employees replenish shelves manually. Auto-replenishment wasn't reinstated until months later.

There was another reason for the discrepancies between what items appeared to be in stock at headquarters and were actually missing from stores. Target Canada's replenishment system had a feature to notify distribution centers to ship more product when a store ran out. Some of the business analysts responsible for this function, however, were purposely turning it off. These business analysts were judged based on the percentage of their products that were in stock at any given time. When the auto-replenishment switch was turned off, the system

How Supply Chain Management Problems Killed Target Canada

CASE STUDY

Target is one of the world's most successful general merchandise retailers, with 1,801 retail store locations and a powerful brand image as a fashion-forward discount retailer. It is not as big or far-flung as Walmart, with \$74 billion in annual revenue compared with \$482 billion for Walmart, and all of its stores are located in the United States. (Walmart has 11,600 all over the world.) Target is very good at what it does and, ideally, would like to grow like Walmart. In 2011 it decided to make its first foray into global expansion by opening up retail stores in Canada. That year Target acquired the leaseholds of 189 locations operated by Hudson's Bay Company's Zellers discount chain for \$1.8 billion, hoping to open Target stores in 124 of these sites by the end of 2013. This was a very ambitious—and possibly unrealistic—timetable.

Target opened its first Canadian stores in March 2013. Target's expansion into Canada was highly anticipated by consumers and feared by rivals, but it failed miserably. On January 15, 2015, Target Canada filed for bankruptcy protection, announcing that it would close all of its 133 Canadian stores, and began liquidating their inventory. All Target Canada stores were closed by April 12, 2015. Some experts consider Target Canada a case study in what retailers should not do when they enter a new market.

Target quickly moved to build three new gigantic distribution centers in Canada. (A distribution center is where all the products from thousands of vendors are sorted and prepared for shipment to individual stores.) Unfortunately, Target Canada was unable to keep track of its products or make sure that the right amounts of products were being ordered, stored, and shipped. At first too few products were arriving at the distribution centers, leaving store shelves bare and Canadian customers empty-handed. Later the distribution centers became overwhelmed with too much product. Target's information systems could not properly compute shelving locations. Target had the stock, but it was stuck in the distribution centers and store shelves still remained empty. Making matters worse, the retail store checkout system was unreliable and didn't process transactions properly. And Target Canada also had higher product prices and less product selection than U.S. Target stores. Canadian sales never took off, and Target had to end its business in Canada.

How could this have happened? First, Target's business was geared to operating domestically in the United States. To operate in Canada, its information systems would have to be able to calculate prices in Canadian currency, which is worth about 72 percent of a U.S. dollar, with the conversion rate constantly fluctuating. Canada also uses the metric system, so the system would have to convert inches and feet into centimeters and meters as well. Knowing the size of an item and the size of packaging is essential for stocking shelves and inventory management. Target's supply chain management and pricing software would have to be modified to handle multiple measurement systems and currencies. Adding to the complexity, products for Target's Canadian market might have different dimensions from those for the United States. A box of shower curtain hooks for the U.S. market might be 12 inches long but only 11 ½ inches for Canada, expressed in centimeters. In other words, internationalizing systems takes a great deal of work and planning.

Target's U.S. operations used custom-built systems for ordering products from vendors, moving goods through warehouses, and stocking store shelves. These systems worked very well, and Target's IT staff and business end users were highly experienced in using them. Target's management had to decide whether to customize these domestic systems so they could work abroad or move to completely new systems for Canada. Because it would require considerable time and effort to internationalize these systems, Target's management opted for a new ready-made software package solution, thinking that it could be implemented faster, even if the company had little experience actually using the new system.

SAP was selected because of its functionality in enterprise resource planning (ERP) and supply chain management as well as capabilities for supporting different languages and currencies. Data on the products in Target's Canadian stores would be fed from the SAP system to other systems to forecast demand for products, manage its distribution centers, and replenish stock in the stores. Target hoped that eventually it could replace its custom homegrown systems with SAP so that the entire company would have the same set of systems worldwide. However, SAP implementations in large companies typically

for repairing heating ducts, broken windows, leaky roofs, broken water pipes, and other problems. The company assigns each request a number and writes down the service request number, the identification number of the customer account, the date of the request, the type of equipment requiring repair, and a brief description of the problem. The service requests are handled on a first-come-first-served basis. After the service work has been completed, Prime calculates the cost of the work, enters the price on the service request form, and bills the client. This arrangement treats the most important and profitable clients—those with accounts of more than \$70,000—no differently from its clients with small accounts. Management would like to find a way to provide its best customers with better service. It would also like to know which types of service problems occur most frequently so that it can make sure it has adequate resources to address them.

Prime Service has a small database with client account information, which can be found in MyMIS-Lab. Use database software to design a solution that would enable Prime's customer service representatives to identify the most important customers so that they could receive priority service. Your solution will require more than one table. Populate your database with at least 10 service requests. Create several reports that would be of interest to management, such as a list of the highest—and lowest—priority accounts and a report showing the most frequently occurring service problems. Create a report listing service calls that customer service representatives should respond to first on a specific date.

Achieving Operational Excellence: Evaluating Supply Chain Management Services

Software skills: Web browser and presentation software

Business skills: Evaluating supply chain management services

9-11 In addition to carrying goods from one place to another, some trucking companies provide supply chain management services and help their customers manage their information. In this project, you'll use the web to research and evaluate two of these business services. Investigate the websites of two companies, UPS Logistics and Schneider Logistics, to see how these companies' services can be used for supply chain management. Then respond to the following questions:

- What supply chain processes can each of these companies support for its clients?
- How can customers use the websites of each company to help them with supply chain management?
- Compare the supply chain management services these companies provide. Which company would you select to help your firm manage its supply chain? Why?

Collaboration and Teamwork Project

Analyzing Enterprise Application Vendors

9-12 With a group of three or four other students, use the web to research and evaluate the products of two vendors of enterprise application software. You could compare, for example, the SAP and Oracle enterprise systems, the supply chain management systems from JDA Software and SAP, or the customer relationship management systems of Oracle and Salesforce.com. Use what you have learned from these companies' websites to compare the software products you have selected in terms of business functions supported, technology platforms, cost, and ease of use. Which vendor would you select? Why? Would you select the same vendor for a small business (50–300 employees) as well as for a large one? If possible, use Google Docs and Google Drive or Google Sites to brainstorm, organize, and develop a presentation of your findings for the class.

- Describe the tools and capabilities of customer relationship management software for sales, marketing, and customer service.
 - Distinguish between operational and analytical CRM.
- 9-4** What are the challenges that enterprise applications pose, and how are enterprise applications taking advantage of new technologies?
- List and describe the challenges enterprise applications pose.
 - Explain how these challenges can be addressed.
 - Describe how enterprise applications are taking advantage of SOA, cloud computing, and open source software.
 - Define social CRM and explain how customer relationship management systems are using social networking.

Discussion Questions

- 9-5** MyMISLab Supply chain management is less about managing the physical movement of goods and more about managing information. Discuss the implications of this statement.
- 9-6** MyMISLab If a company wants to implement an enterprise application, it had better do its homework. Discuss the implications of this statement.
- 9-7** MyMISLab Which enterprise application should a business install first: ERP, SCM, or CRM? Explain your answer.

Hands-On MIS Projects

The projects in this section give you hands-on experience analyzing business process integration, suggesting supply chain management and customer relationship management applications, using database software to manage customer service requests, and evaluating supply chain management business services. Visit MyMISLab's Multimedia Library to access this chapter's Hands-On MIS Projects.

Management Decision Problems

- 9-8** Toronto-based Mercedes-Benz Canada, with a network of 55 dealers, did not know enough about its customers. Dealers provided customer data to the company on an ad hoc basis. Mercedes did not force dealers to report this information. There was no real incentive for dealers to share information with the company. How could CRM and PRM systems help solve this problem?
- 9-9** Office Depot sells a wide range of office supply products and services in the United States and internationally. The company tries to offer a wider range of office supplies at lower cost than other retailers by using just-in-time replenishment and tight inventory control systems. It uses information from a demand forecasting system and point-of-sale data to replenish its inventory in its 1,600 retail stores. Explain how these systems help Office Depot minimize costs and any other benefits they provide. Identify and describe other supply chain management applications that would be especially helpful to Office Depot.

Improving Decision Making: Using Database Software to Manage Customer Service Requests

Software skills: Database design; querying and reporting
Business skills: Customer service analysis

- 9-10** In this exercise, you'll use database software to develop an application that tracks customer service requests and analyzes customer data to identify customers meriting priority treatment.
- Prime Service is a large service company that provides maintenance and repair services for close to 1,200 commercial businesses in New York, New Jersey, and Connecticut. Its customers include businesses of all sizes. Customers with service needs call into its customer service department with requests

9-4 *What are the challenges that enterprise applications pose, and how are enterprise applications taking advantage of new technologies?*

Enterprise applications are difficult to implement. They require extensive organizational change, large new software investments, and careful assessment of how these systems will enhance organizational performance. Enterprise applications cannot provide value if they are implemented atop flawed processes or if firms do not know how to use these systems to measure performance improvements. Employees require training to prepare for new procedures and roles. Attention to data management is essential.

Enterprise applications are now more flexible, web-enabled, and capable of integration with other systems, using web services and service-oriented architecture (SOA). They also have open source and on-demand versions and can run in cloud infrastructures or on mobile platforms. CRM software has added social networking capabilities to enhance internal collaboration, deepen interactions with customers, and use data from social networking sites. Open source, mobile, and cloud versions of some of these products are becoming available.

Key Terms

Analytical CRM, 355

Bullwhip effect, 345

Churn rate, 359

Cross-selling, 354

Customer lifetime value (CLTV), 358

Demand planning, 346

Employee relationship management (ERM), 353

Enterprise software, 341

Just-in-time strategy, 345

Operational CRM, 355

Partner relationship management (PRM), 353

Pull-based model, 348

Push-based model, 348

Sales force automation (SFA), 353

Social CRM, 361

Supply chain, 343

Supply chain execution systems, 346

Supply chain planning systems, 345

Touch point, 352

MyMISLab

To complete the problems with the [MyMISLab](#), go to the EOC Discussion Questions in MyMISLab.

Review Questions

9-1 How do enterprise systems help businesses achieve operational excellence?

- Define an enterprise system and explain how enterprise software works.
- Describe how enterprise systems provide value for a business.

9-2 How do supply chain management systems coordinate planning, production, and logistics with suppliers?

- Define a supply chain and identify each of its components.
- Explain how supply chain management systems help reduce the bullwhip effect and how they provide value for a business.
- Define and compare supply chain planning systems and supply chain execution systems.

- Describe the challenges of global supply chains and how Internet technology can help companies manage them better.

- Distinguish between a push-based and a pull-based model of supply chain management and explain how contemporary supply chain management systems facilitate a pull-based model.

9-3 How do customer relationship management systems help firms achieve customer intimacy?

- Define customer relationship management and explain why customer relationships are so important today.
- Describe how partner relationship management (PRM) and employee relationship management (ERM) are related to customer relationship management (CRM).

Business Intelligence in Enterprise Applications

Enterprise application vendors have added business intelligence features to help managers obtain more meaningful information from the massive amounts of data these systems generate. SAP now makes it possible for its enterprise applications to use HANA in-memory computing technology so that they are capable of much more rapid and complex data analysis. Included are tools for flexible reporting, ad hoc analysis, interactive dashboards, what-if scenario analysis, and data visualization. Rather than requiring users to leave an application and launch separate reporting and analytics tools, the vendors are starting to embed analytics within the context of the application itself. They are also offering complementary analytics products such as SAP BusinessObjects and Oracle Business Intelligence Enterprise Edition.

The major enterprise application vendors offer portions of their products that work on mobile handhelds. You can find out more about this topic in our Learning Track on Wireless Applications for Customer Relationship Management, Supply Chain Management, and Healthcare.

Review Summary

9-1 How do enterprise systems help businesses achieve operational excellence?

Enterprise software is based on a suite of integrated software modules and a common central database. The database collects data from and feeds the data into numerous applications that can support nearly all of an organization's internal business activities. When one process enters new information, the information is made available immediately to other business processes.

Enterprise systems support organizational centralization by enforcing uniform data standards and business processes throughout the company and a single unified technology platform. The firmwide data that enterprise systems generate help managers evaluate organizational performance.

9-2 How do supply chain management systems coordinate planning, production, and logistics with suppliers?

Supply chain management (SCM) systems automate the flow of information among members of the supply chain so they can use it to make better decisions about when and how much to purchase, produce, or ship. More accurate information from supply chain management systems reduces uncertainty and the impact of the bullwhip effect.

Supply chain management software includes software for supply chain planning and for supply chain execution. Internet technology facilitates the management of global supply chains by providing the connectivity for organizations in different countries to share supply chain information. Improved communication among supply chain members also facilitates efficient customer response and movement toward a demand-driven model.

9-3 How do customer relationship management systems help firms achieve customer intimacy?

Customer relationship management (CRM) systems integrate and automate customer-facing processes in sales, marketing, and customer service, providing an enterprise-wide view of customers. Companies can use this customer knowledge when they interact with customers to provide them with better service or sell new products and services. These systems also identify profitable or unprofitable customers or opportunities to reduce the churn rate.

The major customer relationship management software packages provide capabilities for both operational CRM and analytical CRM. They often include modules for managing relationships with selling partners (partner relationship management) and for employee relationship management.

SAP's next-generation enterprise applications incorporate SOA standards and can link SAP's own applications and web services developed by independent software vendors. Oracle also has included SOA and business process management capabilities in its Fusion middleware products. Businesses can use these tools to create platforms for new or improved business processes that integrate information from multiple applications.

Next-generation enterprise applications also include open source and cloud solutions as well as more functionality available on mobile platforms. Open source products such as Compiere, Apache Open for Business (OFBiz), and Openbravo do not offer as many capabilities as large commercial enterprise software but are attractive to companies such as small manufacturers because of their low cost.

For small- and medium-sized businesses, SAP offers cloud-based versions of its Business One and Business ByDesign enterprise software solutions (see the chapter-opening case study). Cloud-based enterprise systems are also offered by smaller vendors such as NetSuite and Plex Systems, but they are not as popular as cloud-based CRM products. The undisputed global market leader in cloud-based CRM systems is Salesforce.com, with more than 100,000 customers. Salesforce.com delivers its service through Internet-connected computers or mobile devices, and it is widely used by small, medium, and large enterprises. As cloud-based products mature, more companies will be choosing to run all or part of their enterprise applications in the cloud on an as-needed basis. Several Fortune 500 firms are planning to move most of their enterprise software to cloud based platforms in the next five years where they will not incur the costs of maintaining their own hardware, and the software will be charged on a metered basis.

Social CRM and Business Intelligence

CRM software vendors are enhancing their products to take advantage of social networking technologies. These social enhancements help firms identify new ideas more rapidly, improve team productivity, and deepen interactions with customers (see Chapter 10). Using **social CRM** tools, businesses can better engage with their customers by, for example, analyzing their sentiments about their products and services.

Social CRM tools enable a business to connect customer conversations and relationships from social networking sites to CRM processes. The leading CRM vendors now offer such tools to link data from social networks into their CRM software. SAP, Salesforce.com and Oracle CRM products now feature technology to monitor, track, and analyze social media activity in Facebook, LinkedIn, Twitter, YouTube, and other sites. Business intelligence and analytics software vendors such as SAS also have capabilities for social media analytics (with several measures of customer engagement across a variety of social networks) along with campaign management tools for testing and optimizing both social and traditional web-based campaigns.

Salesforce.com connected its system for tracking leads in the sales process with social-listening and social-media marketing tools, enabling users to tailor their social-marketing dollars to core customers and observe the resulting comments. If an ad agency wants to run a targeted Facebook or Twitter ad, these capabilities make it possible to aim the ad specifically at people in the client's lead pipeline who are already being tracked in the CRM system. Users will be able to view tweets as they take place in real time and perhaps uncover new leads. They can also manage multiple campaigns and compare them all to figure out which ones generate the highest click-through rates and cost per click.

This requires new organizational learning and should also be factored into ERP implementation costs.

SCM systems require multiple organizations to share information and business processes. Each participant in the system may have to change some of its processes and the way it uses information to create a system that best serves the supply chain as a whole.

Some firms experienced enormous operating problems and losses when they first implemented enterprise applications because they didn't understand how much organizational change was required. For example, Kmart had trouble getting products to store shelves when it first implemented i2 Technologies (now JDA Software) SCM software. The i2 software did not work well with Kmart's promotion-driven business model, which created sharp spikes in demand for products. Overstock.com's order tracking system went down for a full week when the company replaced a homegrown system with an Oracle enterprise system. The company rushed to implement the software and did not properly synchronize the Oracle software's process for recording customer refunds with its accounts receivable system. The chapter-ending case shows how rushed implementation of enterprise applications contributed to Target Canada's business failure.

Enterprise applications also introduce switching costs. When you adopt an enterprise application from a single vendor, such as SAP, Oracle, or others, it is very costly to switch vendors, and your firm becomes dependent on the vendor to upgrade its product and maintain your installation.

Enterprise applications are based on organization-wide definitions of data. You'll need to understand exactly how your business uses its data and how the data would be organized in a CRM, SCM, or ERP system. CRM systems typically require some data cleansing work.

Enterprise software vendors are addressing these problems by offering pared-down versions of their software and fast-start programs for small and medium-sized businesses and best-practice guidelines for larger companies. Companies are also achieving more flexibility by using cloud applications for functions not addressed by the basic enterprise software so that they are not constrained by a single do-it-all type of system.

Companies adopting enterprise applications can also save time and money by keeping customizations to a minimum. For example, Kennametal, a \$2 billion metal-cutting tools company in Pennsylvania, had spent \$10 million over 13 years maintaining an ERP system with more than 6400 customizations. The company replaced it with a plain-vanilla, uncustomized version of SAP enterprise software and changed its business processes to conform to the software.

Next-Generation Enterprise Applications

Today, enterprise application vendors are delivering more value by becoming more flexible, web-enabled, mobile, and capable of integration with other systems. Stand-alone enterprise systems, customer relationship management systems, and SCM systems are becoming a thing of the past. The major enterprise software vendors have created what they call *enterprise solutions*, *enterprise suites*, or *e-business suites* to make their CRM, SCM, and ERP systems work closely with each other and link to systems of customers and suppliers. SAP Business Suite, Oracle E-Business Suite, and Microsoft Dynamics Suite (aimed at midsized companies) are examples, and they now use web services and service-oriented architecture (SOA) (see Chapter 5).

Business Value of Customer Relationship Management Systems

Companies with effective customer relationship management systems realize many benefits, including increased customer satisfaction, reduced direct-marketing costs, more effective marketing, and lower costs for customer acquisition and retention. Information from CRM systems increases sales revenue by identifying the most profitable customers and segments for focused marketing and cross-selling (see the Interactive Session on Organizations).

Customer churn is reduced as sales, service, and marketing respond better to customer needs. The **churn rate** measures the number of customers who stop using or purchasing products or services from a company. It is an important indicator of the growth or decline of a firm's customer base.

9-4 What are the challenges that enterprise applications pose, and how are enterprise applications taking advantage of new technologies?

Many firms have implemented enterprise systems and systems for supply chain and customer relationship management because they are such powerful instruments for achieving operational excellence and enhancing decision making. But precisely because they are so powerful in changing the way the organization works, they are challenging to implement. Let's briefly examine some of these challenges as well as new ways of obtaining value from these systems.

Enterprise Application Challenges

Promises of dramatic reductions in inventory costs, order-to-delivery time, more efficient customer response, and higher product and customer profitability make enterprise systems and systems for SCM and CRM very alluring. But to obtain this value, you must clearly understand how your business has to change to use these systems effectively.

Enterprise applications involve complex pieces of software that are very expensive to purchase and implement. It might take a large Fortune 500 company several years to complete a large-scale implementation of an enterprise system or a system for SCM or CRM. According to a 2015 survey of 562 companies conducted by Panorama Consulting Solutions, the average cost of an ERP project was \$6.1 million. Projects took an average of 15.7 months to complete, and 53 percent of the projects delivered 50 percent or less of the expected benefits. Approximately 58 percent of these projects exceeded their planned budgets, and 65 percent experienced schedule overruns (Panorama Consulting Solutions, 2015). Changes in project scope and additional customization work add to implementation delays and costs.

Enterprise applications require not only deep-seated technological changes but also fundamental changes in the way the business operates. Companies must make sweeping changes to their business processes to work with the software. Employees must accept new job functions and responsibilities. They must learn how to perform a new set of work activities and understand how the information they enter into the system can affect other parts of the company.

customer experiences and wanted to make this differentiate the company among its competitors. Celcom's systems solution enables customer interactions to seamlessly traverse its retail shop, online shop, call center, and partner/dealer channels.

The BSS provides a single customer record, regardless of how many services (mobile, landline, and data) and devices a customer purchases, that is populated with data from various touchpoints. By consolidating customer data into a unified customer record, Celcom can offer tailored promotions offers in real time that fit a customer's individual history. Celcom's holistic view of a customer includes family relationships, which has special significance when marketing in Asia. The company is able to see every aspect of service each customer uses, which makes cross-marketing and up-selling more efficient.

Celcom completed the BSS implementation in just 18 months, replacing 17 separate systems with one seven-module Oracle system.

Celcom officials explicitly tried to get employees invested in the new system to ensure it aligned with the business. The company enlisted project directors from both business and IT departments. Representatives from sales and marketing chaired the technology selection committees to ensure that people outside of IT were making the case for the project. Top management, including sales and marketing department heads and Celcom's CEO, are part of a steering committee for customer experience management that meets every two weeks.

Celcom's integrated systems make it possible for call center representatives to respond much

more rapidly to customer queries. In the past, customer agents needed to toggle between two to five screens to do their work. Now they work with just a single screen, which increases efficiency. Using fewer screens cuts average call-handling time by 15 to 20 percent. BSS includes a new tablet-based app for Celcom dealers that makes signing a customer up for a new mobile phone completely paperless. New phone activation time has been cut from two hours to two minutes. Fewer activations require manual follow-up. Celcom dealers and customers are happier.

Inventory of mobile handsets at Celcom facilities and dealer stores is now centralized and managed using BSS. Dealers can see what Celcom has in stock, and Celcom inventory managers can monitor the stock on dealer shelves. More detailed inventory control helps Celcom move more products because it can ship fast-selling units to dealers before shortages occur or have marketers target promotions in regions where the company want to move specific products. This would have been impossible before. Salespeople are beginning to use big data collected in BSS to better manage sales by region.

Celcom is now much closer to achieving its brand vision: pleasing its customers and exceeding their expectations.

Sources: Jessica Sirkin, "Oracle Implementation at Celcom Brings IT, Business Together," *searchoracle.techtarget.com*, accessed January 17, 2016; www.celcom.com, accessed January 18, 2016; Fred Sandsmark, "Customers First," *Profit Magazine*, May 2014; and Oracle Corporation, "Celcom Transforms Its Customer Experience with Industry Leading Oracle Communications Suite," March 31, 2014.

CASE STUDY QUESTIONS

1. What was the problem at Celcom described in this case? What management, organization, and technology factors contributed to this problem?
2. What was Celcom's business strategy, and what was the role of customer relationship management in that strategy?
3. Describe Celcom's solution to its problem. What management, organization, and technology issues had to be addressed by the solution?
4. How effective was this solution? How did it affect the way Celcom ran its business and its business performance?

Another important output of analytical CRM is the customer's lifetime value to the firm. **Customer lifetime value (CLTV)** is based on the relationship between the revenue produced by a specific customer, the expenses incurred in acquiring and servicing that customer, and the expected life of the relationship between the customer and the company.

INTERACTIVE SESSION: ORGANIZATIONS

Customer Relationship Management Helps Celcom Become Number One

Celcom Axiata Berhad (Celcom) is the oldest mobile telecommunications company in Malaysia and also its largest, with an unrivaled reputation for quality and reliability. Nevertheless, maintaining its competitive edge has been a struggle. In 2006 Celcom dropped to third place among Malaysian cellular providers. Since then, management has worked feverishly to turn the company around, and Celcom has regained the top spot in its market. This turnaround required new technology and business processes for managing the customer experience.

To become number one in the Malaysian market again, Celcom's senior management knew that the company had to build better networks and market more aggressively. But the real key to success lay in improving the customer experience. According to Suresh Sidhu, Celcom's chief corporate and operations officer, there will always be a competitor who can beat you on price or even out-innovate you. But it's much harder for a competitor to disrupt a strong, positive relationship with customers. Celcom believes it's the market's best differentiator.

The Malaysia telecommunications market is quite mature, with few opportunities to acquire new customers. Customer retention is essential, as is luring customers away from competitors. Malaysia's customer base of 14 million is large and diverse, which requires multiple approaches to interacting with them. Older customers prefer in-person service from Celcom dealers or retail outlets, while sophisticated young urban users prefer to do business online. All want reliable mobile service.

Celcom was saddled with a siloed information technology architecture and business processes that could not provide a complete view of customers. For instance, customer data from one system such as billing were not easily available to other systems such as inventory. This is a common problem for mobile providers because carriers have traditionally counted customers by looking at SIM (subscriber identity modules in mobile phones) IDs. However many customers have multiple devices and SIMs for personal and work uses. Celcom needed systems that could identify and serve each customer rather than that person's SIMs. Otherwise, Celcom service representatives would waste valuable company and customer time making sense of a customer's

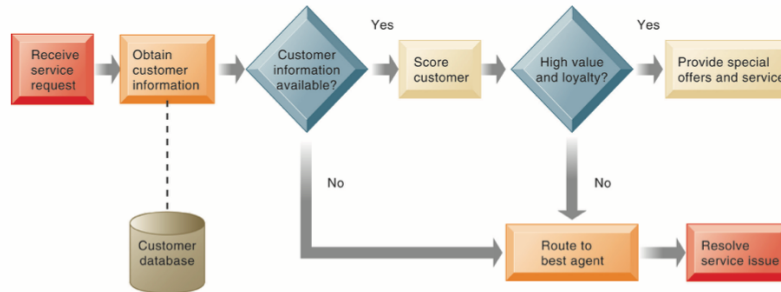
multiple SIM IDs scattered among various records in the system. The company wanted to be able to see a customer as a specific person, not a SIM or a number.

Celcom's solution involved changes to the company's technology, processes, and people. At the core is an Oracle-based business support system (BSS) that consolidated customer records, centralized inventory management, and sped up business processes. This system consolidates customer information into a single view of the customer to improve customer service across online, call center, and retail channels. The Oracle implementation included new customer portal sites and retail stores as well as an Oracle Siebel call center system and Oracle inventory management and Communications Order and Service Management applications.

The BSS project team asked approximately 700 Celcom employees in customer service, retail, marketing, and other divisions to list the top 10 experiences that users and dealers wanted, such as fast activation, less paperwork, and always having the most popular phones in stock. The BSS transformation team then developed technical and business process requirements based on these top 10 lists and compared offerings from several vendors.

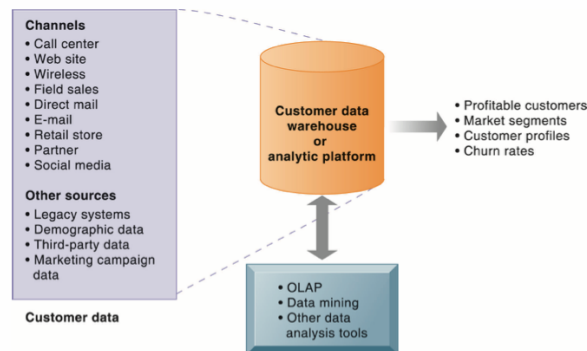
Celcom chose Oracle as the primary technology provider for the new customer experience management system. The company wanted the most complete suite of customer relationship management (CRM) tools that would support multichannel and cross-channel marketing efforts. Oracle seemed the best fit and had the most functionality built in without requiring additional modifications.

Celcom's transformation plan entailed retaining some of Celcom's existing systems, and the Celcom team liked Oracle Communications' modularity and interoperability as well as its cross-channel capabilities. Oracle Communications is a cross-channel product suite that provides a variety of services, including broadband data, wireless data, and mobile voice services. It helps communications services provider such as Celcom manage and integrate customer interactions across multiple channels to improve customer support, reduce problem resolution time, customize marketing to narrow market segments, and expedite time-to-market for new products and services. Celcom understood the importance of cross-channel

FIGURE 9.9 CUSTOMER LOYALTY MANAGEMENT PROCESS MAP


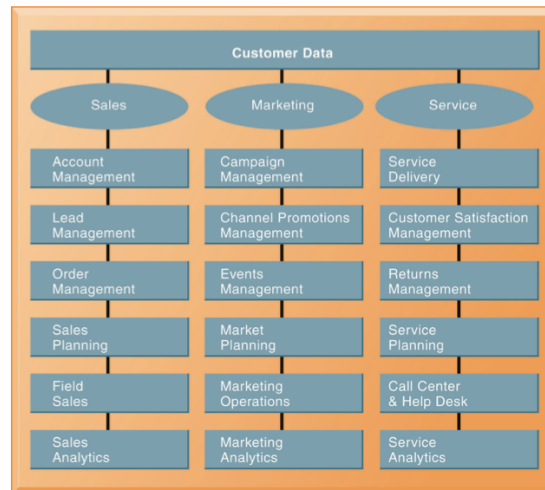
This process map shows how a best practice for promoting customer loyalty through customer service would be modeled by customer relationship management software. The CRM software helps firms identify high-value customers for preferential treatment.

Analytical CRM applications are based on data from operational CRM systems, customer touch points, and other sources that have been organized in data warehouses or analytic platforms for use in online analytical processing (OLAP), data mining, and other data analysis techniques (see Chapter 6). Customer data collected by the organization might be combined with data from other sources, such as customer lists for direct-marketing campaigns purchased from other companies or demographic data. Such data are analyzed to identify buying patterns, to create segments for targeted marketing, and to pinpoint profitable and unprofitable customers (see Figure 9.10).

FIGURE 9.10 ANALYTICAL CRM


Analytical CRM uses a customer data warehouse or analytic platform and tools to analyze customer data collected from the firm's customer touch points and from other sources.

FIGURE 9.8 CRM SOFTWARE CAPABILITIES



The major CRM software products support business processes in sales, service, and marketing, integrating customer information from many sources. Included is support for both the operational and analytical aspects of CRM.

Figure 9.9 illustrates how a best practice for increasing customer loyalty through customer service might be modeled by CRM software. Directly servicing customers provides firms with opportunities to increase customer retention by singling out profitable long-term customers for preferential treatment. CRM software can assign each customer a score based on that person's value and loyalty to the company and provide that information to help call centers route each customer's service request to agents who can best handle that customer's needs. The system would automatically provide the service agent with a detailed profile of that customer that includes his or her score for value and loyalty. The service agent would use this information to present special offers or additional service to the customer to encourage the customer to keep transacting business with the company. You will find more information on other best-practice business processes in CRM systems in our Learning Tracks.

Operational and Analytical CRM

All of the applications we have just described support either the operational or analytical aspects of customer relationship management. **Operational CRM** includes customer-facing applications, such as tools for sales force automation, call center and customer service support, and marketing automation. **Analytical CRM** includes applications that analyze customer data generated by operational CRM applications to provide information for improving business performance.

groups achieve greater productivity, reduced transaction time, and higher quality of service at lower cost. The customer is happier because he or she spends less time on the phone restating his or her problem to customer service representatives.

CRM systems may also include web-based self-service capabilities: The company website can be set up to provide inquiring customers personalized support information as well as the option to contact customer service staff by phone for additional assistance.

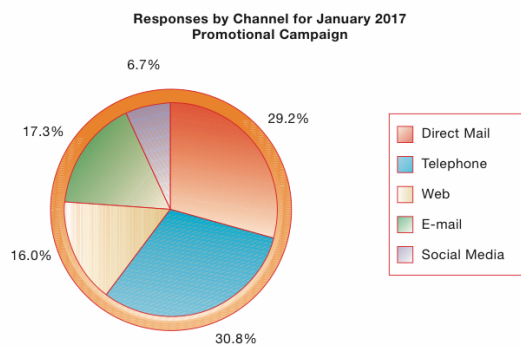
Marketing

CRM systems support direct-marketing campaigns by providing capabilities for capturing prospect and customer data, for providing product and service information, for qualifying leads for targeted marketing, and for scheduling and tracking direct-marketing mailings or e-mail (see Figure 9.7). Marketing modules also include tools for analyzing marketing and customer data, identifying profitable and unprofitable customers, designing products and services to satisfy specific customer needs and interests, and identifying opportunities for cross-selling.

Cross-selling is the marketing of complementary products to customers. (For example, in financial services, a customer with a checking account might be sold a money market account or a home improvement loan.) CRM tools also help firms manage and execute marketing campaigns at all stages, from planning to determining the rate of success for each campaign.

Figure 9.8 illustrates the most important capabilities for sales, service, and marketing processes found in major CRM software products. Like enterprise software, this software is business-process driven, incorporating hundreds of business processes thought to represent best practices in each of these areas. To achieve maximum benefit, companies need to revise and model their business processes to conform to the best-practice business processes in the CRM software.

FIGURE 9.7 HOW CRM SYSTEMS SUPPORT MARKETING



Customer relationship management software provides a single point for users to manage and evaluate marketing campaigns across multiple channels, including e-mail, direct mail, telephone, the web, and social media.

Customer Relationship Management Software

Commercial CRM software packages range from niche tools that perform limited functions, such as personalizing websites for specific customers, to large-scale enterprise applications that capture myriad interactions with customers, analyze them with sophisticated reporting tools, and link to other major enterprise applications, such as supply chain management and enterprise systems. The more comprehensive CRM packages contain modules for **partner relationship management (PRM)** and **employee relationship management (ERM)**.

PRM uses many of the same data, tools, and systems as customer relationship management to enhance collaboration between a company and its selling partners. If a company does not sell directly to customers but rather works through distributors or retailers, PRM helps these channels sell to customers directly. It provides a company and its selling partners with the ability to trade information and distribute leads and data about customers, integrating lead generation, pricing, promotions, order configurations, and availability. It also provides a firm with tools to assess its partners' performances so it can make sure its best partners receive the support they need to close more business.

ERM software deals with employee issues that are closely related to CRM, such as setting objectives, employee performance management, performance-based compensation, and employee training. Major CRM application software vendors include Oracle, SAP, Salesforce.com, and Microsoft Dynamics CRM.

Customer relationship management systems typically provide software and online tools for sales, customer service, and marketing. We briefly describe some of these capabilities.

Sales Force Automation

Sales force automation (SFA) modules in CRM systems help sales staff increase productivity by focusing sales efforts on the most profitable customers, those who are good candidates for sales and services. SFA modules provide sales prospect and contact information, product information, product configuration capabilities, and sales quote generation capabilities. Such software can assemble information about a particular customer's past purchases to help the salesperson make personalized recommendations. SFA modules enable sales, marketing, and shipping departments to share customer and prospect information easily. SFA increases each salesperson's efficiency by reducing the cost per sale as well as the cost of acquiring new customers and retaining old ones. SFA modules also provide capabilities for sales forecasting, territory management, and team selling.

Customer Service

Customer service modules in CRM systems provide information and tools to increase the efficiency of call centers, help desks, and customer support staff. They have capabilities for assigning and managing customer service requests.

One such capability is an appointment or advice telephone line. When a customer calls a standard phone number, the system routes the call to the correct service person, who inputs information about that customer into the system only once. When the customer's data are in the system, any service representative can handle the customer relationship. Improved access to consistent and accurate customer information helps call centers handle more calls per day and decrease the duration of each call. Thus, call centers and customer service

that customers interact with the firm (over the web, the phone, e-mail, blogs, and in person). It becomes especially difficult to integrate information from all these sources and deal with the large number of customers.

A large business's processes for sales, service, and marketing tend to be highly compartmentalized, and these departments do not share much essential customer information. Some information on a specific customer might be stored and organized in terms of that person's account with the company. Other pieces of information about the same customer might be organized by products that were purchased. In this traditional business environment, there is no convenient way to consolidate all this information to provide a unified view of a customer across the company.

This is where customer relationship management systems help. Customer relationship management (CRM) systems, which we introduced in Chapter 2, capture and integrate customer data from all over the organization, consolidate the data, analyze the data, and then distribute the results to various systems and customer touch points across the enterprise. A **touch point** (also known as a contact point) is a method of interaction with the customer, such as telephone, e-mail, customer service desk, conventional mail, Facebook, Twitter, website, wireless device, or retail store. Well-designed CRM systems provide a single enterprise view of customers that is useful for improving both sales and customer service (see Figure 9.6.)

Good CRM systems provide data and analytical tools for answering questions such as these: What is the value of a particular customer to the firm over his or her lifetime? Who are our most loyal customers? Who are our most profitable customers? What do these profitable customers want to buy? Firms use the answers to these questions to acquire new customers, provide better service and support to existing customers, customize their offerings more precisely to customer preferences, and provide ongoing value to retain profitable customers.

FIGURE 9.6 CUSTOMER RELATIONSHIP MANAGEMENT (CRM)



CRM systems examine customers from a multifaceted perspective. These systems use a set of integrated applications to address all aspects of the customer relationship, including customer service, sales, and marketing.

considered as new transportation plans are created. Multiple users can access and edit any active plan.

As LG Electronics Europe's users became comfortable with the system, they progressed beyond basic tasks such as loading trucks and scheduling deliveries to more complex issues including managing tariffs and checking for invoice duplication. Workload efficiency was bolstered by the ability to access real-time information, the exception-based management tools, and the ability to tailor logistics to local environments. Managers quickly gained confidence in their logistics decision making.

Investing in JDA Services—Consulting, Education, Performance Engineering, and Support Services—provided valuable support with system implementation. Although change was introduced systematically with a comprehensive training regimen, LG Electronics Europe's transportation manager, Menno Cleton, was thankful to have JDA consultants during the final three steps of the seven-step JDA Enterprise Methodology (JEM): Deploy, Transition, and Evolve. These experts walked users through equipment use, interface details, tool usage minutiae, and other miscellaneous issues. In addition, LG participated in a JDA Special Interest Group (SIG), which organized and supervised group meetings with other JDA customers to share experiences and offer peer-to-peer support.

A true supply chain transportation knowledge base and increased visibility into LG's transportation

network quickly produced significant cost savings, yielding a generous profit. Dedicated performance analysis using the built-in business intelligence (BI) tools resulted in improvements in all transportation metrics. Managers can now see a load plan's optimized cost compared with its implemented cost or how shipment costs are calculated from loads along with 60 other key metrics by selecting a report or dashboard directly within their current transportation workflow. Improved service (in-stock) levels, faster order cycle times, reduced time to implementation, and improvements in the freight audit process have all been achieved.

LG Electronics Europe can now also assess the performance of its carriers and allocate loads accordingly. Improved service levels have yielded increased customer satisfaction. Consolidation ratios in all implementations saw a 10 percent improvement, and optimized load configurations improved truck-loading efficiency ratios. In partnership with its 3PL providers, LG Electronics Europe is poised for continuing improvement in its service levels and adoption of additional JDA solutions.

Sources: "JDA Intelligent Fulfillment: Transportation & Logistics Management," JDA Software Group Inc., June 4, 2015; "LG Life's Good: Taking Control: LG Electronics Optimizes Its European Logistics with JDA Transportation Solutions," JDA Software Group Inc., July 8, 2015; "JDA Transportation Modeler," www.jda.com, accessed February 28, 2016; "LG History," www.lg.com, accessed March 4, 2016.

CASE STUDY QUESTIONS

1. Identify the supply chain management problems LG Electronics faced. What was the business impact of its inability to manage its supply chain well?
2. What management, organization, and technology factors contributed to LG's supply chain problems?
3. How did implementing JDA Software solutions change the way LG ran its business?
4. How did LG's new logistics and transportation management system improve management decision making? Describe two decisions that the new system solution improved.

what kinds of products and services they are interested in, and how much money they spend on your company. If you could, you'd want to make sure you knew each of your customers well, as if you were running a small-town store. And you'd want to make your good customers feel special.

In a small business operating in a neighborhood, it is possible for business owners and managers to know their customers well on a personal, face-to-face basis, but in a large business operating on a metropolitan, regional, national, or even global basis, it is impossible to know your customer in this intimate way. In these kinds of businesses, there are too many customers and too many ways

INTERACTIVE SESSION: MANAGEMENT

Logistics and Transportation Management at LG Electronics

From its origins as the progenitor of South Korea's electronics industry and then its first global exporter, LG Electronics has evolved to a respected global brand with manufacturing facilities in China, India, Mexico, Brazil, Poland, and Russia and a presence in 49 countries. Headquartered in Seoul, South Korea, the company has 84,000 employees in 112 locations around the world, including 81 subsidiaries. Perhaps best known today for its quality mobile phones, LG Electronics is also one of the world's top manufacturers of flat-screen televisions, air conditioners, washing machines, and refrigerators.

Led primarily by exploding demand for flat-screen televisions and mobile phones in the past 15 years, LG Electronics' European operations grew exponentially. By 2015, its logistics network was inadequate and severely overtaxed. Most of its transportation needs were outsourced to third-party logistics (3PL) providers. Internal knowledge and expertise were nonexistent. LG Electronics Europe wanted to change this equation. By creating a collaborative effort with its partners, LG believed that it could better control coordination of its transportation networks and realize aggregate cost savings.

Management was clamoring for increased logistics visibility so that it could preempt bottlenecks rather than fashioning reflexive, and often imprudent, remedies. Dependent on their 3PL providers, managers had little to no control over transportation planning. Fixed routing in outsourced systems hamstrung management's ability to optimize carriers, loads, and overall capacity. In order to control performance and costs, LG Electronics Europe knew it had to take control of its logistics system and adopt robust performance evaluation tools so that it could continually adapt and revise transportation decisions.

LG Electronics already had a relationship with JDA Software, a leading vendor of supply chain management systems, employing many of its products in localities across the globe. Impressed with JDA's global presence and armed with positive reports about its partnerships with other divisions, LG Electronics Europe chose JDA Software's Intelligent Fulfillment solutions—Transportation Modeler, Transportation Manager, and Transportation Planner. The ease of use and exceptional data-sharing capabilities of this unified supply chain planning, optimization, and business analytics platform immediately drew favorable reviews.

Once all managers could log in to a single source where all logistics data were shared, they could collaborate to find the most efficient and cost-effective transportation options. Transportation strategies could now be flexible and easily adapted to respond to fluctuations in product demand, shipping rates, fuel costs, and other factors.

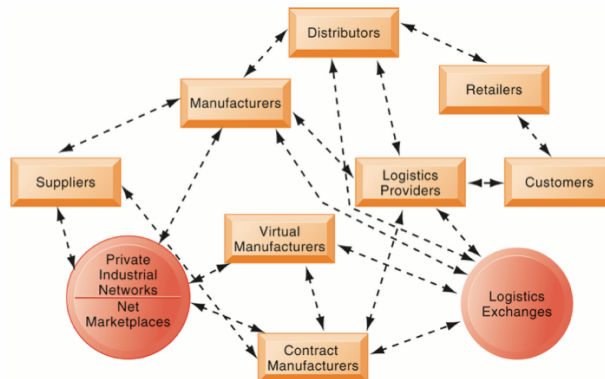
LG used JDA Transportation Modeler to model an ideal logistics system that consolidated orders, established transportation hubs, and selected carriers in a flexible manner based on costs and service levels. With Transportation Modeler, LG Electronics Europe can assess the abilities of alternative transportation hubs and associated carriers to optimize order consolidation. What-if scenarios examine various requirements and objectives to design possible networks and outline the best way to run them.

Once a logistics system model has been settled upon, it is run through Transportation Manager to generate a new network. Transportation orders can then be dynamically managed. What's more, cross-company workflows now connect LG Electronics Europe to its supplier network. Rather than ceding control to its 3PL providers, LG works in partnership with them. Freight audits reveal comprehensive statistical insight into logistics spending. Truck-loading efficiency ratios are used to optimize the vehicle-miles needed to transport like tonnages of freight. Consolidation ratios show how to combine two or more shipments to yield maximum cost savings.

Transportation Planner then weighs product availability, customer delivery commitments, and facility, inventory, and transportation network constraints to create benchmarks. By focusing managerial attention only on activities that fall outside of these accepted norms, labor productivity is maximized. This built-in exception-based management functionality minimizes the need for human intervention and review.

Three-dimensional load building automatically uses order line data to optimally configure pallets, taking into account weights, dimensions, stacking protocols, and other factors. A web-enabled interface displays this customizable 3-D view, and a Gantt bar chart illustrates the project schedule for dock and vehicle utilization. All transportation plans are archived so that they can be used in historical analysis and future what-if scenario construction, and previous asset allocations and carrier assignments are

FIGURE 9.5 THE EMERGING INTERNET-DRIVEN SUPPLY CHAIN



The emerging Internet-driven supply chain operates like a digital logistics nervous system. It provides multidirectional communication among firms, networks of firms, and e-marketplaces so that entire networks of supply chain partners can immediately adjust inventories, orders, and capacities.

Total supply chain costs represent the majority of operating expenses for many businesses and in some industries approach 75 percent of the total operating budget. Reducing supply chain costs has a major impact on firm profitability.

In addition to reducing costs, supply chain management systems help increase sales. If a product is not available when a customer wants it, customers often try to purchase it from someone else. More precise control of the supply chain enhances the firm's ability to have the right product available for customer purchases at the right time.

9-3 How do customer relationship management systems help firms achieve customer intimacy?

You've probably heard phrases such as "the customer is always right" or "the customer comes first." Today these words ring truer than ever. Because competitive advantage based on an innovative new product or service is often very short lived, companies are realizing that their most enduring competitive strength may be their relationships with their customers. Some say that the basis of competition has switched from who sells the most products and services to who "owns" the customer and that customer relationships represent a firm's most valuable asset.

What is Customer Relationship Management?

What kinds of information would you need to build and nurture strong, long-lasting relationships with customers? You'd want to know exactly who your customers are, how to contact them, whether they are costly to service and sell to,

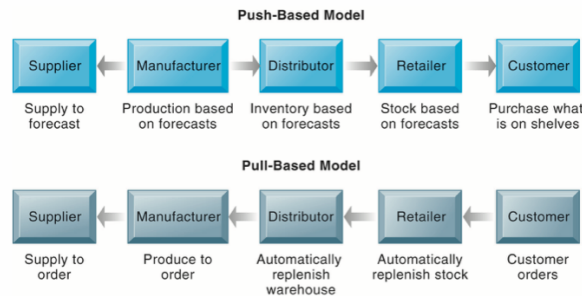
Earlier supply chain management systems were driven by a push-based model (also known as build-to-stock). In a **push-based model**, production master schedules are based on forecasts or best guesses of demand for products, and products are pushed to customers. With new flows of information made possible by web-based tools, supply chain management more easily follows a pull-based model. In a **pull-based model**, also known as a demand-driven or build-to-order model, actual customer orders or purchases trigger events in the supply chain. Transactions to produce and deliver only what customers have ordered move up the supply chain from retailers to distributors to manufacturers and eventually to suppliers. Only products to fulfill these orders move back down the supply chain to the retailer. Manufacturers use only actual order demand information to drive their production schedules and the procurement of components or raw materials, as illustrated in Figure 9.4. Walmart's continuous replenishment system described in Chapter 3 is an example of the pull-based model.

The Internet and Internet technology make it possible to move from sequential supply chains, where information and materials flow sequentially from company to company, to concurrent supply chains, where information flows in many directions simultaneously among members of a supply chain network. Complex supply networks of manufacturers, logistics suppliers, outsourced manufacturers, retailers, and distributors can adjust immediately to changes in schedules or orders. Ultimately, the Internet will enable a digital logistics nervous system for supply chains (see Figure 9.5).

Business Value of Supply Chain Management Systems

You have just seen how supply chain management systems enable firms to streamline both their internal and external supply chain processes and provide management with more accurate information about what to produce, store, and move. By implementing a networked and integrated supply chain management system, companies match supply to demand, reduce inventory levels, improve delivery service, speed product time to market, and use assets more effectively (see the Interactive Session on Management).

FIGURE 9.4 PUSH- VERSUS PULL-BASED SUPPLY CHAIN MODELS



The difference between push- and pull-based models is summarized by the slogan "Make what we sell, not sell what we make."

Management System (WMS) that Haworth Incorporated uses. Haworth is a world-leading manufacturer and designer of office furniture, with distribution centers in four states. The WMS tracks and controls the flow of finished goods from Haworth's distribution centers to its customers. Acting on shipping plans for customer orders, the WMS directs the movement of goods based on immediate conditions for space, equipment, inventory, and personnel.

Global Supply Chains and the Internet

Before the Internet, supply chain coordination was hampered by the difficulties of making information flow smoothly among disparate internal supply chain systems for purchasing, materials management, manufacturing, and distribution. It was also difficult to share information with external supply chain partners because the systems of suppliers, distributors, or logistics providers were based on incompatible technology platforms and standards. Enterprise and supply chain management systems enhanced with Internet technology supply some of this integration.

A manager uses a web interface to tap into suppliers' systems to determine whether inventory and production capabilities match demand for the firm's products. Business partners use web-based supply chain management tools to collaborate online on forecasts. Sales representatives access suppliers' production schedules and logistics information to monitor customers' order status.

Global Supply Chain Issues

More and more companies are entering international markets, outsourcing manufacturing operations, and obtaining supplies from other countries as well as selling abroad. Their supply chains extend across multiple countries and regions. There are additional complexities and challenges to managing a global supply chain.

Global supply chains typically span greater geographic distances and time differences than domestic supply chains and have participants from a number of countries. Performance standards may vary from region to region or from nation to nation. Supply chain management may need to reflect foreign government regulations and cultural differences.

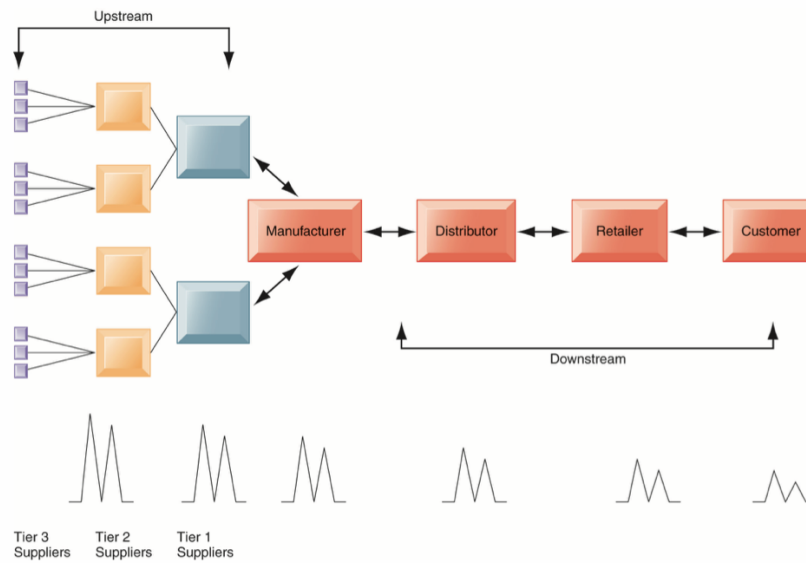
The Internet helps companies manage many aspects of their global supply chains, including sourcing, transportation, communications, and international finance. Today's apparel industry, for example, relies heavily on outsourcing to contract manufacturers in China and other low-wage countries. Apparel companies are starting to use the web to manage their global supply chain and production issues. (Review the discussion of Li & Fung in Chapter 3.)

In addition to contract manufacturing, globalization has encouraged outsourcing warehouse management, transportation management, and related operations to third-party logistics providers, such as UPS Supply Chain Solutions and Schneider National. These logistics services offer web-based software to give their customers a better view of their global supply chains. Customers can check a secure website to monitor inventory and shipments, helping them run their global supply chains more efficiently.

Demand-Driven Supply Chains: From Push to Pull Manufacturing and Efficient Customer Response

In addition to reducing costs, supply chain management systems facilitate efficient customer response, enabling the workings of the business to be driven more by customer demand. (We introduced efficient customer response systems in Chapter 3.)

FIGURE 9.3 THE BULLWHIP EFFECT



Inaccurate information can cause minor fluctuations in demand for a product to be amplified as one moves further back in the supply chain. Minor fluctuations in retail sales for a product can create excess inventory for distributors, manufacturers, and suppliers.

inventory levels for raw materials, intermediate products, and finished goods; determining where to store finished goods; and identifying the transportation mode to use for product delivery.

For example, if a large customer places a larger order than usual or changes that order on short notice, it can have a widespread impact throughout the supply chain. Additional raw materials or a different mix of raw materials may need to be ordered from suppliers. Manufacturing may have to change job scheduling. A transportation carrier may have to reschedule deliveries. Supply chain planning software makes the necessary adjustments to production and distribution plans. Information about changes is shared among the relevant supply chain members so that their work can be coordinated. One of the most important—and complex—supply chain planning functions is **demand planning**, which determines how much product a business needs to make to satisfy all its customers' demands. JDA Software, SAP, and Oracle all offer supply chain management solutions.

Supply chain execution systems manage the flow of products through distribution centers and warehouses to ensure that products are delivered to the right locations in the most efficient manner. They track the physical status of goods, the management of materials, warehouse and transportation operations, and financial information involving all parties. An example is the Warehouse

may keep too many parts in inventory because they do not know exactly when they will receive their next shipments from their suppliers. Suppliers may order too few raw materials because they do not have precise information on demand. These supply chain inefficiencies waste as much as 25 percent of a company's operating costs.

If a manufacturer had perfect information about exactly how many units of product customers wanted, when they wanted them, and when they could be produced, it would be possible to implement a highly efficient **just-in-time strategy**. Components would arrive exactly at the moment they were needed, and finished goods would be shipped as they left the assembly line.

In a supply chain, however, uncertainties arise because many events cannot be foreseen—uncertain product demand, late shipments from suppliers, defective parts or raw materials, or production process breakdowns. To satisfy customers, manufacturers often deal with such uncertainties and unforeseen events by keeping more material or products in inventory than they think they may actually need. The *safety stock* acts as a buffer for the lack of flexibility in the supply chain. Although excess inventory is expensive, low fill rates are also costly because business may be lost from canceled orders.

One recurring problem in supply chain management is the **bullwhip effect**, in which information about the demand for a product gets distorted as it passes from one entity to the next across the supply chain. A slight rise in demand for an item might cause different members in the supply chain—distributors, manufacturers, suppliers, secondary suppliers (suppliers' suppliers), and tertiary suppliers (suppliers' suppliers' suppliers)—to stockpile inventory so each has enough just in case. These changes ripple throughout the supply chain, magnifying what started out as a small change from planned orders and creating excess inventory, production, warehousing, and shipping costs (see Figure 9.3).

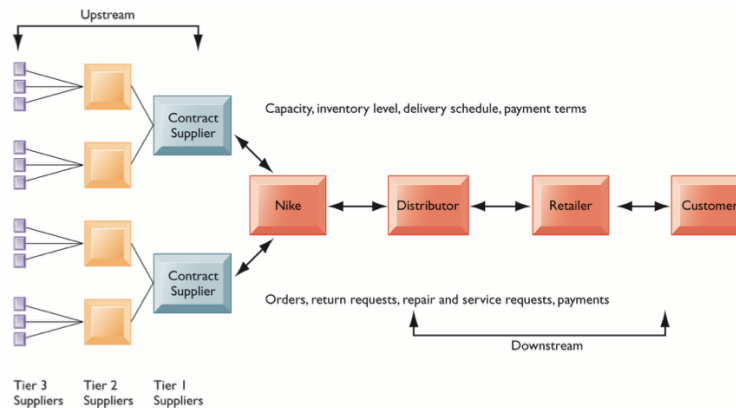
For example, Procter & Gamble (P&G) found it had excessively high inventories of its Pampers disposable diapers at various points along its supply chain because of such distorted information. Although customer purchases in stores were fairly stable, orders from distributors spiked when P&G offered aggressive price promotions. Pampers and Pampers' components accumulated in warehouses along the supply chain to meet demand that did not actually exist. To eliminate this problem, P&G revised its marketing, sales, and supply chain processes and used more accurate demand forecasting.

The bullwhip effect is tamed by reducing uncertainties about demand and supply when all members of the supply chain have accurate and up-to-date information. If all supply chain members share dynamic information about inventory levels, schedules, forecasts, and shipments, they have more precise knowledge about how to adjust their sourcing, manufacturing, and distribution plans. Supply chain management systems provide the kind of information that helps members of the supply chain make better purchasing and scheduling decisions.

Supply Chain Management Software

Supply chain software is classified as either software to help businesses plan their supply chains (supply chain planning) or software to help them execute the supply chain steps (supply chain execution). **Supply chain planning systems** enable the firm to model its existing supply chain, generate demand forecasts for products, and develop optimal sourcing and manufacturing plans. Such systems help companies make better decisions such as determining how much of a specific product to manufacture in a given time period; establishing

FIGURE 9.2 NIKE'S SUPPLY CHAIN



This figure illustrates the major entities in Nike's supply chain and the flow of information upstream and downstream to coordinate the activities involved in buying, making, and moving a product. Shown here is a simplified supply chain, with the upstream portion focusing only on the suppliers for sneakers and sneaker soles.

distributors, retailers, and customers. Nike's contract manufacturers are its primary suppliers. The suppliers of soles, eyelets, uppers, and laces are the secondary (Tier 2) suppliers. Suppliers to these suppliers are the tertiary (Tier 3) suppliers.

The *upstream* portion of the supply chain includes the company's suppliers, the suppliers' suppliers, and the processes for managing relationships with them. The *downstream* portion consists of the organizations and processes for distributing and delivering products to the final customers. Companies that manufacture, such as Nike's contract suppliers of sneakers, also manage their own *internal supply chain processes* for transforming materials, components, and services their suppliers furnish into finished products or intermediate products (components or parts) for their customers and for managing materials and inventory.

The supply chain illustrated in Figure 9.2 has been simplified. It only shows two contract manufacturers for sneakers and only the upstream supply chain for sneaker soles. Nike has hundreds of contract manufacturers turning out finished sneakers, socks, and athletic clothing, each with its own set of suppliers. The upstream portion of Nike's supply chain actually comprises thousands of entities. Nike also has numerous distributors and many thousands of retail stores where its shoes are sold, so the downstream portion of its supply chain is also large and complex.

Information Systems and Supply Chain Management

Inefficiencies in the supply chain, such as parts shortages, underused plant capacity, excessive finished goods inventory, or high transportation costs, are caused by inaccurate or untimely information. For example, manufacturers

particular organizational unit is performing, determine which products are most or least profitable, and calculate costs for the company as a whole.

For example, Alcoa's enterprise system includes functionality for global human resources management that shows correlations between investment in employee training and quality, measures the companywide costs of delivering services to employees, and measures the effectiveness of employee recruitment, compensation, and training.

9-2 How do supply chain management systems coordinate planning, production, and logistics with suppliers?

If you manage a small firm that makes a few products or sells a few services, chances are you will have a small number of suppliers. You could coordinate your supplier orders and deliveries by using just a telephone and fax machine. But if you manage a firm that produces more complex products and services, you will have hundreds of suppliers, and each of your suppliers will have its own set of suppliers. Suddenly, you will need to coordinate the activities of hundreds or even thousands of other firms to produce your products and services. Supply chain management (SCM) systems, which we introduced in Chapter 2, are an answer to the problems of supply chain complexity and scale.

The Supply Chain

A firm's **supply chain** is a network of organizations and business processes for procuring raw materials, transforming these materials into intermediate and finished products, and distributing the finished products to customers. It links suppliers, manufacturing plants, distribution centers, retail outlets, and customers to supply goods and services from source through consumption. Materials, information, and payments flow through the supply chain in both directions.

Goods start out as raw materials and, as they move through the supply chain, are transformed into intermediate products (also referred to as components or parts) and, finally, into finished products. The finished products are shipped to distribution centers and from there to retailers and customers. Returned items flow in the reverse direction from the buyer back to the seller.

Let's look at the supply chain for Nike sneakers as an example. Nike designs, markets, and sells sneakers, socks, athletic clothing, and accessories throughout the world. Its primary suppliers are contract manufacturers with factories in China, Thailand, Indonesia, Brazil, and other countries. These companies fashion Nike's finished products.

Nike's contract suppliers do not manufacture sneakers from scratch. They obtain components for the sneakers—the laces, eyelets, uppers, and soles—from other suppliers and then assemble them into finished sneakers. These suppliers in turn have their own suppliers. For example, the suppliers of soles have suppliers for synthetic rubber, suppliers for chemicals used to melt the rubber for molding, and suppliers for the molds into which to pour the rubber. Suppliers of laces have suppliers for their thread, for dyes, and for the plastic lace tips.

Figure 9.2 provides a simplified illustration of Nike's supply chain for sneakers; it shows the flow of information and materials among suppliers, Nike, Nike's

of the system and made very few changes to the SAP software itself. It used as many tools and features that were already built into the SAP software as it could. SAP has more than 3,000 configuration tables for its enterprise software.

Leading enterprise software vendors include SAP, Oracle, IBM, Infor Global Solutions, and Microsoft. Versions of enterprise software packages are designed for small and medium-sized businesses and on-demand software services running in the cloud (see the chapter-opening case and Section 9-4).

Business Value of Enterprise Systems

Enterprise systems provide value by both increasing operational efficiency and providing firmwide information to help managers make better decisions. Large companies with many operating units in different locations have used enterprise systems to enforce standard practices and data so that everyone does business the same way worldwide.

Coca-Cola, for instance, implemented a SAP enterprise system to standardize and coordinate important business processes in 200 countries. Lack of standard, companywide business processes prevented the company from using its worldwide buying power to obtain lower prices for raw materials and from reacting rapidly to market changes. Crocs used ERP for similar purposes, as described in the Chapter 15 ending case study.

Enterprise systems help firms respond rapidly to customer requests for information or products. Because the system integrates order, manufacturing, and delivery data, manufacturing is better informed about producing only what customers have ordered, procuring exactly the right number of components or raw materials to fill actual orders, staging production, and minimizing the time that components or finished products are in inventory.

Alcoa, the world's leading producer of aluminum and aluminum products with operations spanning 31 countries and more than 200 locations, had initially been organized around lines of business, each of which had its own set of information systems. Many of these systems were redundant and inefficient. Alcoa's costs for executing requisition-to-pay and financial processes were much higher, and its cycle times were longer than those of other companies in its industry. (Cycle time refers to the total elapsed time from the beginning to the end of a process.) The company could not operate as a single worldwide entity.

After implementing enterprise software from Oracle, Alcoa eliminated many redundant processes and systems. The enterprise system helped Alcoa reduce requisition-to-pay cycle time by verifying receipt of goods and automatically generating receipts for payment. Alcoa's accounts payable transaction processing dropped 89 percent. Alcoa was able to centralize financial and procurement activities, which helped the company reduce nearly 20 percent of its worldwide costs.

Enterprise systems provide much valuable information for improving management decision making. Corporate headquarters has access to up-to-the-minute data on sales, inventory, and production and uses this information to create more accurate sales and production forecasts. Enterprise software includes analytical tools to use data the system captures to evaluate overall organizational performance. Enterprise system data have common standardized definitions and formats that are accepted by the entire organization. Performance figures mean the same thing across the company. Enterprise systems allow senior management to find out easily at any moment how a

If a sales representative places an order for tire rims, for example, the system verifies the customer's credit limit, schedules the shipment, identifies the best shipping route, and reserves the necessary items from inventory. If inventory stock is insufficient to fill the order, the system schedules the manufacture of more rims, ordering the needed materials and components from suppliers. Sales and production forecasts are immediately updated. General ledger and corporate cash levels are automatically updated with the revenue and cost information from the order. Users can tap into the system and find out where that particular order is at any minute. Management can obtain information at any point in time about how the business was operating. The system can also generate enterprise-wide data for management analyses of product cost and profitability.

Enterprise Software

Enterprise software is built around thousands of predefined business processes that reflect best practices. Table 9.1 describes some of the major business processes that enterprise software supports.

Companies implementing this software first have to select the functions of the system they wish to use and then map their business processes to the predefined business processes in the software. (One of our Learning Tracks shows how SAP enterprise software handles the procurement process for a new piece of equipment.) Configuration tables provided by the software manufacturer enable the firm to tailor a particular aspect of the system to the way it does business. For example, the firm could use these tables to select whether it wants to track revenue by product line, geographical unit, or distribution channel.

If the enterprise software does not support the way the organization does business, companies can rewrite some of the software to support the way their business processes work. However, enterprise software is unusually complex, and extensive customization may degrade system performance, compromising the information and process integration that are the main benefits of the system. If companies want to reap the maximum benefits from enterprise software, they must change the way they work to conform to the business processes defined by the software.

To implement a new enterprise system, Tasty Baking Company identified its existing business processes and then translated them into the business processes built into the SAP ERP software it had selected. To ensure that it obtained the maximum benefits from the enterprise software, Tasty Baking Company deliberately planned for customizing less than 5 percent

TABLE 9.1 BUSINESS PROCESSES SUPPORTED BY ENTERPRISE SYSTEMS

Financial and accounting processes, including general ledger, accounts payable, accounts receivable, fixed assets, cash management and forecasting, product-cost accounting, cost-center accounting, asset accounting, tax accounting, credit management, and financial reporting
Human resources processes, including personnel administration, time accounting, payroll, personnel planning and development, benefits accounting, applicant tracking, time management, compensation, workforce planning, performance management, and travel expense reporting
Manufacturing and production processes, including procurement, inventory management, purchasing, shipping, production planning, production scheduling, material requirements planning, quality control, distribution, transportation execution, and plant and equipment maintenance
Sales and marketing processes, including order processing, quotations, contracts, product configuration, pricing, billing, credit checking, incentive and commission management, and sales planning

at any point in time, especially if you're running a large company. Enterprise systems provide the integration to make this possible. Let's look at how they work and what they can do for the firm.

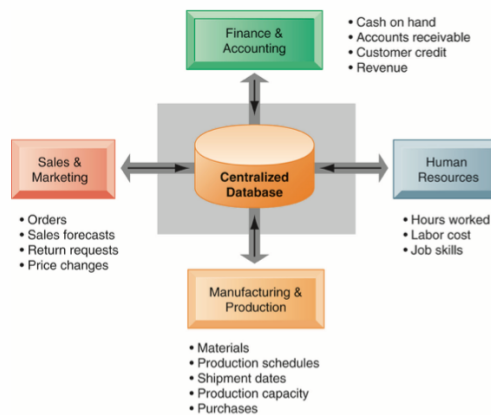
What are Enterprise Systems?

Imagine that you had to run a business based on information from tens or even hundreds of databases and systems, none of which could speak to one another. Imagine your company had 10 major product lines, each produced in separate factories and each with separate and incompatible sets of systems controlling production, warehousing, and distribution.

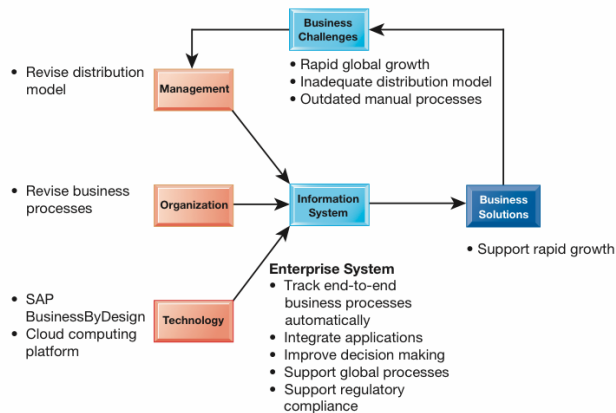
At the very least, your decision making would often be based on manual hard-copy reports, often out of date, and it would be difficult to understand what is happening in the business as a whole. Sales personnel might not be able to tell at the time they place an order whether the ordered items are in inventory, and manufacturing could not easily use sales data to plan for new production. You now have a good idea of why firms need a special enterprise system to integrate information.

Chapter 2 introduced enterprise systems, also known as enterprise resource planning (ERP) systems, which are based on a suite of integrated software modules and a common central database. The database collects data from many divisions and departments in a firm and from a large number of key business processes in manufacturing and production, finance and accounting, sales and marketing, and human resources, making the data available for applications that support nearly all an organization's internal business activities. When new information is entered by one process, the information is made immediately available to other business processes (see Figure 9.1).

FIGURE 9.1 HOW ENTERPRISE SYSTEMS WORK



Enterprise systems feature a set of integrated software modules and a central database by which business processes and functional areas throughout the enterprise can share data.



The chapter-opening case calls attention to important points raised by this case and this chapter. Skullcandy's business performance and ability to expand to new markets domestically and overseas suffered because it was saddled with outdated systems designed primarily for its old distribution model as a small company selling to local ski and skate shops. Its spreadsheet-based systems and manual processes made it difficult for different parts of the company to work together and respond to new market opportunities. They left the company operating too inefficiently and unable to pursue its new business goals. By implementing SAP's Business ByDesign enterprise applications, Skullcandy was able to transition to more efficient business processes and coordinate for its new business model, including forecasting, planning, profitability analysis, and new-product development, and it could support its strategic growth plan based on new acquisitions.

Skullcandy's new systems made it possible to run its business more efficiently and effectively and also had the functionality to support global expansion. However, in order to obtain these benefits from the enterprise software, Skullcandy had to change some of its outdated business processes as well as its old legacy systems.

Here are some questions to think about: What problems did Skullcandy solve by implementing Business ByDesign? How did the new system change the way Skullcandy ran its business? What were the benefits of using cloud-based software for Skullcandy's solution?

9-1 How do enterprise systems help businesses achieve operational excellence?

Around the globe, companies are increasingly becoming more connected, both internally and with other companies. If you run a business, you'll want to be able to react instantaneously when a customer places a large order or when a shipment from a supplier is delayed. You may also want to know the impact of these events on every part of the business and how the business is performing

human resources management, customer relationship management, executive management support, and compliance management. The applications are integrated, and the system is the backbone for tracking all the transactions of the company. As Skullcandy continued to grow, it implemented additional Business ByDesign capabilities for managing third-party logistics (3PL) providers, omnichannel sales, and additional financial processes. (Omnichannel sales seek to provide the customer with a seamless shopping experience whether the customer is shopping online from a desktop or mobile device, by telephone, or in a brick-and-mortar store.) Skullcandy uses the Business ByDesign software running in SAP cloud computing centers. It doesn't need a computer center of its own to run these systems or more than a few people in its IT department.

How have the new ERP applications worked out? Very well, according to Skullcandy's management. The new system functionality has been credited with helping the business pursue a strategic acquisition, expand internationally, and significantly increase its customer base. In 2011, Skullcandy acquired Astro Gaming, a premium gaming headset company based in San Francisco. The Business ByDesign system was able to absorb this acquisition and run its transactions as a new and separate legal entity. The system also supports Sarbanes-Oxley (SOX) compliance, which is one of the requirements for filing as a public company, smoothing the way for Skullcandy to issue an IPO (initial public offering).

Shortly after going public, Skullcandy set up operations in Zurich, Switzerland, which became its European headquarters. The company also has locations in Canada, Mexico, Japan, and China. Business ByDesign already incorporated the regulations and laws of each country where Skullcandy operated. Skullcandy did not have to implement another system to transact in euros or deal with value-added taxes. This functionality was already included in the Business ByDesign software, so Skullcandy could easily set up operations in other countries with their own laws, regulations, languages, and currencies.

Skullcandy's distribution channels continued to expand. Best Buy, Target, and Walmart began selling its products. Today nearly 80 percent of Skullcandy's transactions are fully automated from point-of-sale through delivery. Everything is so interconnected and automated that from the time a customer clicks "buy," it takes less than a half hour for the transaction to move through Skullcandy's systems with a credit check, a check for fraud, interfacing with SAP Business ByDesign, checking availability, and warehouse fulfillment. Skullcandy can better manage its inventory, accounts, and information as it grows.

Sources: Ken Murphy, "Skullcandy Rocks the Cloud," *SAP Insider Profiles* 7, No. 1 (January 2016); "Every Revolution Needs a Soundtrack" and "Case Study: Skullcandy Inc.," www.sap.com, accessed February 27, 2016; and www.Skullcandy.com, accessed February 27, 2016.

Skullcandy's problems with its legacy systems and its need to find integrated systems to support its new distribution model and global growth strategy illustrate why companies need enterprise applications. Enterprise resource planning (ERP) systems as well as those for supply chain management and customer relationship management can dramatically improve operational effectiveness and decision making by integrating different business functions and providing consistent information throughout the company.

Skullcandy Rocks with ERP in the Cloud

Those colorful edgy earbuds for your mobile phone might very well come from Skullcandy, a leading maker of audio and gaming headphones, earbuds, speakers, and other accessories. Skullcandy was born in 2003 on a chairlift, when founder Rick Alden came up with the idea for a device that could control both a mobile phone and a MP3 music player with a hassle-free one-touch button built into a set of earbuds. Skullcandy's bold colors and designs as well as products that could be integrated directly into helmets and backpacks made the brand a favorite of skiers, surfers, skaters, and other action sports enthusiasts. Skullcandy became wildly popular worldwide, growing 200 percent each year, and now has annual revenue of \$250 million.

With such explosive growth, the company quickly outgrew its distribution model, which consisted of Alden delivering products personally from his basement to ski and skate shops in the Park City, Utah, area (the site of Skullcandy corporate headquarters). Skullcandy's business processes were primarily manual, with individual spreadsheets serving as the system of record for its business transactions. In order to grow to a company that could ship a million items each year, Skullcandy needed to automate its processes and use a new set of information systems to support them.

In 2008, the company started to replace its spreadsheets and manual processes with SAP Business ByDesign cloud-based software providing a single enterprise resource planning (ERP) system supporting finance, planning, purchasing, inventory management, and order management. Business ByDesign is an enterprise resource planning and business management software product designed for small and medium-sized enterprises. The software is designed to track end-to-end business processes for financial management, project management, supply chain management, supplier relationship management,



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Achieving Operational Excellence and Customer Intimacy: Enterprise Applications

Learning Objectives

After reading this chapter, you will be able to answer the following questions:

- 9.1 How do enterprise systems help businesses achieve operational excellence?
- 9.2 How do supply chain management systems coordinate planning, production, and logistics with suppliers?
- 9.3 How do customer relationship management systems help firms achieve customer intimacy?
- 9.4 What are the challenges that enterprise applications pose, and how are enterprise applications taking advantage of new technologies?

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CHAPTER CASES

Skullcandy Rocks with ERP in the Cloud
Logistics and Transportation Management at LG Electronics
Customer Relationship Management Helps Celcom Become Number One
How Supply Chain Management Problems Killed Target Canada

VIDEO CASES

Life Time Fitness Gets in Shape with Salesforce CRM
Evolution Homecare Manages Patients with Microsoft Dynamics CRM
Instructional Video:
GSMS Protects Patients by Serializing Every Bottle of Drugs