

Key System Applications for the Digital Age

III PART

- 8 Achieving Operational Excellence and Customer Intimacy: Enterprise Applications**
- 9 E-Commerce: Digital Markets, Digital Goods**
- 10 Improving Decision Making and Managing Knowledge**

Part III examines the core information system applications businesses are using today to improve operational excellence and decision making. These applications include enterprise systems; systems for supply chain management, customer relationship management, and knowledge management; e-commerce applications; decision-support systems; and executive support systems. This part answers questions such as these: How can enterprise applications improve business performance? How do firms use e-commerce to extend the reach of their businesses? How can systems improve decision making and help companies make better use of their knowledge assets?

Achieving Operational Excellence and Customer Intimacy: Enterprise Applications



STUDENT LEARNING OBJECTIVES

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

1. How do enterprise systems help businesses achieve operational excellence?
2. How do supply chain management systems coordinate planning, production, and logistics with suppliers?
3. How do customer relationship management systems help firms achieve customer intimacy?
4. What are the challenges posed by enterprise applications?
5. How are enterprise applications used in platforms for new cross-functional services?

CHAPTER OUTLINE

Chapter-Opening Case: *Tasty Baking Company:
An Enterprise System Transforms an Old Favorite*

- 8.1 Enterprise Systems
- 8.2 Supply Chain Management Systems
- 8.3 Customer Relationship Management Systems
- 8.4 Enterprise Applications: New Opportunities and Challenges
- 8.5 Hands-On MIS

Business Problem-Solving Case: *Sunsweet Growers
Cultivates Its Supply Chain*

TASTY BAKING COMPANY: AN ENTERPRISE SYSTEM TRANSFORMS AN OLD FAVORITE

Tasty Baking Company's name says it all. It is known for its Tastykake single-portion cupcakes, snack pies, cookies, and donuts, which are pre-wrapped fresh at its bakery and sold through approximately 15,500 convenience stores and supermarkets in the eastern United States. The Philadelphia-based company, which sold \$28 in cakes its first day of business in 1914, rang up sales of \$168 million in 2006.

Although Tasty Baking Company made customers smile, management and stockholders were frowning. Tasty is a fairly small enterprise in a maturing business, and saw its market share and sales dropping in the mid-1990s. In 2002, profitability levels were at an all-time low, with a -4.9 percent operating margin. To turn the company around, Tasty's new president and CEO Charles Pizzi introduced a new management team and strategic transformation plan.

The strategy required new manufacturing methods and new information systems. Tasty's existing systems were technically challenged, inflexible, and posed serious compliance and other business risks. Many key processes were traditional and heavily



manual, and the company did not have timely information for tracking manufacturing outputs and warehouse shipments. Tasty had to physically count all the items in its warehouses every day. Even so, inventory information was still inaccurate and out of date. Shipments were missed, and excess inventory had to be sold at a discount at bakery thrift stores. Tasty's market share and sales dropped while operating costs rose.

Much of Tasty's information about sales and products comes from its network of sales distributors. Tasty needed to create better connections with its sales operation to receive this information as soon as it was available.

Tasty's new management team decided to implement a new enterprise system using software from SAP designed specifically for the food and beverage industry. Consultants from SAP and Deloitte helped the company identify its business processes and figure out how to make them work with the SAP software. By limiting changes to the software and enforcing rigorous project management standards, the company was able to implement the new enterprise system on time and on budget in nine months. Tasty's SAP enterprise system uses a Microsoft SQL Server database and Windows operating system running on an Intel server.

Tasty was willing to make many changes in its business processes to take maximum advantage of the enterprise software's capabilities. It adopted Deloitte's template of best practices for the food and beverage industry. Tasty implemented the SAP modules for financials, order entry, manufacturing resource planning (MRP), and scheduling. The system integrates information that was previously maintained manually or in separate systems, and provides real-time information for inventory and warehouse management, financial activities, and centralized procurement. It provides more precise information about customer demand and inventory that helps managers make better decisions.

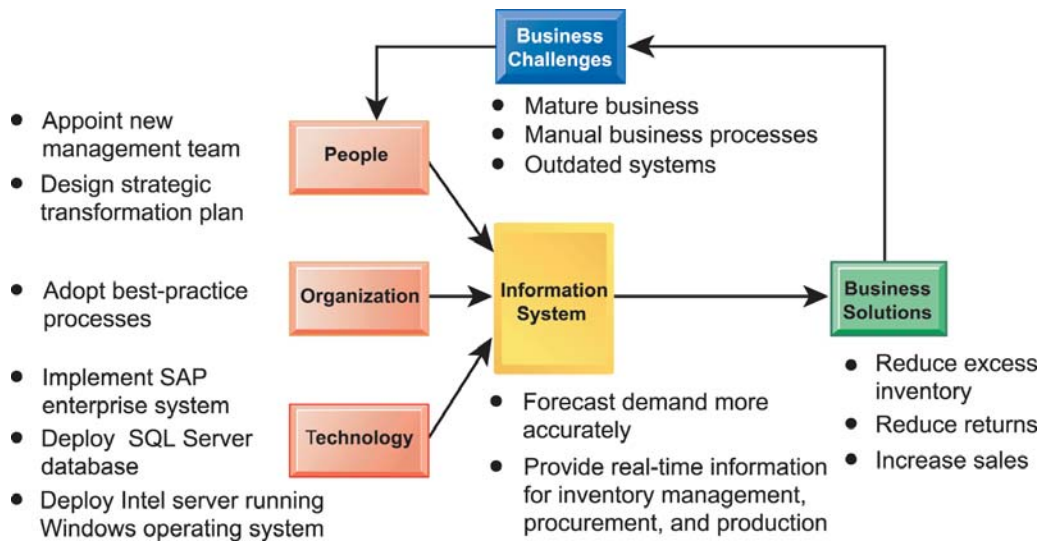
Since implementing SAP's enterprise system, Tasty's financial condition has become much healthier. The company has reduced inventory writedowns by 60 percent and price markdowns by 40 percent. Customer satisfaction has increased, as reflected in lower return rates and higher order fill rates. Tasty increased sales 11 percent without having to hire more staff.

Sources: "Tasty Baking Company," and "Tasty Baking," www.mysap.com, accessed July 5, 2007 and "Tasty Baking Company 10-K Annual Report" filed March 14, 2007.

Tasty Banking Company's problems with its inventory and work processes illustrate the critical role of enterprise applications. The company's costs were too high because it did not have accurate and timely information to manage its inventory. Tasty also lost sales from missed shipments.

The chapter-opening diagram calls attention to important points raised by this case and this chapter. Tasty's fresh-baked products have a fairly short shelf life. Key business processes were manual, preventing the company from knowing exactly what items had shipped and what items were in inventory. Management couldn't access the data rapidly enough for daily decision making and planning.

Management could have chosen to add more employees or automate its existing business processes with newer technology. Instead, it decided to change many of its business processes to conform to industry-wide best practices and to implement an enterprise system. The enterprise system integrated financial, order entry, scheduling, and manufacturing information, and made it more widely available throughout the company. Data on manufacturing output and warehouse shipments are captured as soon as they are created. Instant availability of more timely and accurate information helps employees work more efficiently and helps managers make better decisions.



HEADS UP

This chapter focuses on how firms use enterprise-wide systems to achieve operational excellence, customer intimacy, and improved decision making. Enterprise systems and systems for supply chain management and customer relationship management help companies integrate information from many different parts of the business, forge closer ties with customers, and coordinate firm activities with those of suppliers and other business partners.

8.1 Enterprise Systems

Around the globe, companies are increasingly becoming more connected, both internally and with other companies. If you run a business, you will 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 at any point in time, especially if you are 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 different databases and systems, none of which could speak to one another? Imagine your company had 10 different 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 really understand what is happening in the business as whole. 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 different 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 of 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 8-1).

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 are 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 was 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 8.1 describes some of the major business processes supported by enterprise software.

Companies implementing this software would have to first select the functions of the system they wished 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.) A firm would use configuration tables provided by the software 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

Figure 8-1
How Enterprise Systems Work
 Enterprise systems feature a set of integrated software modules and a central database that enables data to be shared by many different business processes and functional areas throughout the enterprise.

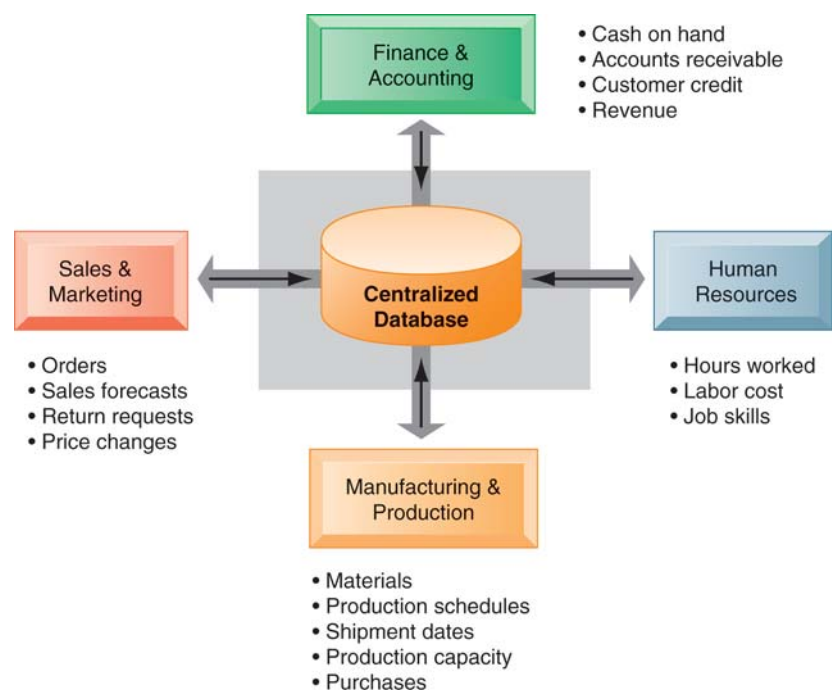


TABLE 8.1**Business Processes Supported by Enterprise Systems**

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

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 in the software.

Major enterprise software vendors include SAP, Oracle (with its acquisition PeopleSoft), and SSA Global. There are versions of enterprise software packages designed for small businesses and versions obtained through service providers over the Web. Although initially designed to automate the firm's internal "back-office" business processes, enterprise systems have become more externally oriented and capable of communicating with customers, suppliers, and other organizations.

BUSINESS VALUE OF ENTERPRISE SYSTEMS

Enterprise systems provide value both by increasing operational efficiency and by 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 leveraging its worldwide buying power to obtain lower prices for raw materials and from reacting rapidly to market changes.

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 amount of components or raw materials to fill actual orders, staging production, and minimizing the time that components or finished products are in inventory.

Enterprise software includes analytical tools for using data captured by the system 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 easily find out at any moment how a particular organizational unit is performing or to determine which products are most or least profitable.

8.2 Supply Chain Management Systems

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 using a telephone and fax machine. But if you manage a firm that produces more

complex products and services, then you will have hundreds of suppliers, and your suppliers will each have their own set of suppliers. Suddenly, you are in a situation where you will need to coordinate the activities of hundreds or even thousands of other firms in order to produce your products and services. Supply chain management systems, which we introduced in Chapter 2, are an answer to these 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 8-2 provides a simplified illustration of Nike's supply chain for sneakers; it shows the flow of information and materials among suppliers, Nike, and Nike's 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 doing manufacturing, such as the Nike's contract suppliers of sneakers, also manage their own *internal supply chain* processes for transforming materials, components, and services furnished by their suppliers into finished products or intermediate products (components or parts) for their customers and for managing materials and inventory.

The supply chain illustrated in Figure 8-2 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 would actually comprise 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, underutilized plant capacity, excessive finished goods inventory, or high transportation costs, are caused by inaccurate or untimely information. For example, manufacturers may keep too many parts in inventory

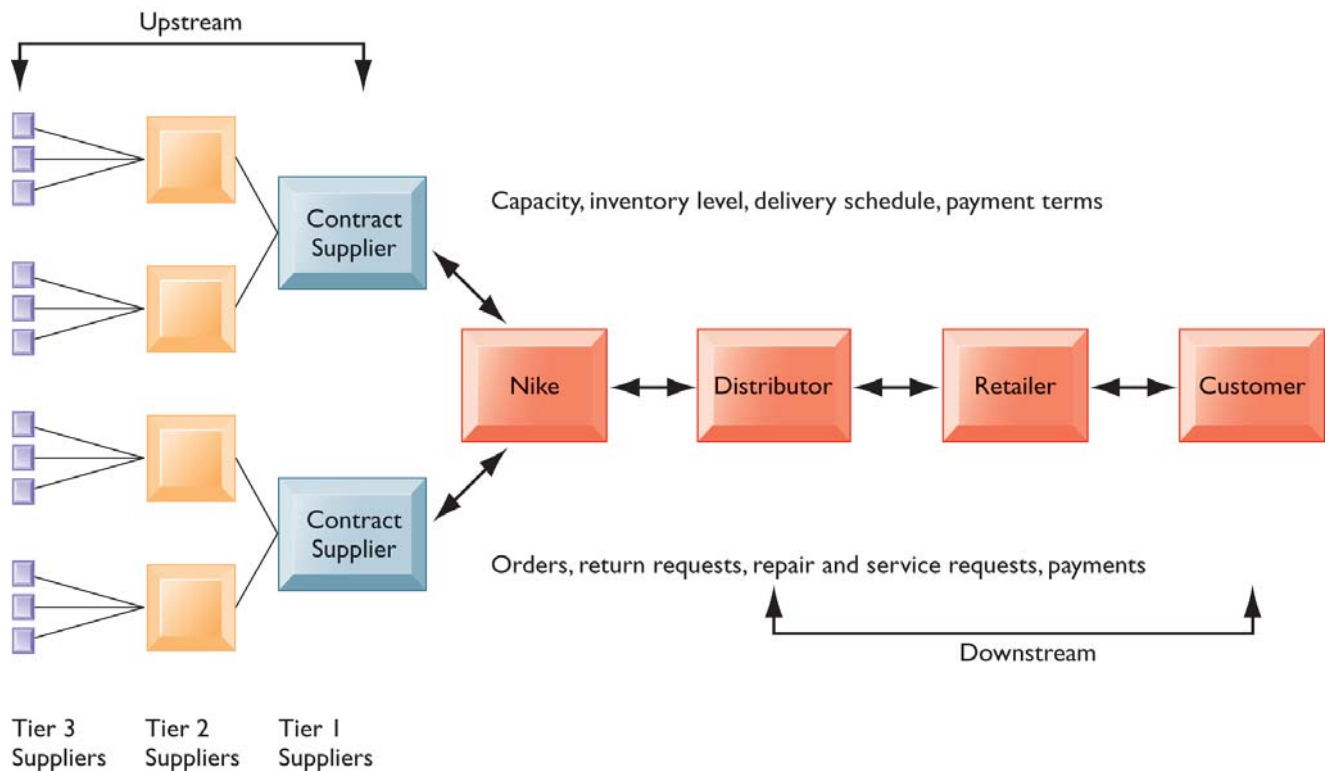


Figure 8-2
Nike's Supply Chain

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.

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 what 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, creating excess inventory, production, warehousing, and shipping costs (see Figure 8-3).

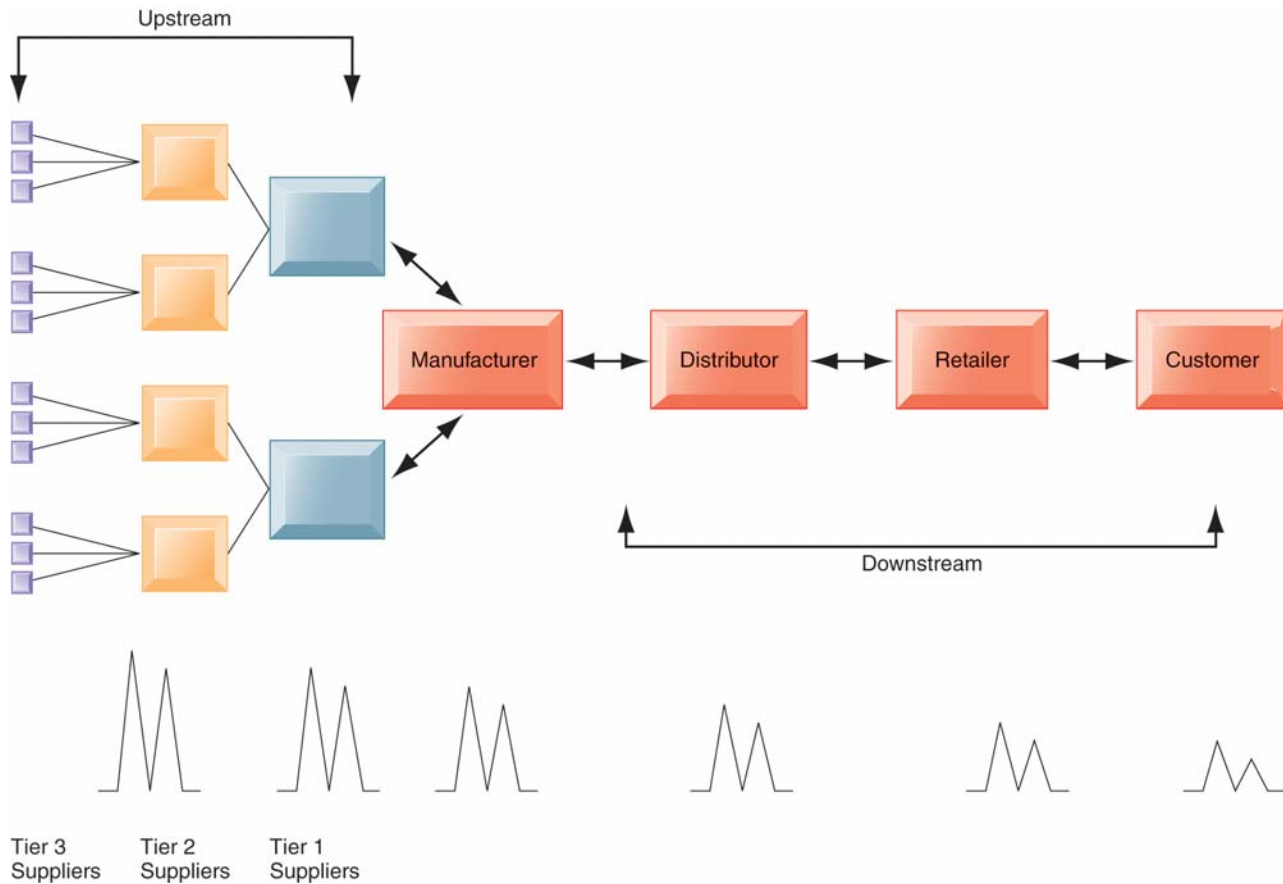


Figure 8-3
The Bullwhip Effect

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.

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 would spike 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 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 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 of its customers' demands.

Whirlpool Corporation, which produces washing machines, dryers, refrigerators, ovens and other home appliances, uses supply chain planning systems to make sure what it produces matches customer demand. The company uses supply chain planning software from i2 Technologies, which includes modules for Master Scheduling, Deployment Planning, and Inventory Planning. Whirlpool also installed i2's Web-based tool for Collaborative Planning, Forecasting, and Replenishment (CPFR) for sharing and combining its sales forecasts with those of its major sales partners. Improvements in supply chain planning helped Whirlpool increase availability of products in stock when customers needed them to 97 percent, while reducing the number of excess finished goods in inventory by 20 percent and forecasting errors by 50 percent (i2, 2007).

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. Haworth Incorporated's Transportation Management System and Warehouse Management System described in Chapter 2 are examples of such systems. Manugistics (acquired by JDA Software Group) and i2 Technologies are major supply chain management software vendors, and enterprise software vendors SAP and Oracle-PeopleSoft offer supply chain management modules.

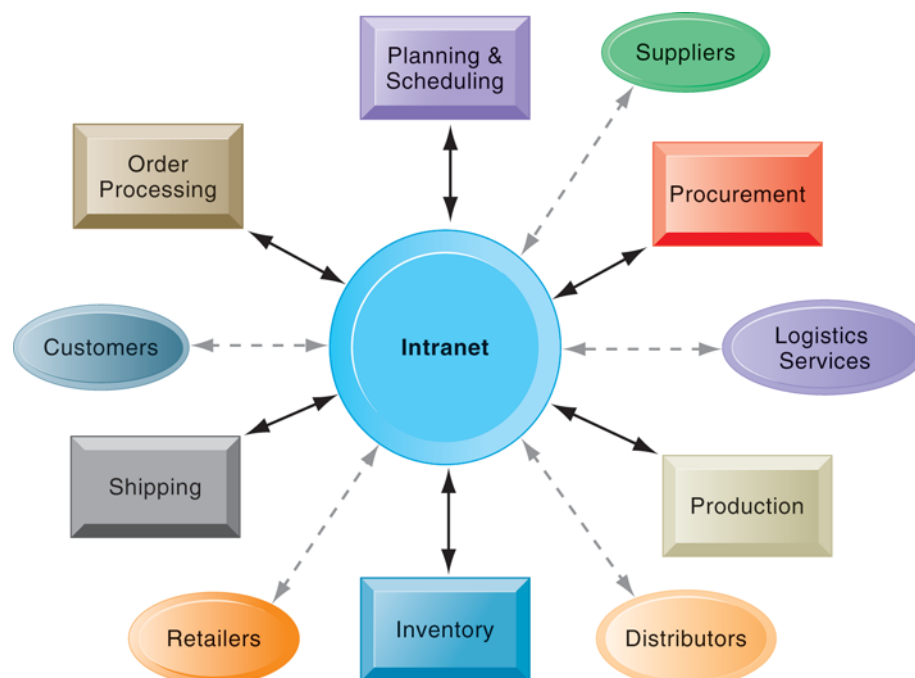


Figure 8-4
Intranets and Extranets for Supply Chain Management

Intranets integrate information from isolated business processes within the firm to help manage its internal supply chain. Access to these private intranets can also be extended to authorized suppliers, distributors, logistics services, and, sometimes, to retail customers to improve coordination of external supply chain processes.

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 systems supply some integration of internal supply chain processes but they are not designed to deal with external supply chain processes.

Some supply chain integration is supplied inexpensively using Internet technology. Firms use intranets to improve coordination among their internal supply chain processes, and they use extranets to coordinate supply chain processes shared with their business partners (see Figure 8-4).

Using intranets and extranets, all members of the supply chain are instantly able to communicate with each other, using up-to-date information to adjust purchasing, logistics, manufacturing, packaging, and schedules. A manager will use a Web interface to tap into suppliers' systems to determine whether inventory and production capabilities match demand for the firm's products. Business partners will use Web-based supply chain management tools to collaborate online on forecasts. Sales representatives will 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 different countries. Although the purchase price of many goods might be lower abroad, there are often additional costs for transportation, inventory (the need for a larger buffer of safety stock), and local taxes or fees. 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. All of these factors impact how a company takes orders, plans distribution, organizes warehousing, and manages inbound and outbound logistics throughout the global markets it services.

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.

Koret of California, a subsidiary of apparel maker Kellwood Co., uses e-SPS Web-based software to gain end-to-end visibility into its entire global supply chain. E-SPS features Web-based software for sourcing, work-in-progress tracking, production routing, product-development tracking, problem identification and collaboration, delivery-date projections, and production-related inquiries and reports.

As goods are being sourced, produced, and shipped, communication is required among retailers, manufacturers, contractors, agents, and logistics providers. Many, especially smaller companies, still share product information over the phone, via e-mail, or through faxes. These methods slow down the supply chain and also increase errors and uncertainty. With e-SPS, all supply chain members communicate through a Web-based system. If one of Koret's vendors makes a change in the status of a product, everyone in the supply chain sees the change.

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 Services and American Port Services. These logistics services offer Web-based software to give their customers a

better view of their global supply chains. American Port Services invested in software to synchronize processes with freight forwarders, logistics hubs, and warehouses around the world that it uses for managing its clients' shipments and inventory. Customers are able to check a secure Web site 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.)

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 model or build-to-order, 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 only use actual order-demand information to drive their production schedules and the procurement of components or raw materials, as illustrated in Figure 8-5. Wal-Mart's continuous replenishment system and Dell Computer's build-to-order system, both described in Chapter 3, are examples 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. Members of the network immediately adjust to changes in schedules or orders. Ultimately, the Internet could create a “digital logistics nervous system” throughout the supply chain (see Figure 8-6).

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

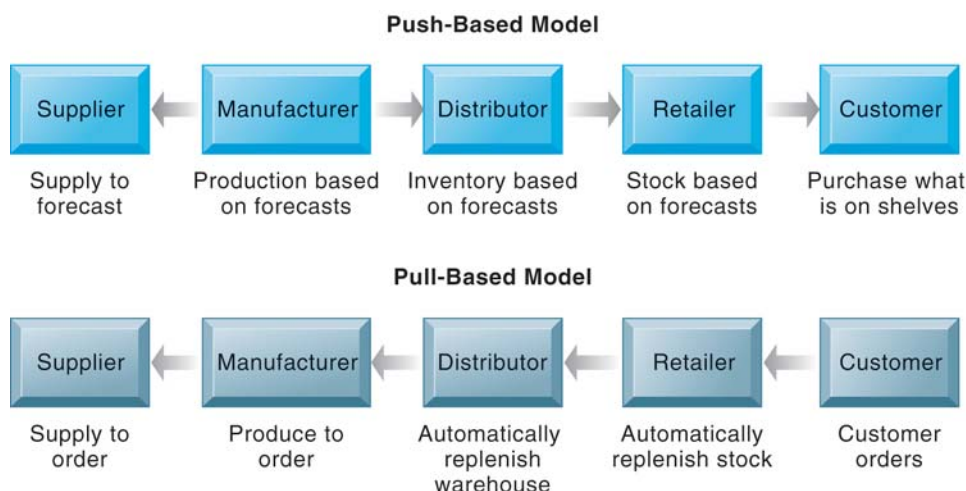
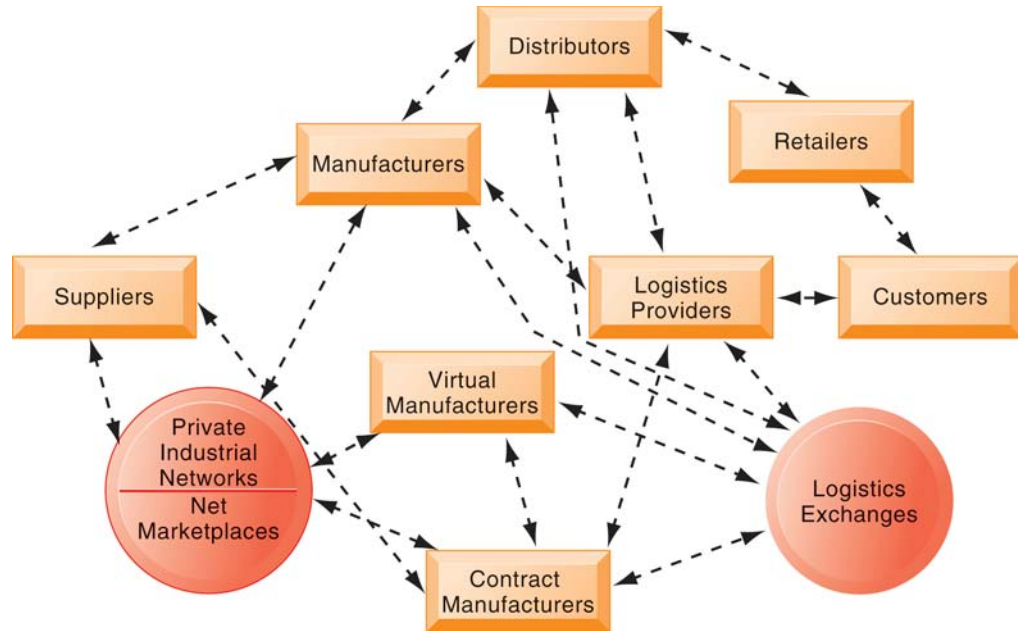


Figure 8-5
Push- Versus Pull-Based Supply Chain Models

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

Figure 8-6
The Future Internet-Driven Supply Chain

The future 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.



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.

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 (Handfield and Nichols, 2002). Reducing supply chain costs may have 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, as illustrated by the previous discussion of Whirlpool.

8.3 Customer Relationship Management Systems

You have probably heard phrases such as “the customer is always right” or “the customer comes first.” Today these words ring more true than ever. Because competitive advantage based on an innovative new product or service is often very short lived, companies are realizing that their only 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 would want to know exactly who your customers are, how to contact them, whether they are costly to service and sell to, what kinds of products and services they are interested in, and how much money they spend on your company. If you could, you would want to make sure you knew your each of your customers well, as if you were running a small-town store. And you would 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 really know their customers 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 different ways that customers interact with the firm (over the Web, the phone, fax, and face to face). It becomes especially difficult to integrate information from all these sources and to deal with the large numbers of customers.

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, Web site, 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. Such systems likewise provide customers with a single view of the company regardless of what touch point the customer uses (see Figure 8-7).

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?” (It can cost six times more to sell to a new customer than to an existing customer.) “Who are our most profitable customers?” and “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.

CRM SOFTWARE

Commercial CRM software packages range from niche tools that perform limited functions, such as personalizing Web sites 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)**.



Figure 8-7
Customer Relationship Management (CRM Systems)
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.

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-owned Siebel Systems and PeopleSoft, SAP, and Salesforce.com.

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 (SFA)

Sales force automation modules in CRM systems help sales staff increase their productivity by focusing sales efforts on the most profitable customers, those who are good candidates for sales and services. CRM systems 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. CRM software enables sales, marketing, and delivery departments to easily share customer and prospect information. It increases each salesperson's efficiency in reducing the cost per sale as well as the cost of acquiring new customers and retaining old ones. CRM software also has 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. Once 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 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 Web site 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 8-8). 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.

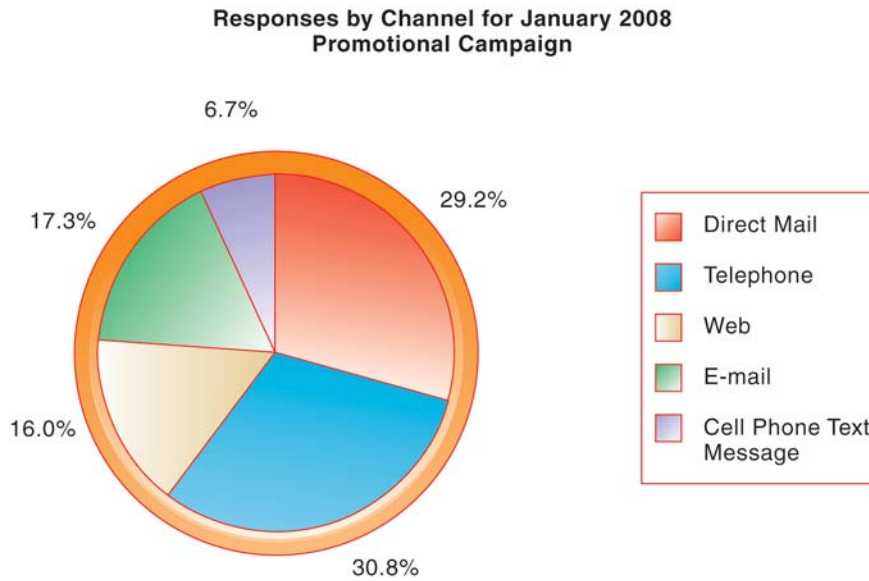


Figure 8-8
How CRM Systems Support Marketing
 Customer relationship management software provides a single point for users to manage and evaluate marketing campaigns across multiple channels, including e-mail, direct mail, telephone, the Web, and wireless messages.

Figure 8-9 illustrates the most important capabilities for sales, service, and marketing processes that would be 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.

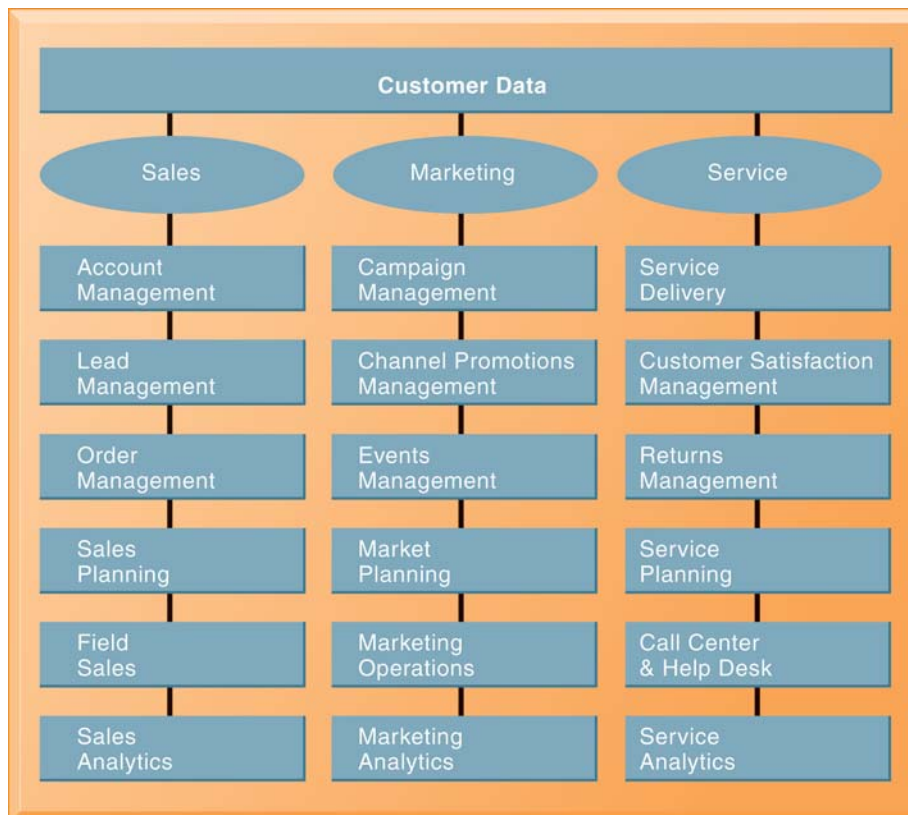


Figure 8-9
CRM Software Capabilities
 The major CRM software products support business processes in sales, service, and marketing, integrating customer information from many different sources. Included are support for both the operational and analytical aspects of CRM.

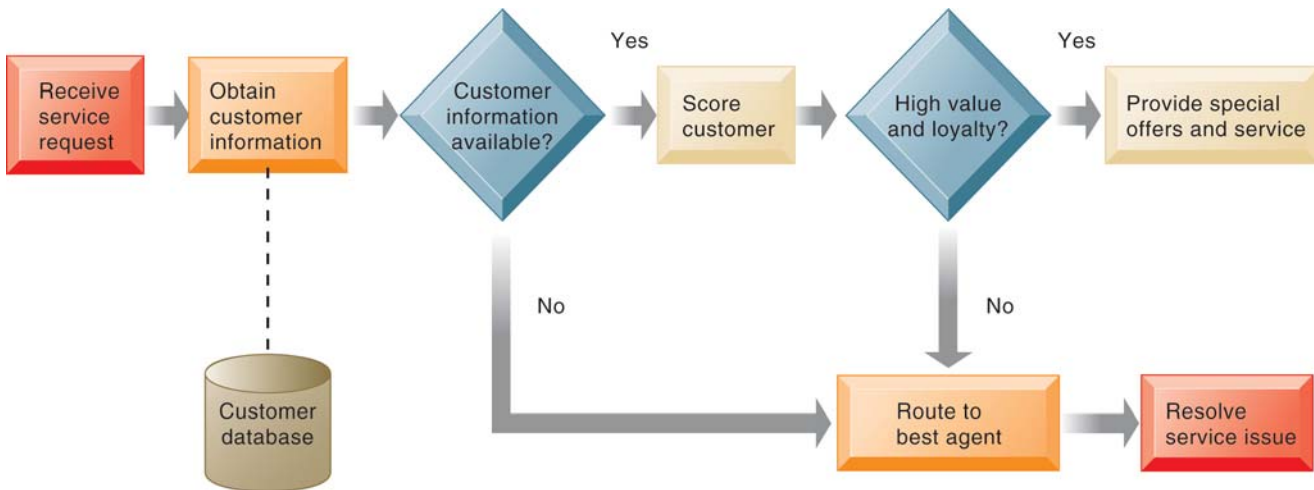


Figure 8-10
Customer Loyalty Management Process Map

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.

Figure 8-10 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.

Analytical CRM applications are based on data warehouses that consolidate the data from operational CRM systems and customer touch points for use with online analytical processing (OLAP), data mining, and other data analysis techniques (see Chapter 5). 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 8-11).

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.

The Interactive Session on People describes how Alaska Airlines benefited from analytical CRM. To learn more about its customers and improve customer service, Alaska Airlines installed Oracle-Siebel Business Analytics software. As you read this case, try to identify the problem this company was facing; what alternative solutions were available to management; how well the chosen solution worked; and the people, organization, and technology issues that had to be addressed when developing the solution.

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.

Customer churn is reduced as sales, service, and marketing better respond 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.

8.4 Enterprise Applications: New Opportunities and Challenges

Many firms have implemented enterprise systems and systems for supply chain management and customer relationship 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, as well as more efficient customer response and higher product and customer profitability make enterprise

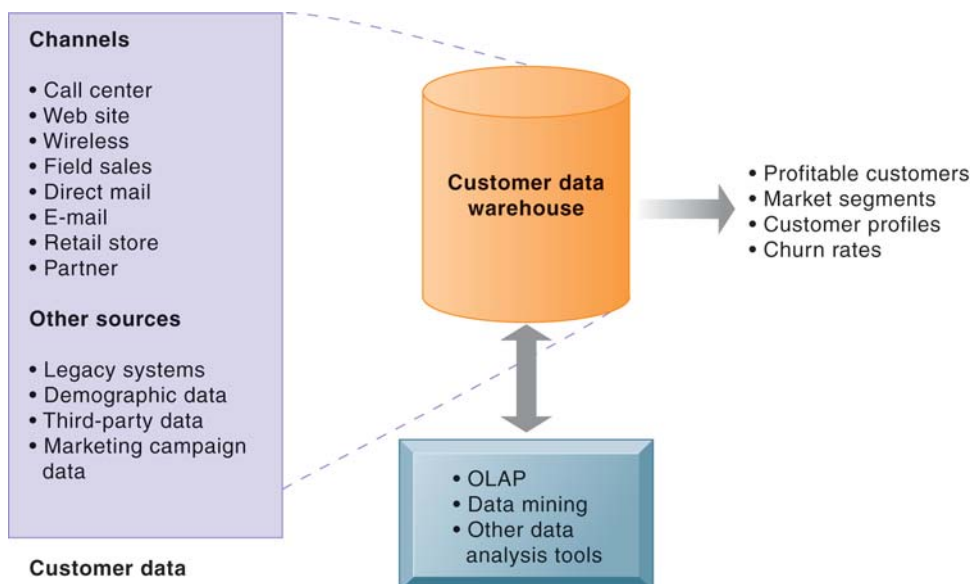


Figure 8-11
Analytical CRM Data Warehouse
 Analytical CRM uses a customer data warehouse and tools to analyze customer data collected from the firm's customer touch points and from other sources.

INTERACTIVE SESSION: PEOPLE**Alaska Airlines Soars with Customer Relationship Management**

The airline industry is very competitive and challenged by low profit margins and high fixed costs for wages, jet fuel, aircraft ownership and maintenance, and facilities. Customer loyalty achieved through strong customer service has been one of the best tools for airlines to fight these constrictions. Alaska Airlines continues to lead the way with award-winning customer service and dedication to technical innovation.

Formed in 1932, Alaska Airlines is a major passenger carrier in the Pacific Northwest, with an operating fleet of 114 jets. Over 17 million travelers flew on this airline in 2006. The company had been accumulating vast amounts of customer data for years, but could do very little with it.

Alaska Airlines' customer data existed in silos, stored in disparate systems across the company. The company was only able to use these data to track miles flown and price paid. To build a better and more relevant customer experience, the airline needed to integrate its customer data and find better ways to analyze them. Only then would the airline be able to gain a better understanding of customer trends and purchasing habits.

In its quest to provide better value for its customers than its competitors, Alaska Airlines invoked the same principles of continuous improvement that it applied to all of its business processes. These principles were based on the lean manufacturing system practiced to near perfection at Toyota (see the Chapter 2 Interactive Session on Organizations). The system led the airline to examine the processes of its customer service for holes rather than immediately searching for a CRM solution. The airline found that its executives were deprived of timely and accurate information that was crucial for strategic planning and meeting strategic objectives. With improved analytic capabilities, Alaska Airlines hoped to bring together its disparate data and use them to design marketing programs that would result in greater customer loyalty.

Alaska Airlines took a major step forward with its customer service in 2005 by selecting Oracle's Siebel Business Analytics software to complement its proprietary CRM system. The airline had evaluated solutions from four different vendors. Siebel was a good choice for a number of reasons. The system had the ability to access data from anywhere in the enterprise, including the Sabre distribution system the airline used to manage many of its reservations. The Siebel analytics software could also integrate the data from all these sources and provide actionable information rather than simply aggregate information. Up until this time, the airline had used an off-the-shelf

SQL query and reporting tool that did not have such integration capabilities.

With Siebel Business Analytics, Alaska Airlines was able to create digital dashboards furnishing executives with customized views of information from disparate sources in a user-friendly manner. Among the other attractive elements of the Siebel system was the ease with which it could be implemented. Alaska Airlines looked for a solution that would not put a strain on its information systems department. Alaska Airlines deployed the system in about six weeks, and used Siebel's training, which proved to be very effective.

Also highly effective were Siebel's capabilities for measuring customer loyalty. Indicators for loyalty include how recently customers have flown, how frequently they fly, how much they have spent, the total mileage they have flown, and whether they are members of a frequent flier program. A customer's loyalty may depend on the flexibility of flight schedules, the ease of buying a ticket, check-in procedures, on-time rates, and seat selection. Siebel gave Alaska Airlines a clearer picture of all of these data points, highlighting the airline's strengths and weaknesses, and ultimately casting light on how well the company was serving its customers.

The new analytics helped Alaska Airlines improve another key component of customer service: providing customers with a highly relevant experience. By tracking customer interactions with the airline and combining that data with demographic data, the marketing department was in a better position to make targeted offers to customers. The Siebel system enabled Alaska Airlines to market more proactively while still respecting the privacy and time of customers. It also provided information for targeting special offers to specific customers to solicit business during "slow" travel periods.

Benefits from Siebel Business Analytics have extended to nearly all the operations and business processes at Alaska Airlines. CRM Director James Archuleta believes that it is really not the software solution or the data that have given Alaska Airlines a competitive advantage, but the people who are making the decisions using the software and the data. The employees are now better able to analyze customer behavior, identify trends, and design appropriate promotions.

Sources: "Alaska Airlines Soars in Meeting the Needs of More Than 17 Million Customers Annually," Oracle Customer Case Study, June 2006; Tony Kontzer, "Alaska Airlines Taps Siebel for Business Intelligence," *InformationWeek*, March 7, 2005; "Alaska Airlines Selects Siebel Business Analytics," *CRM Today*, March 8, 2005; and Alaska Air Group Inc. Report to the Securities and Exchange Commission on Form 10-K for the fiscal year ended December 31, 2006, accessed via www.alaskaair.com, July 9, 2007.

CASE STUDY QUESTIONS

1. What was the problem at Alaska Airlines in this story? How did the problem affect business performance?
2. What was the solution chosen by the airline? How well did this solution help the airline compete with its rivals?
3. What are the ways in which a typical customer interacts with an airline? List and briefly describe the customer data elements generated during these interactions (making a reservation, using frequent flyer miles, completing a flight.) How does information from CRM improve these interactions?

MIS IN ACTION

Go to www.alaskaair.com and answer the following questions:

1. What promotions is Alaska Airlines currently offering? (Promotions may be featured on the home page or found by using the Deals menu near the top of the page.)
2. What types of data do you think contributed to the airline's decision to offer these specific promotions?
3. Select a specific promotion or deal and make an educated guess as to why Alaska Airlines is featuring it. Who might be the target of this promotion? Do you think this is an effective marketing technique? Why or why not?

systems and systems for supply chain management and customer relationship management 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 company several years to complete a large-scale implementation of an enterprise system or a system for supply chain management or customer relationship management. The total implementation cost of a large system, including software, database tools, consulting fees, personnel costs, training, and perhaps hardware costs, might amount to four to five times the initial purchase price for the software.

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. This requires new organizational learning.

Supply chain management 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 did not understand how much organizational change was required. Kmart had trouble getting products to store shelves when it implemented supply chain management software from i2 Technologies in July 2000. The i2 software did not work well with Kmart's promotion-driven business model, which creates sharp spikes and drops in demand for products, and it was not designed to handle the massive number of products stocked in Kmart stores.

Hershey Foods' profitability dropped when it tried to implement SAP enterprise software, Manugistics SCM software, and Siebel Systems CRM software on a crash schedule in 1999 without thorough testing and employee training. Shipments ran two weeks late, and many customers did not receive enough candy to stock shelves during the busy

Halloween selling period. Hershey lost sales and customers during that period, although the new systems eventually improved operational efficiency.

The Interactive Session on Organizations describes another company's struggle to implement enterprise software. Invacare, a leading health care products manufacturer, had trouble making some of the modules of Oracle's E-Business Suite perform properly. Its experience illustrates some of the problems that occur when a company tries to make enterprise software work with its unique business processes.

Enterprise applications also introduce "switching costs." Once 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 will need to understand exactly how your business uses its data and how the data would be organized in a customer relationship management, supply chain management, or enterprise system. CRM systems typically require some data cleansing work.

In a nutshell, it takes a lot of work to get enterprise applications to work properly. Everyone in the organization must be involved. Of course, for those companies that have successfully implemented CRM, SCM, and enterprise systems, the results have justified the effort.

EXTENDING ENTERPRISE SOFTWARE

Today many experienced business firms are looking for ways to wring more value from their enterprise applications. One way is to make them more flexible, Web-enabled, and capable of integration with other systems. The major enterprise software vendors have created what they call *enterprise solutions*, *enterprise suites*, or *e-business suites* to make their customer relationship management, supply chain management, and enterprise systems work closely together with each other, and link to systems of customers and suppliers. SAP's mySAP and Oracle's e-Business Suite are examples.

Service Platforms

Another way of leveraging investments in enterprise applications is to use them to create service platforms for new or improved business processes that integrate information from multiple functional areas. These enterprise-wide service platforms provide a greater degree of cross-functional integration than the traditional enterprise applications. A **service platform** integrates multiple applications from multiple business functions, business units, or business partners to deliver a seamless experience for the customer, employee, manager, or business partner.

For instance, the order-to-cash process involves receiving an order and seeing it all the way through obtaining payment for the order. This process begins with lead generation, marketing campaigns, and order entry, which are typically supported by CRM systems. Once the order is received, manufacturing is scheduled and parts availability is verified—processes that are usually supported by enterprise software. The order then is handled by processes for distribution planning, warehousing, order fulfillment, and shipping, which are usually supported by supply chain management systems. Finally, the order is billed to the customer, which is handled by either enterprise financial applications or accounts receivable. If the purchase at some point required customer service, customer relationship management systems would again be invoked.

A service such as order-to-cash requires data from enterprise applications and financial systems to be further integrated into an enterprise-wide composite process. To accomplish this, firms need software tools that use existing applications as building blocks for new cross-enterprise processes (see Figure 8-12). Enterprise application vendors provide middleware and tools that use XML and Web services for integrating enterprise applications with older legacy applications and systems from other vendors.

INTERACTIVE SESSION: ORGANIZATIONS**Invacare Struggles with Its Enterprise System Implementation**

Invacare, headquartered in Elyria, Ohio, is the world's leading manufacturer and distributor of non-acute health care products, including wheel chairs, motorized scooters, home care beds, portable compressed oxygen systems, bath safety products, and skin and wound care products. It conducts business in over 80 countries, maintaining manufacturing plants in the United States and 11 other nations. Invacare sells its products primarily to over 25,000 home health care and medical equipment provider locations in the United States, Europe, Australia, New Zealand, and Canada, with the remainder of its sales primarily to government agencies and distributors. The company also distributes medical equipment and related supplies manufactured by other companies.

Invacare does not maintain much inventory. It manufactures most of its products to meet near-term demands, and it builds some of its products to order. It is constantly revising and expanding its numerous product lines.

In 2004, Invacare began working on replacing a collection of homemade legacy systems for purchase to payable processes with modules from Oracle's 11i E-Business Suite. Invacare had been using Oracle database software and had implemented the financial modules from Oracle E-Business Suite four years earlier. The company experienced no problems implementing and using the Oracle E-Business financial modules.

However, Invacare ran into problems when it went live with new order-to-cash modules, which let a company receive an order, allocate supplies to build it, and provide customer access to order status. Invacare's information systems specialists had tested the software under real-world business conditions and everyone felt the software was ready to be used in actual business operations.

When the new system went live in October 2005, the software would not perform properly. "Our systems were locking up," observed Greg Thompson, Invacare's Chief Financial Officer. Invacare call center representatives were unable to answer customer telephone calls in a timely manner. When they did talk with customers, they could not find complete information in the system about stock availability and shipment dates for products. The company was unable to ship products to customers within required lead times. Invacare's management never expected the implementation to be trouble-free, but it clearly did

not foresee the magnitude of the problems it experienced with the new system.

As a result of the malfunctioning software, Invacare lost sales and had higher than usual levels of returned goods. It also incurred extra expenses for expediting product orders and for paying for employee overtime in its manufacturing, distribution, and customer-service departments. Two months of sales disruptions caused Invacare to cut its fourth-quarter 2005 revenue estimate to between \$370 million and \$380 million, lower than the previous year and well below the 2 percent sales increase the company had previously projected. Losses totaled \$30 million for the quarter and extended into the first quarter of 2006.

The new system also changed some of the company's internal controls over financial reporting, and some of these controls did not function as intended. During the final quarter of 2005, Invacare had to perform a physical year-end inventory count for its North American operations, and take special steps to validate the figures used in financial statements.

According to Thompson, Invacare's problems were not caused by the Oracle software but by the way that Invacare configured the software and integrated its business processes with the new system. He and other Invacare management also believe that the company should have done more testing work.

Oracle worked closely with Invacare to resolve the problems, and Thompson was pleased by Oracle's response. "Oracle has been very helpful in working with our teams to resolve the issues we've identified," he said. Thompson anticipated all ordering and invoicing problems to be cleared up by early 2006.

Thompson also expressed hope that the new ERP system will provide enough value to offset the company's losses from the system. Invacare spent \$20 million on its ERP implementation. The final phase of ERP implementation was scheduled for completion in late 2007 or early 2008, so it's still too early to tell whether Invacare's ERP system will justify its costs.

Sources: "Invacare Corporation 10-K Annual Report," filed March 3, 2007; Marc Songini, "Faulty ERP App Results in Shortfall for Medical Firm," *Computerworld*, January 2, 2006 and "Medical Products Maker Invacare Faces Rough ERP Ride," *Computerworld*, December 20, 2006.

CASE STUDY QUESTIONS

1. How did problems implementing the Oracle enterprise software affect Invacare's business performance?
2. What people, organization, and technology factors affected Invacare's ERP implementation?
3. If you were Invacare's management, what steps would you have taken to prevent these problems?

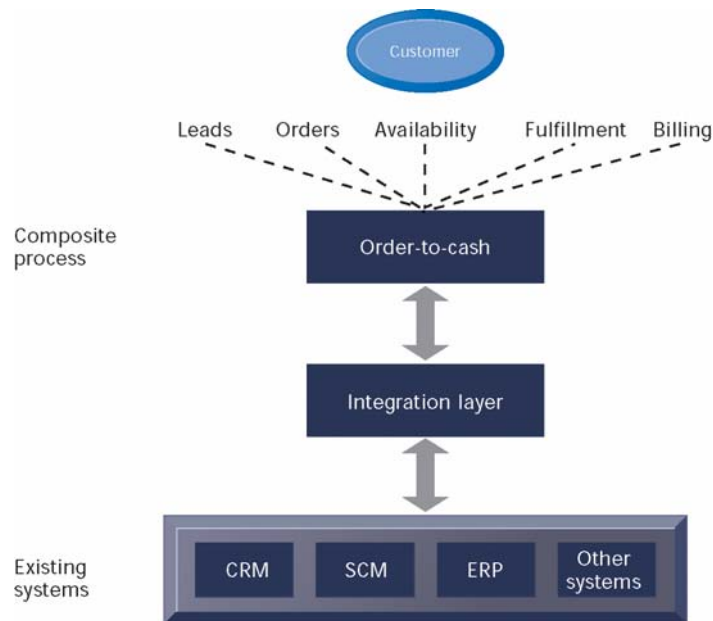
MIS IN ACTION

Visit the Oracle Web site and explore its section on Oracle E-Business Suite. Listen to one of Oracle's podcasts about this software. Then answer the following questions:

1. List and describe the capabilities of the order management modules.
2. How would the order management modules benefit a company such as Invacare? Describe how Invacare would use these capabilities.

Figure 8-12 Order-to-Cash Service

Order-to-cash is a composite process that integrates data from individual enterprise systems and legacy financial applications. The process must be modeled and translated into a software system using application integration tools.



Increasingly, these new services will be delivered through portals. Today's portal products provide frameworks for building new composite services. Portal software can integrate information from enterprise applications and disparate in-house legacy systems, presenting it to users through a Web interface so that the information appears to be coming from a single source.

8.5 Hands-On MIS

The projects in this section give you hands-on experience evaluating supply chain management software for a real-world company, using database software to manage customer service requests, and evaluating supply chain management business services.



ACHIEVING OPERATIONAL EXCELLENCE: IDENTIFYING SUPPLY CHAIN MANAGEMENT SOLUTIONS

Software skills: Web browser and presentation software

Business skills: Locating and evaluating suppliers

In this project, you will use the Web to identify the best suppliers for one component of a dirt bike and appropriate supply chain management software for a small manufacturing company.

A growing number of Dirt Bikes's orders cannot be fulfilled on time because of delays in obtaining some important components and parts for its motorcycles, especially their fuel tanks. Complaints are mounting from distributors who fear losing sales if the dirt bikes they have ordered are delayed too long. Dirt Bikes's management has asked you to help it address some of its supply chain issues.

- Use the Internet to locate alternative suppliers for motorcycle fuel tanks. Identify two or three suppliers. Find out the amount of time and cost to ship a fuel tank (weighing about five pounds) by ground (surface delivery) from each supplier to Dirt Bikes in Carbondale, Colorado. Which supplier is most likely to take the shortest amount of time and cost the least to ship the fuel tanks?
- Dirt Bikes's management would like to know if there is any supply chain management software for a small business that would be appropriate for Dirt Bikes. Use the Internet to locate two supply chain management software providers for companies such as Dirt Bikes. Briefly describe the capabilities of the two software applications and indicate how they could help Dirt Bikes. Which supply chain management software product would be more appropriate for Dirt Bikes? Why?
- (Optional) Use electronic presentation software to summarize your findings for management.

IMPROVING DECISION MAKING: USING DATABASE SOFTWARE TO MANAGE CUSTOMER SERVICE REQUESTS

Software skills: Database design, querying, and reporting

Business skills: Customer service analysis

In this exercise, you will 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 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, 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.

Management is not happy with this arrangement because the most important and profitable clients—those with accounts of more than \$70,000—are treated no differently from its clients with small accounts. It would like to find a way to provide its best customers with better service. Management would also like to know which types of service problems occur the 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 on the Laudon Web site for Chapter 8. A sample is illustrated below. It includes fields for the account ID, company (account) name, street address, city, state, ZIP code, account size (in dollars), contact last name, contact first name, and contact telephone number. The contact is the name of the person in each company who is responsible for contacting Prime about maintenance and repair work. Use your 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 15 service requests. Create several reports that would be of inter-

| ACCT_ID | NAME | ADDR | CITY | STATE | ZIP | DOLLAR_SIZE | CONTACT_FIR | CONTACT_LAS | PHONE |
|---------|-------------------|-----------------|-----------|-------|------------|-------------|-------------|-------------|----------------|
| 1 | Able Association | 123 Axion Stree | Albertain | NY | 11444-4444 | \$50,000 | Alison | Ableson | (209) 111-1111 |
| 2 | Briggs Bakery | 123 Boggs Stre | Brimstone | CT | 11200-1234 | \$94,000 | Barry | Berryman | (210) 111-1212 |
| 3 | Constant Carriers | 31 Carmine Le | Carver | NJ | 20111-1212 | \$200,000 | Carl | Compress | (202) 123-1222 |
| 4 | Darning Drapers | 1234 Dante Ave | Dribble | NY | 12345-6849 | \$60,000 | Delilah | Dilman | (209) 123-4321 |
| 5 | Eagle Engineers | Eagle Park | Edmonton | CT | 11222-2313 | \$45,000 | Eddie | Exeter | (210) 212-2233 |
| * | (AutoNumber) | | | | | \$0 | | | |

est to management, such as a list of the highest- and lowest-priority accounts or a report showing the most frequently occurring service problems. Create a report showing customer service representatives which service calls they 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

Trucking companies no longer merely carry goods from one place to another. Some also provide supply chain management services to their customers and help them manage their information. In this project, you will use the Web to research and evaluate two of these business services.

Investigate the Web sites of two companies, J.B. Hunt 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 their clients?
- How can customers use the Web sites of each company to help them with supply chain management?
- Compare the supply chain management services provided by these companies. Which company would you select to help your firm manage its supply chain? Why?

LEARNING TRACKS

The following Learning Tracks provide content relevant to topics covered in this chapter:

1. SAP Business Process Map
2. Business Processes in Supply Chain Management and Supply Chain Metrics
3. Best Practices Business Processes in CRM Software

Review Summary

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 new information is entered by one process, 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 generated by enterprise systems helps managers evaluate organizational performance.

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

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 to sell new products and services. These systems also identify profitable or nonprofitable 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.

4 What are the challenges posed by enterprise applications? 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.

5 How are enterprise applications used in platforms for new cross-functional services? Service platforms integrate data and processes from the various enterprise applications (customer relationship management, supply chain management, and enterprise systems), as well as from disparate legacy applications to create new composite business processes. Web services tie various systems together. The new services are delivered through enterprise portals, which can integrate disparate applications so that information appears to be coming from a single source.

Key Terms

Analytical CRM, 282
Bullwhip effect, 273
Churn rate, 283
Cross-selling, 280
Customer lifetime value (CLTV), 282
Demand planning, 275

Employee relationship management (ERM), 279
Just-in-time, 273
Operational CRM, 282
Partner relationship management (PRM), 279
Pull-based model, 277
Push-based model, 277

Service platform, 286
Supply chain, 272
Supply chain execution systems, 275
Supply chain planning systems, 274
Touch point, 279

Review Questions

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.
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 pull-based model of supply chain management and explain how contemporary supply chain management systems facilitate a pull-based model.
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).
 - Describe the tools and capabilities of customer relationship management software for sales, marketing, and customer service.
 - Distinguish between operational and analytical CRM.
4. What are the challenges posed by enterprise applications?
 - List and describe the challenges posed by enterprise applications
 - Explain how these challenges can be addressed.
5. How are enterprise applications used in platforms for new cross-functional services?
 - Define a service platform and describe the tools for integrating data from enterprise applications.

Discussion Questions

1. Supply chain management is less about managing the physical movement of goods and more about managing information. Discuss the implications of this statement.
2. If a company wants to implement an enterprise application, it had better do its homework. Discuss the implications of this statement.

Video Case

You will find a video case illustrating some of the concepts in this chapter on the Laudon Web site along with questions to help you analyze the case.

Teamwork

Analyzing Enterprise Application Vendors

With a group of three or four 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 i2 and JDA Software's Manugistics, or the customer relationship management systems of Oracle's Siebel Systems and Salesforce.com. Use what you have learned from these companies' Web sites to compare the software packages 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 as well as a large one? If possible, use electronic presentation software to present your findings to the class.

BUSINESS PROBLEM-SOLVING CASE

Sunsweet Growers Cultivates Its Supply Chain

Sunsweet Growers Inc. is an agricultural cooperative headquartered in Yuba City, California, and is the largest handler of dried tree fruits in the world. Sunsweet processes and markets 40,000 cases of dried fruit every day. In addition to dried cranberries, apricots, pineapples, and many other fruits, Sunsweet produces more than 50,000 tons of prunes annually for over one-third of the global market.

With 400 member-owners of orchards located primarily in the Sacramento and San Joaquin valleys of central California, Sunsweet has unique supply chain management issues. Most companies are constrained by either demand or supply, but not both. But in Sunsweet's case, both demand and supply are determined by factors that the company does not control. Sunsweet cannot control its supply, which is determined by the weather and growing season, or its demand, which is set by the market.

Like many manufacturers, Sunsweet sees spikes in demand for its products around holidays, such as Christmas and Easter. The growers harvest their fruit in August, September, and October, triggering a furious effort at the processing plant to dry, store, and package the fruit for delivery to retail stores. However, with the source limited to 400 growers in one geographic area, the supply of fruit varies significantly from year to year.

When demand peaked around the holidays, Sunsweet often found itself shelling out extra money to pay workers overtime in order to fulfill its orders. Scheduling and planning the production and distribution of dozens of varieties and sizes of fruits in packaging bearing 20 different languages was a complex operation.

Sunsweet needed to improve scheduling and line utilization while reducing inventory, transportation costs, and order lead time. To address these supply chain management issues, Sunsweet adopted a sales and operations planning (S&OP) program, which seeks to balance demand and supply on a regular and formal basis and keep them balanced as conditions change. S&OP helps businesses routinely handle unexpected events such as unanticipated demand, shortages in supply, and production disruptions.

Prior to implementing S&OP, Sunsweet managed its supply chain with a paper-based spreadsheet system. That system became increasingly inadequate as the business grew more complex due to outdated data, difficulty in supporting collaboration, and a lack of powerful tools for representing the business problem. Sunsweet's planners spent too much managing the spreadsheets, and performing tasks such as cost analysis often required up to three days of work. The company wanted to perform planning and analysis tasks in hours, not days, and the ability to model multiple versions of a production plan to schedule its plant production resources more efficiently. Sunsweet found the solution in the Zemeter S&OP supply chain management suite from Supply Chain Consultants.

With Zemeter replacing the old Excel-based system, Sunsweet revamped its forecast meetings. Previously, each group involved in the supply chain went to those monthly meetings with their own set of data and little understanding of any other department's data. One of the first, and most important, steps that Sunsweet took under its new S&OP project was to scrub all of its data

and unify them in one database. Using one set of data was key to getting all supply chain participants to work most effectively with each other for the good of the whole cooperative.

Of course, getting line manufacturing supervisors, customer service representatives, schedulers, salespeople, engineers, and others on board with the new program required careful change management. Sunsweet's managers realized that it was important to show the value of S&OP early in the transformation. Such value would be demonstrated in the first phase of a five-phase implementation—demand visibility. By its very nature, improving demand visibility necessitated better communication and decision making at every level. It was also during this phase that all of Sunsweet's various groups first gained access to the same data and each other's goals.

Sunsweet needed just four weeks to implement the demand visibility phase. By its end, Sunsweet had also established parameters for training users, tested the scalability of the program, and initiated the program without disrupting the existing workflow.

The next phase of the S&OP project was demand planning. This phase provided Sunsweet's complete forecasting solution, which, in addition to providing a demand plan routinely, tracked and maintained improvements to the plan. Specific capabilities included creating and updating statistical forecasts, preparing plans for price changes and promotions, and analyzing demand data such as orders and shipments. Zementer's Demand Planner module analyzes input from multiple sources and outputs the best plan from the proposals. Sunsweet gained an objective method of balancing sales forecasts and operational plans. Demand Planner also helped Sunsweet improve the accuracy of its operational budget.

The demand planning phase included implementation of an early-warning system that dispenses e-mail alerts to the proper employees under various circumstances. The alerts give departments a head start in reviewing metrics when events dictate that plans might need to be altered to keep operations in sync. For example, an increase in new customers or a change in the most popular items for a particular customer would be cause for a review. Continuous planning taking into account the latest available data became a key element of the company's business processes.

Inventory planning was the third phase of the S&OP project. The new inventory systems calculated current inventory and used data about inventory history to detect trends and predict problems before they caused significant losses.

In phase four, Sunsweet addressed supply planning. The cooperative added a Supply Planner module to raise the effectiveness of planning across its network of

suppliers, with particular attention to maintaining a uniform labor force throughout the year. By taking into consideration the limits on production and supply in conjunction with a 15-month rolling forecast, Sunsweet evened out its production requirements instead of basing them on seasonal demands.

The fifth phase of the implementation was finite scheduling, which had to do with the daily operational activities at the cooperative's plant headquarters. Finite scheduling handles fruit-size issues, material availability, overtime and downtime, changeover times on the packing lines, and other shift and workday oriented issues.

Prior to implementing the S&OP program, Sunsweet left tasks such as sales forecasting, operational planning, inventory planning, and finite scheduling to monthly meetings using summarized sales information. These meetings resulted in a tendency to meet sales forecasts and customer requirements with little consideration for operational costs. With Zementer in place, Sunsweet moved its planning processes to weekly meetings using the latest information. With everyone sharing the most up-to-date information about finite scheduling, daily production, and inventory levels, Sunsweet was better positioned to meet customer demands without throwing off operational costs and long-term production plans.

Sunsweet achieved its return on investment in its S&OP system in about half the time it anticipated—six and a half months—while the implementation was still ongoing. Sunsweet improved the accuracy of its forecasts by 15 to 20 percent while reducing the amount of time necessary to make forecasts. The early warning e-mail alert system moved up responses to problems such as supply shortages and order discrepancies by two to three weeks. Planning and cost analysis tasks that used to take days using spreadsheets are now completed in four to five hours. Information from the system enabled Sunsweet to reduce the number of production lines, production line changeovers, inventory, and transportation costs, and cut overtime from 30 percent down to 10 percent.

Another by-product of the program was a more efficient and collaborative environment. The integration of data across the company ushered in cross-functional metrics, such as measurements of how well current inventory supports forecasts.

Once the S&OP program was implemented, several obstacles remained. In some cases, the problem was modern supply chain software, which is very liberal in permitting custom configurations. As the circumstances surrounding an organization's business processes change, workers may find it difficult to make the necessary changes in the custom-configured software. Instead, with easy access to desktop productivity tools, they introduce ad-hoc solutions into the process, thereby

weakening the mainstream system. Sunsweet mitigated this concern by incorporating the desktop into the integrated S&OP system. Employees were still able to work with data on their desktops, but the scrubbed and validated data on the system remained reliable.

In some supply chain planning implementations, only a few planners are responsible for the bulk of the application setup. When these planners move on to other tasks or other jobs, they take the knowledge of the initial setup methodology with them. Sunsweet avoided this complication by involving a wide swath of the organization in the planning phases. Furthermore, a large portion of the organization maintains access to the integrated data.

Another complexity of S&OP is that it addresses problems in the supply chain before they surface. This can create a false sense of security and lead to the conclusion that planning is no longer a critical issue. Rather than remaining dedicated to continuous planning, an organization may drop it as a high priority and begin to streamline the process. Sunsweet still confronts this issue regularly, looking for ways to stress that continuous refinement and improvement are paramount to a successful S&OP.

Successful S&OP programs include processes to sustain them. Among these are continuing education and training for departments whose decisions impact the supply chain; encouragement of management training;

ensuring transparency of decisions affecting the supply chain and supply chain data; development of a structure and budget that leave room for responding to crises; and recognition of achievements.

Today, Sunsweet is more successful at deploying its assets to satisfy demand projections. The cooperative has reduced inventory and transportation costs.

Sources: Harold Upton and Harpal Singh, "Balanced S&OP: Sunsweet Growers's Story," *Supply Chain Management Review*, March 1, 2007; Jane Lee, "Making Your Supply Chain a Competitive Advantage: Implementing S&OP," www.supplychainbrain.com, accessed June 6, 2007; Amy Roach Partridge, "Unwrapping Seasonality Challenges," www.inboundlogistics.com, November 2006; Chris Chiappinelli, "Sales and Operations Planning: The New Crystal Ball," www.managingautomation.com, January 22, 2007; "About Sunsweet," www.sunsweet.com, accessed June 6, 2007; and Jim Wasserman, "Growing Globally," *The Sacramento Bee*, December 4, 2005.

Case Study Questions

1. What are the constraints on Sunsweet Growers's supply chain?
2. What problems did Sunsweet Growers encounter as a result of these constraints? What was their business impact?
3. Describe sales and operations planning. What are its principles? What disciplines does it involve?
4. How did S&OP software help Sunsweet Growers better manage its supply chain?
5. What additional ways can you think of for Sunsweet Growers to ease its supply chain concerns?