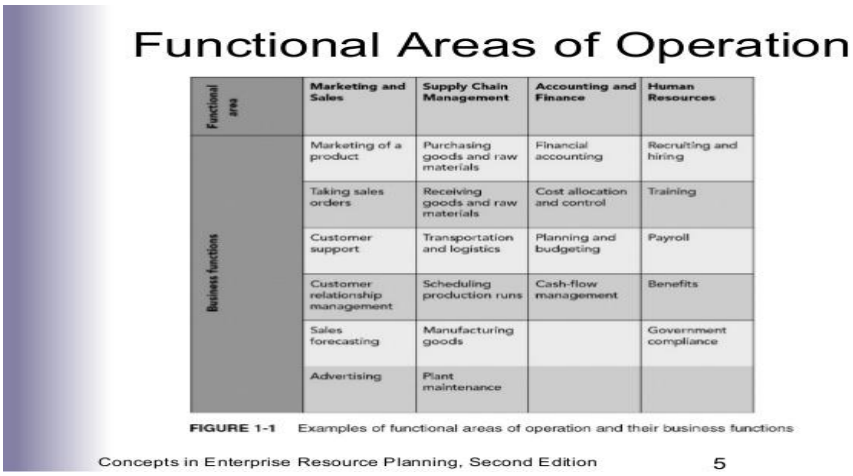
Enterprise Resource Planning
Unit – 1

Enterprise Resource Planning (ERP) programs are core software used by companies to coordinate information in every area of the business. ERP programs help to manage companywide business processes.
A **business process** is a collection of activities that takes one or more kinds of input and creates an output.

ERP software supports the efficient operation of business processes by integrating throughout a business tasks related to sales, marketing, manufacturing, logistics, accounting, and staffing. In later chapters, you will learn how successful businesspeople use ERP programs to improve how work is done within a company.

Functional Areas of Operation

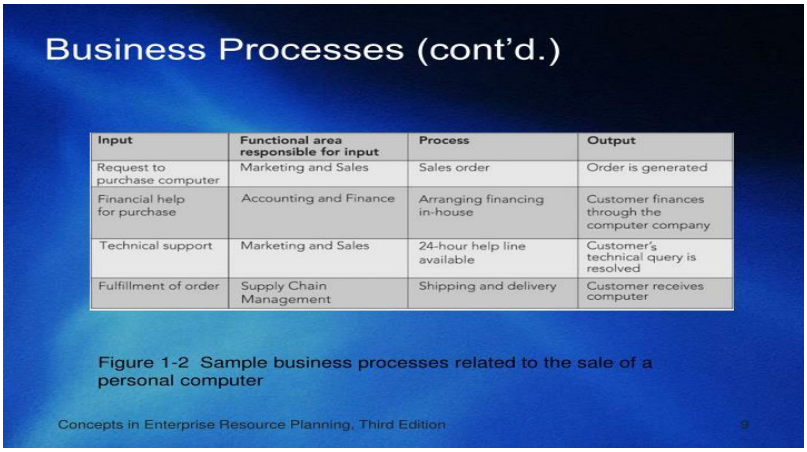
Most companies have four main functional areas of operation:
Marketing and Sales (M/S), **Supply Chain Management (SCM)**, **Accounting and Finance (A/F)**, and **Human Resources (HR)**.



An **information system (IS)** includes the computers, people, procedures, and software that store, organize, and deliver information.

Business Processes

Recently, managers have begun to think in terms of business processes rather than business functions. Recall that a business process is a collection of activities that takes one or more kinds of input and creates an output that is of value to the customer.



What is the difference between a **business function** and a **business process** from the customer's point of view? Suppose the customer's computer is damaged during shipment. Because only one functional area is involved in accepting the damaged item, receipt of the return is a ***business function*** and is handled by the customer relationship management function of Marketing and Sales.

Because several functional areas are involved in repair and return of the computer, the handling of the repair is a ***business process***.

Sharing data effectively and efficiently between and within functional areas leads to more efficient business processes. Information systems can be designed so that functional areas share data. These systems are called **integrated information systems**.

Marketing and Sales

The functions of Marketing and Sales include developing products, determining pricing, promoting products to customers, and taking customers' orders. M/S also helps to create a sales forecast to ensure the successful operation of the lemonade stand. Product development can be done informally in such a simple business; you gather information about who buys which kind of lemonade and note what customers say about each product. You also analyze historical sales records to spot trends that are not obvious. Deciding whether to sell a product also depends on how much it costs to produce the product.

Supply Chain Management

The functions within Supply Chain Management include making the lemonade (manufacturing/production) and buying raw materials (purchasing). Production is planned so that, as much as possible, lemonade is available when needed, without excess production of lemonade that must be liquidated. This planning requires sales forecasts from the M/S functional area. **Sales forecasts** are analyses that attempt to predict the future sales of a product. A forecast's accuracy will be improved if it is based on historical sales figures.

Accounting and Finance

Functions within Accounting and Finance include recording raw data about transactions (including sales), raw material purchases, payroll, and receipt of cash from customers. Raw data are simply numbers collected from those operations, without any manipulation, calculation, or arrangement for presentation. Those data are then summarized in meaningful ways to determine the profitability of the lemonade stand and to support decision making. Note that data from Accounting and Finance are used by Marketing and Sales as well as by Supply Chain Management.

Human Resources

Even a simple business needs employees to support the M/S and SCM functional areas, which means that the business must recruit, train, evaluate, and compensate employees. These are the functions of Human Resources.
At the lemonade stand, the number of employees and the timing of hiring depend on the level of lemonade sales. HR uses sales forecasts developed by the individual departments to plan personnel needs. A part-time helper might be needed at forecasted peak hours or days. How much should a part-time helper be paid? That depends on prevailing job market conditions, and it is HR's job to monitor those conditions.

FUNCTIONAL AREA INFORMATION SYSTEMS

It describe potential inputs and outputs for each functional area.

Marketing and Sales

The Marketing and Sales area needs information from all other functional areas to do its job.

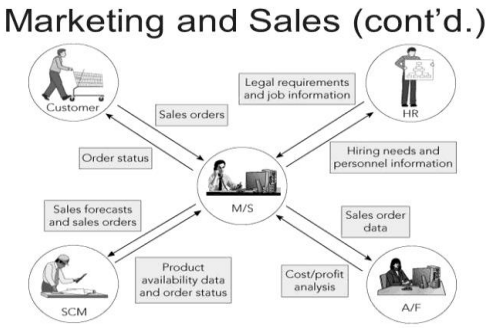


Figure 1-4 The Marketing and Sales functional area exchanges data with customers and with the Human Resources, Accounting and Finance, and Supply Chain Management functional areas

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Customers communicate their orders to M/S in person or by telephone, e-mail, fax, the Web, and so on. In the case of Web-based systems, customer and order data should be stored automatically in the information system; otherwise, data must be stored manually, by a person typing data into a keyboard or point-of-sale system, or using a bar code reader or other device. Sales orders must be passed to SCM for planning purposes and to A/F for billing. Sales order data are also valuable for analyzing sales trends for business decision making. For example, M/S management might use a report showing the trend of a product's sales to evaluate marketing efforts and to determine strategies for the sales force.

Inputs for M/S include:

● Customer data
● Order data
● Sales trend data
● Per-unit cost
● Travel expense company policy

Outputs for M/S include:
● Sales strategies
● Product pricing
● Employment needs

Supply Chain Management

Supply Chain Management also needs information from the various functional areas.

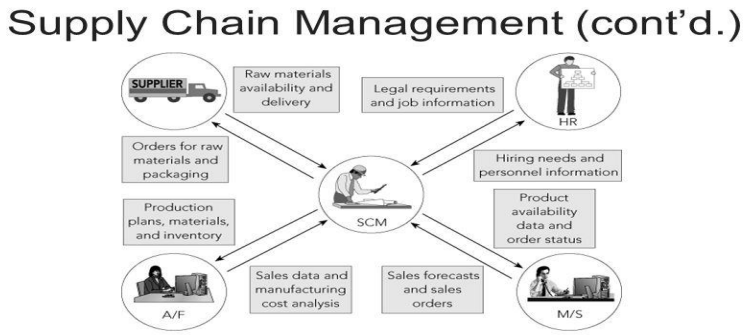


Figure 1-5 The Supply Chain Management functional area exchanges data with suppliers and with the Human Resources, Marketing and Sales, and Accounting and Finance functional areas

Supply Chain Management records can provide the data needed by Accounting and Finance to determine how much of each resource (materials, labor, supplies, and overhead) was used to make completed products in inventory.
Supply Chain Management data can support the M/S function by providing information about what has been produced and shipped. For example, some computer manufacturers, such as Gateway, have automated systems that call customers to notify them that their computer order has been shipped. Shipping companies, such as UPS and FedEx, provide shipment-tracking information on the Internet. By entering a tracking number, the customer can see each step of the shipping process by noting where the package's bar code was scanned. Thus, accurate and timely production information can support the sales process and increase customer satisfaction. For long-range planning, management might want to see monthly reports showing sales and production figures. The data for such reports must come from the production and inventory data. Supply Chain Management also interacts in some ways with Human Resources. SCM passes hiring information to HR, and HR informs SCM of the company's layoff and recall policy, which might pertain to workers in the plant.

Inputs for SCM include:
● Product sales data
● Production plans
● Inventory levels
● Layoff and recall company policy

Outputs for SCM include:
● Raw material orders
● Packaging orders
● Resource expenditure data
● Production and inventory reports
● Hiring information

Accounting and Finance

Accounting and Finance needs information from all the other functional areas to complete its jobs accurately. People in other functional areas provide data to A/F: M/S provides sales data, SCM provides production and inventory data, and HR provides payroll and benefit expense data. The accuracy and timeliness of A/F data depend on the accuracy and timeliness of the data from the other functional areas. M/S personnel require data from A/F to evaluate customer credit. If an order will cause the customer to exceed his or her credit limit, M/S should see that the customer's accounts receivable balance (the amount owed to the company) is too high and hold new orders until the customer's balance is lowered. If A/F is slow to record sales, the accounts receivable balances will be inaccurate, and M/S might approve credit for customers who have already exceeded their credit limits and who might never pay off their

accounts. If A/F does not record customers' payments promptly, the company could deny credit to customers who actually owe less than their credit limit, potentially damaging the company's relationship with those customers.

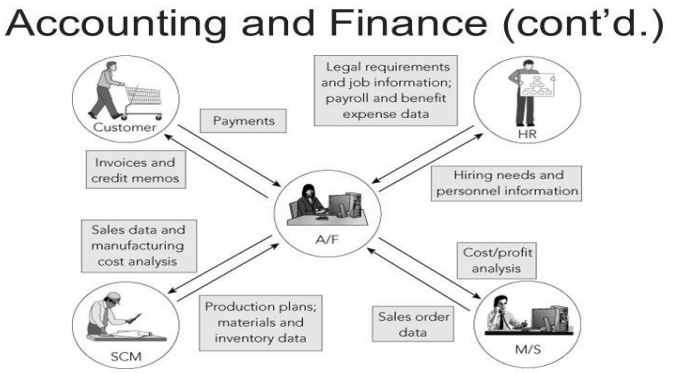


Figure 1-6 The Accounting and Finance functional area exchanges data with customers and with the Human Resources, Marketing and Sales, and Supply Chain Management functional areas

To summarize, inputs for A/F include:
- Payments from customers
- Accounts receivable data
- Accounts payable data
- Sales data
- Production and inventory data
- Payroll and expense data

Outputs for A/F include:
- Payments to suppliers
- Financial reports
- Customer credit data

Human Resources

Like the other functional areas, HR also needs information from the other departments to do its job accurately.

Figure 1-7 The Human Resources functional area exchanges data with the Accounting and Finance, Marketing and Sales, and Supply Chain Management functional areas

State and federal laws require companies to observe many governmental regulations in recruiting, training, compensating, promoting, and terminating employees—and these regulations must be observed company-wide. Usually, it is also HR's responsibility to ensure that employees receive training in a timely manner, and that they get certified (and recertified) in key skills, such as materials handling and equipment operation. HR must also administer wages, salaries, raises and bonuses. For these and other reasons, corporate HR needs timely and accurate data from other areas.

Inputs for HR include:
- Personnel forecasts
- Skills data

Outputs for HR include:

- Regulation compliance
- Employee training and certification
- Skills database
- Employee evaluation and compensation

THE EVOLUTION OF INFORMATION SYSTEMS

Until recently, most companies had unintegrated information systems that supported only the activities of individual business functional areas. Thus, a company would have a Marketing information system, a Production information system, and so on, each with its own hardware, software, and methods of processing data and information. This configuration of information systems is known as **silos** because each department has its own stack, or silo, of information that is unconnected to the next silo. Silos are also known as stovepipes. Such unintegrated systems might work well within individual functional areas, but to achieve its goals, a company must share data among all the functional areas. When a company's information systems are not integrated, costly inefficiencies can result.

The development of ERP system SAP R/3

SAP was the first company to develop software for ERP systems and is the current market leader in ERP software sales. According to some estimates, SAP is used to complete 50 percent of the world's business transactions. As of 2007, SAP had 33,000 customers and seeks to triple that number by 2010.

In 1972, five former IBM systems analysts in Mannheim, Germany—Dietmar Hopp, Claus Wellenreuther, Hasso Plattner, Klaus Tschira, and Hans-Werner Hector—formed (Systems Analysis and Program Development, or SAP, pronounced "S-A-P.
To keep up with the ongoing development of mainframe computer technology, in 1978 SAP began developing a more integrated version of its software products, called the R/2 system. In 1982, after four years of development, SAP released its R/2 mainframe ERP software package.

Sales grew rapidly in the 1980s, and SAP extended its software's capabilities and expanded into international markets. This was no small task, because the software had to be able to accommodate different languages, currencies, accounting practices, and tax laws.

By 1988, SAP had established subsidiaries in numerous foreign countries, established a joint venture with consulting company Arthur Andersen, and sold its 1,000th system. SAP also became SAP AG, a publicly traded company.

SAP R/3
In 1988, SAP realized the potential of client-server hardware architecture and began development of its **R/3** system to take advantage of client-server technology. The first version of SAP R/3 was released in 1992. Each subsequent release of the SAP R/3 software contained new features and capabilities. The client-server architecture used by SAP allowed R/3 to run on a variety of computer platforms, including UNIX and Windows NT. The SAP R/3 system was also designed using an open architecture approach.

New Directions in ERP

In the late 1990s, the Year 2000, or Y2K, problem motivated many companies to move to ERP systems. As it became clear that the date turnover from December 31, 1999 to January 1, 2000 would wreak havoc on some information systems, companies searched for ways to consolidate data, and ERP systems provided one solution.

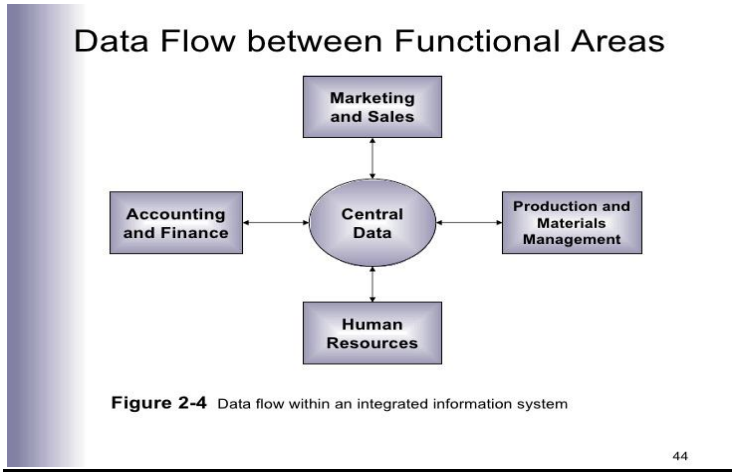
Y2K Problem

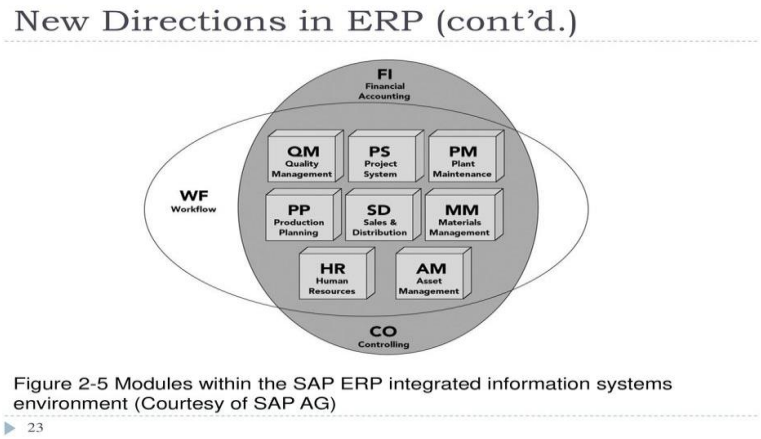
The Y2K problem originated from programming shortcuts made by programmers in the preceding decades. With memory and storage space a small fraction of what it is today, early programmers developed software that used as few computer resources as possible. To save memory, programmers in the 1970s and 1980s typically wrote programs that only used two digits to identify a year. For example, if an invoice was posted on October 29, 1975, the programmer could just store the date as 10/29/75, rather than 10/29/1975. While this may not seem like a big storage savings, with millions of transactions needing to be manipulated, it adds up. These programmers never imagined that software written in the 1970s would still be running major companies and financial institutions in 1999. These old systems were known as **legacy systems**. Many companies were faced with a choice: pay programmers millions of dollars to correct the Y2K problem in their old, limited software—or invest in an ERP system that would not only solve the Y2K problem, but potentially provide better management of their business processes as well. Thus, the Y2K problem led to a dramatic increase in business for ERP vendors in the late 1990s. However, the rapid growth of the 1990s was followed by an ERP slump starting in 1999. By 1999, companies were in the final stages of either an ERP implementation or modification of their existing software. Many companies that had not yet decided to move to a Y2K-compliant ERP system waited until after the new millennium to upgrade their information systems.

By 2000, SAP AG had 22,000 employees in 50 countries and 10 million users at 30,000 installations around the world. By that time, SAP had competition in the ERP market, namely from Oracle and PeopleSoft (PeopleSoft expanded its offerings through the acquisition of ERP software vendor JD Edwards in 2003). In late 2004, Oracle succeeded in its bid to take over PeopleSoft.

SAP ERP

SAP ERP software (previous versions were known as R/3, and later, mySAP ERP) has changed over the years due to product evolution and for marketing purposes. The latest versions of ERP systems by SAP and other companies allow all business areas to access the same database, as shown in Figure 2-4, eliminating redundant data and communications lags. Perhaps most importantly, the system allows data to be entered once, and then used throughout the organization.





The basic functions of each of the modules are as follows:

- The **Sales and Distribution (SD) module** records sales orders and scheduled deliveries. Information about the customer (pricing, how and where to ship products, how the customer is to be billed, and so on) is maintained and accessed from this module.
- The **Materials Management (MM) module** manages the acquisition of raw materials from suppliers (purchasing) and the subsequent handling of raw materials inventory, from storage to work-in-progress goods to shipping of finished goods to the customer.
- The **Production Planning (PP) module** maintains production information. Here production is planned and scheduled, and actual production activities are recorded.
- The **Quality Management (QM) module** plans and records quality control activities, such as product inspections and material certifications.
- The **Plant Maintenance (PM) module** manages maintenance resources and planning for preventive maintenance of plant machinery, to minimize equipment breakdowns.
- The **Asset Management (AM) module** helps the company to manage fixed asset purchases (plant and machinery) and related depreciation.
- The **Human Resources (HR) module** facilitates employee recruiting, hiring, and training. This module also includes payroll and benefits.
- The **Project System (PS) module** allows the planning for and control over new R&D, construction, and marketing projects. This module allows for costs to be collected against a project, and it is frequently used to manage the implementation of the SAP ERP system. PS manages build-to-order items, which are low-volume, highly complex products such as ships and aircrafts.

Two financial modules, FI and CO, are shown in Figure 2-5 as encompassing the modules described above. That is because nearly every activity in the company has an impact on the financial position of the company.

● The **Financial Accounting (FI) module** records transactions in the general ledger accounts. This module generates financial statements for external reporting purposes.
● The **Controlling (CO) module** serves internal management purposes, assigning manufacturing costs to products and to cost centers, so that the profitability of the company's activities can be analyzed. The CO module supports managerial decision making.
● The **Workflow (WF) module** is not a module that automates a specific business function. Rather, it is a set of tools that can be used to automate any of the activities in SAP ERP. It can perform task-flow analysis and prompt employees (by e-mail) if they need to take action. Workflow is ideal for business processes that are not daily activities, but that occur frequently enough to be
worth the effort to implement workflow, such as preparing customer invoices.

To summarize: ERP integrates business functional areas with one another. Before ERP, each functional area operated independently, using its own information systems and ways of recording transactions. ERP software also makes management reporting and decision making faster and more uniform throughout an organization. In addition, ERP promotes thinking about corporate goals, as opposed to thinking only about the goals of a single department or functional area. When top management is queried on the reasons for implementing ERP systems, the overriding answer is *control*. With the capability to see integrated data on their entire company's operation, managers use ERP systems for the control they provide, allowing them to set those corporate goals correctly.

Significance and benefits of ERP software and systems

The significance of ERP lies in its many benefits. Recall that integrated information systems
can lead to more efficient business processes that cost less than those in unintegrated
systems. In addition, ERP systems offer the following benefits:

● ERP allows easier global integration: Barriers of currency exchange rates, language, and culture can be bridged automatically, so data can be integrated across international borders.

● ERP integrates people and data while eliminating the need to update and repair many separate computer systems. For example, Boeing had 450 data systems that fed data into its production process. The company now has a single way to record production data.

ERP allows management to manage operations, not just monitor them. For example, without ERP, getting an answer to "How are we doing?" requires getting data from each business unit and then analyzing that data for a comprehensive, integrated picture. The ERP system already has all the data, allowing the manager to focus on improving processes. This focus enhances management of the company as a whole, and makes the organization more adaptable when change is required.

An ERP system can dramatically reduce costs and improve operational efficiency. For example, Rohm and Haas, the $8 billion chemical company, claims to have doubled revenue per employee over the past six years through productivity improvements due to an SAP implemenation. These improvements can lead to lower costs and more satisified customers. Toyota anticipates savings of $7 million from its new ERP system, which allows employees to access their own human resource records and gives group leaders access to shop floor information on employees. Toyota is saving an additional $50,000 annually by providing access to HR software through a Web browser, meaning that the company does not have to install or support HR software on worker's desktops.

Unit – 2

You will begin learning about the operations of Fitter Snacker (FS), a fictitious company that makes healthy snack bars and does not have an integrated information system

OVER VIEW OF FITTER SNACKER

Fitter Snacker manufactures and sells two types of nutritious snack bars: NRG-A and NRG-B. NRG-A touts "advanced energy." NRG-B boasts "body building proteins."
Each bar contains the following ingredients:
- Vitamins and Minerals: important nutrients
- Dry Base Mixture: oats, wheat germ, protein powder, and spices
- Wet Base Mixture: honey and canola oil

Each type of bar contains additional unique ingredients: NRG-A contains carob chips and raisins, while NRG-B contains hazelnuts and dates.

Fitter Snacker has organized its sales force into two groups, known as divisions:
The Wholesale Division and the Direct Sales Division.

Problems with Fitter Snacker's sales process

Many of Fitter Snacker's sales orders have some sort of problem, such as incorrect pricing, excessive calls to the customer for information, delays in processing orders, missed delivery dates, and so on. These problems occur because FS has separate information systems throughout the company for three functional areas: the sales order system, the warehouse system, and the accounting system. Information from each system is shared electronically through periodic file transfers (sales order system to accounting system) and manually by paper printout

Sales Quotations and Orders

A number of problems can occur with this process:
- The salesperson might make an arithmetic error in the sales quotation. For example, a salesperson in the Direct Sales Division might offer both a quantity discount and a discretionary discount. If the salesperson isn't careful, the two discounts combined might be so deep that the company receives little or no profit.
- Salespeople fax a copy of their sales quotations to the sales office, but sometimes the same customer calls to place an order before the fax is transmitted. The in-office clerk has no knowledge of the terms of the sale (which are outlined on the quotation) and must ask the customer to repeat the information.

On the other hand, even if the quotation has been faxed, the data might not have been entered into the customer database, and still the customer must repeat the order information, much to his annoyance. This situation can also lead to a duplicate order.

- The fax received by the sales office is a faxed copy of a handwritten form, and might not be legible.

Order Filling

To determine what to do in this situation, the order picker might have conversations with the warehouse supervisor, production supervisor, and sales clerks. Whatever the final decision, the warehouse supervisor has to contact the sales clerk so she can notify the customer (which doesn't always happen, when things are busy) and the Accounting department so they can change the invoice.

Accounting and Invoicing

Invoicing the customer is problematic as well. Three times a week, sales clerks send the Accounting department the disk containing the sales order data for customer invoices. The Accounting department loads the data into the PC-based accounting program; then, clerks manually make adjustments for partial shipments and any other changes that have occurred during the order process. Sometimes, order corrections are delayed and don't catch up to the invoicing process, resulting in late or inaccurate invoices. If the completed invoice is waiting to be mailed when the warehouse notifies Accounting of a partial shipment, then a new invoice must be prepared. In any case, an invoice is eventually sent to the customer, separate from the shipment.

Payment and Returns

Fitter Snacker's procedure for processing payments can yield frustrating results for customers. Almost all customers pay the invoice within 10 days to receive the 2 percent discount. If any errors have occurred in the sales process—from the original quotation to entering the order into the sales order program—the customer will receive an incorrect invoice. Even though FS provides customers with two invoice copies, many customers don't return a copy of the invoice with their payment, as instructed. Errors result if the correct customer's account isn't credited.

Sales and Distribution in ERP

An ERP system can improve the sales order process in several ways. Because ERP systems use a common database, they can minimize data entry errors and provide accurate information in real time to all users. An ERP system can also track all transactions (such as invoices, packing lists, RMA numbers, and payments) involved in the sales order. Let's look at how one ERP system, SAP's ERP and its Sales and Distribution module, manages the sales order process. Other ERP software handles the process in a similar fashion. In SAP ERP, important transactions and events are assigned a number for recordkeeping purposes. The electronic evidence of a transaction in SAP ERP is called a "document."

The SAP ERP Sales and Distribution module treats the sales order process as a cycle of events. SAP ERP defines up to six events for any sale:

- Pre-sales activities
- Sales order processing
- Inventory sourcing
- Delivery
- Billing
- Payment

Pre-Sales Activities

The first step in the SAP ERP sales and distribution process is Pre-Sales Activities. At this phase, customers can get pricing information about the company's products, either through an inquiry or a price quotation. The difference between an inquiry and a quotation is that a quotation is a written, binding document; the seller guarantees the buyer that, for some specified period of time, he can buy the product at the quoted price. The inquiry is simply a statement of prices, with no guarantee implied.
Pre-sales activities also include marketing activities such as tracking customer contacts, including sales calls, visits, and mailings. The company can maintain data about customers and generate mailing lists based on specific customer characteristics, which enhances targeted marketing efforts.

Sales Order Processing

In the SAP ERP system, sales order processing is the series of activities that must take place to record a sales order. The sales order can start from a quotation or inquiry generated in the pre-sales step. Any information that was collected from the customer to support the quotation (contact name, address, phone number) is immediately included in the sales order.
Some of the more critical steps in sales order processing are recording the items to be purchased, determining the selling price, and recording the order quantities. Users can define various pricing alternatives in the SAP ERP system. For example, a company can use product-specific pricing, such as quantity discounts, or it can define discounts that depend on both the product and a particular customer. Configuring a complex pricing scheme requires a significant amount of programming work, but once the system is in place, it will automatically calculate the correct price for each customer, eliminating many problems that FS experiences. During sales order processing, the SAP ERP system checks the Accounts Receivable tables in the SAP ERP database to confirm the customer's available credit. SAP ERP adds the value of the order to the credit balance, and then compares the result to the customer's credit limit (also available in the database). If the customer has sufficient credit available, the order is completed. If not, the SAP ERP system prompts sales personnel to either reject the order, call the customer to check on recent payments, or contact Accounting to discuss any extenuating circumstances.

Inventory Sourcing

When recording an order, the SAP ERP system checks the company's inventory records and the production planning records to see whether the requested material is available and can be delivered on the date the customer desires. This Available-to-Promise (ATP) check includes the expected shipping time, taking into account weekends and holidays. Fitter Snacker's current system does not provide a good method for checking inventory availability. In the SAP ERP system, availability is automatically checked and the system can recommend an increase in planned production if a shortfall is expected. SAP also keeps a record of all open orders, so even if the ordered product is still in the warehouse, the system will reserve it on the shelf, making it unavailable to other customers.

Delivery

In the SAP ERP system, the word **delivery** means releasing the documents that the warehouse uses to pick, pack, and ship orders, rather than the traditional definition of transferring goods. The delivery process allows deliveries to be created so that the warehouse and shipping activities are carried out efficiently (for example, combining similar orders for picking, or grouping orders based on shipping method and destination). Once the system has created the documents for picking, packing, and shipping, the documents are transferred to the Materials Management module, where the warehouse activities of picking, packing, and shipping are carried out.

Billing

Next, the SAP ERP system creates an invoice by copying the sales order data into the invoice document. Accounting can print this document and mail it, fax it, or transmit it electronically to the customer. Accounting records are also updated at this point. To record the sale, SAP ERP debits (increases) Accounts Receivable and credits Sales, thus updating the accounting records automatically.

Payment

When the customer sends in a payment (physically or electronically), it is automatically processed by the SAP ERP system, which debits cash and credits (reduces) the customer's account. Notice that the timely recording of this transaction has an effect on the timeliness and accuracy of any subsequent credit checks for the customer. Fitter Snacker has had a problem with getting accurate credit checks, frequently blocking orders for companies that are within their credit limit, while granting credit to other companies beyond what is advisable.

Customer relationship Management

Companies without a good connection between their workers and their customers run the risk of losing business. Take Fitter Snacker, for example. Let's say a salesperson calls on a good customer, Health Express. The salesperson offers Health Express deep discounts for buying a certain number of NRG bars. At the same time, the Marketing department is running a sale on NRG bars. Marketing sends Health Express a flyer advertising the discounted price, which is less than what the salesperson just offered in person. Meanwhile, the vice president of Fitter Snacker plays golf with the CEO of Health Express and offers yet another discount. The connection or relationship with the customer is confused. **customer relationship management (CRM) software** can help companies streamline their interactions with customers. Companies with an ERP system have an added benefit beyond systems integration: vast and complete quantities of data available for analysis. By adding other software tools to its ERP system, a company can extend the capabilities of the system, thus increasing its value.

Core CRM Activities

In general, all CRM software supports the following activities and tools:

● One-to-one marketing: Once a customer is categorized, the company can tailor products, promotions, and pricing accordingly. Customers can be offered products related to what they are now buying (cross-selling) or higher-margin products in the same lines (up-selling).

● Sales force automation (SFA): Occurrences of customer contacts are logged in the company's database. SFA software can automatically route customers who contact the company to a sales representative. Companies can use SFA software to forecast customer needs, based on the customer's history and transactions, and to alert sales representatives accordingly. Sometimes this software is called "lead management software" because a transaction can be tracked from the initial lead to post-sale follow-up.

● Sales campaign management: This software lets a company organize a marketing campaign and compile its results automatically.

● Marketing encyclopaedias: This software serves as a database of promotional literature about products. The material can be routed to sales representatives or customers as needed.

● Call centre automation: When customers call a company to get assistance with a company's products, representatives can query a knowledge management database containing information about the product. Some knowledge management software accepts queries in natural language. If the company must develop a new solution in response to a unique customer query, that information can be added to the knowledge base, which thus becomes "smarter."

The Benefits of CRM

CRM provides companies with these benefits:

● Lower costs: CRM can lead to operational efficiencies, such as better response times in call center operations and better use of sales force time, which lower costs.

● Higher revenue: Segmenting customers leads to better selling opportunities and revenue increases.

● Improved strategy and performance measurement: Installing and operating an ERP system requires management and staff to think of the company as a whole.

This attitude carries over into CRM work. With CRM in place, management can think about different performance measures; for example, should salespeople be rewarded for exceeding sales quotas, and marketing people rewarded for finding new customers—or, should both receive rewards that are based on some measure of customer satisfaction? The former approach, typical in days before CRM and ERP, can lead to unintegrated functional thinking. The latter approach—now feasible with CRM and ERP—can lead all personnel to think in terms of a company-wide effort to satisfy customers.

PRODUCTION OVERVIEW

To meet customer demand efficiently, Fitter Snacker must develop a forecast of customer demand, then develop a production schedule to meet the estimated demand. Developing a production plan is a complicated task, but the end result answers two simple questions:

- How many of each type of snack bar should we produce, and when?
- What quantities of raw materials should we order so we can meet that level of production, and when should they be ordered?

Developing a good production plan is just the first part of serving customers: Fitter Snacker must be able to execute the plan and make adjustments when customer demand does not meet the forecast. An ERP system is a good tool for developing and executing production plans because it integrates the SCM functions of production planning, purchasing, materials management/warehousing, quality management, and sales and accounting. To support even better planning of the supply chain, companies can connect ERP systems to supplier and customer information systems as well.

The goal of production planning is to schedule production economically, so that the company can ship goods to customers by the promised delivery dates in the most cost efficient manner.
There are three general approaches to production:

1. ***Make-to-stock*** items are made for inventory (the "stock") in anticipation of sales orders. Most consumer products (for example, cameras, canned corn, and books) are made this way.

2. ***Make-to-order*** items are produced to fill specific customer orders. Companies usually take this approach when producing items that are too expensive to keep in stock or items that are made or configured to customer specifications. Examples of make-to-order items are airplanes and large industrial equipment.

3. ***Assemble-to-order*** items are produced using a combination of make-to-stock and make-to-order processes. The final product is assembled for a specific order from a selection of make-to-stock components. Personal computers are a typical assemble-to-order product.

THE PRODUCTION PLANNING PROCESS

In this section, you will examine a systematic process for developing a production plan that takes advantage of an ERP system. Production planning is a complicated process. Spreadsheet calculations are presented to explain and illustrate the key steps, and the corresponding screens in the SAP ERP system follow the spreadsheet data.
Production planners are employees who interact with the inventory system and the sales forecast to figure out how much to produce. They follow three important principles:

- Work from a sales forecast and current inventory levels to create an "aggregate"("combined") production plan for all products. Aggregate production plans help to simplify the planning process in two ways: First, plans are made for groups of related products rather than for individual products. Second, the time increment used in planning is frequently a month or a quarter, while the production plans that will actually be executed operate on a daily or weekly basis. Aggregate plans should consider the available capacity in the facility.
- Break down the aggregate plan into more specific production plans for individual products and smaller time intervals.
- Use the production plan to determine raw material requirements.

The SAP ERP Approach to Production Planning

Figure 4.2 The production planning process

The information at each stage of the production process flows through the following steps. Each step is explained in detail in the next section of the chapter.

● *Sales forecasting* is the process of developing a prediction of future demand for a company's products.

● *Sales and operations planning (SOP)* is the process of determining what the company will produce. The Sales forecasting and Starting Inventory levels in the diagram are inputs to this process. At first glance, it would seem that a company should just make products to match the forecasted sales, but developing the production plan can be more complicated, because capacity must be considered. Many products have seasonal demand, and to meet demand during peak periods, production planners must decide whether to build up inventory levels before the peak demand, increase capacity during the peak period, subcontract production, or use some combination of these approaches.

● *Demand management* is the process of breaking down the production plan into finer time units, such as weekly or even daily production figures, to meet demand for individual products.

● *Detailed scheduling* uses demand management's production plans as an input for a production schedule. Methods of detailed scheduling depend on the manufacturing environment. For Fitter Snacker, the detailed production schedule will determine when to switch between the production of NRG-A and NRG-B bars.

● *Production* uses the detailed schedule to manage daily operations, answering the questions, "What should we be producing?" and "What staffing do we need to produce those products?"

● *Materials requirements planning (MRP)* determines the amount and timing of raw material orders. This process answers the questions, "What raw materials should we be ordering so we can meet a particular level of production?" and "When should we order these materials?"

● *Purchasing* takes the quantity and timing information from MRP and creates purchase orders for raw materials, which it transmits to qualified suppliers.

Sales Forecasting

A range of forecasting techniques can be used to predict consumer demand. Fitter Snacker has no formal way of developing a sales forecast and sharing it with Production. SAP's ERP system takes an integrated approach. Whenever a sale is recorded in the Sales and Distribution (SD) module, the quantity sold is recorded as a consumption value for that material. These consumption values can be maintained on a weekly or monthly basis, as desired. If more detail is needed, the Logistics Information system that is part of SAP ERP can record sales with more

detail (for example, by region or sales office), or data can be stored in the separate Business Warehouse (BW) system for more detailed analysis. With an integrated information system, accurate historical sales data are available for forecasting.

Sales Forecasting (cont'd.)

Sales forecasting	Jan.	Feb.	March	April	May	June
Previous year (cases)	5734	5823	5884	6134	6587	6735
Promotion sales (cases)					300	300
Previous year base (cases)	5734	5823	5884	6134	6287	6435
Growth: 3.0%	172	175	177	184	189	193
Base projection (cases)	5906	5998	6061	6318	6476	6628
Promotion (cases)						500
Sales forecast (cases)	5906	5998	6061	6318	6476	7128

- To get accurate base figures for last year's sales, this promotional increase must be subtracted from the previous year's sales numbers
- Fitter's Marketing and Sales Department anticipates a 3 percent growth in sales over last year, based on current trends and on research reported in trade publications

Figure 4-3 Fitter Snacker's sales forecast for January through June

The sales data in Figure 4-3 are for shipping cases, which contain 12 display boxes that contain 24 bars each, for a total of 288 bars. Note in Figure 4-3 that the forecast starts with the previous year's sales levels, to reflect FS's seasonal sales fluctuations (sales are higher in the summer when more people are active). Also note that there was a special marketing promotion last year. The estimated impact of this promotion was an increase in sales of 300 cases for May and June. This increase must be subtracted from the previous year's sales values to get an accurate base measurement. FS's Marketing department anticipates a 3 percent growth in sales over the previous year, based on research reported in trade publications. And finally, FS will be launching a special marketing promotion at the end of May to increase sales at the beginning of the summer season. FS marketing experts think this will result in an increase in sales of 500 cases for June.

Sales and Operations Planning

Sales and operations planning (SOP) is the next step in the production planning process. The input to this step is the sales forecast provided by Marketing. The output of this step is a production plan designed to balance market demand with production capacity. This production plan is the input to the next step, demand management. A sales and operations plan is developed from a sales forecast and determines how Manufacturing can efficiently produce enough goods to meet projected sales.

Sales and Operations Planning (cont'd.)

Sales and operations planning		Dec.	Jan.	Feb.	March	April	May	June
1) Sales forecast			5906	5998	6061	6318	6476	7128
2) Production plan			5906	5998	6061	6318	6900	6700
3) Inventory		100	100	100	100	100	524	96
4) Working days			22	20	22	21	23	21
5) Capacity (shipping cases)			7333	6667	7333	7000	7667	7000
6) Utilization			81%	90%	83%	90%	90%	96%
7) NRG-A (cases)	70.0%		4134	4199	4243	4423	4830	4690
8) NRG-B (cases)	30.0%		1772	1799	1818	1895	2070	2010

Figure 4-5 Fitter Snacker's sales and operations plan for January through June

At the start of January, the production planner is projecting a beginning inventory of 100 cases. The first line in Figure 4-5 is the sales forecast, which is the output of the sales forecasting process shown in Figure 4-3. The next line is the production plan, which is developed by the production planner in a trial-and-error fashion, observing the effect of different production quantities on inventory levels and capacity utilization (the amount of plant capacity that is being consumed). The goal is to develop a production plan that meets demand without exceeding

capacity and that maintains "reasonable" inventory levels (neither too high or two low). This process requires judgment and experience. The third line, inventory, is the difference between the sales forecast and the production plan. The production planner has developed a plan that maintains a minimum planned inventory of 100 cases. This inventory, called safety stock, is planned so that if sales demand exceeds the forecast, sales can be met without altering the production plan. Notice that in May, the production plan is greater than the May sales forecast, and the inventory is 524. Why? Because the planner wants to build up inventory to handle the increased demand in June, which results from the normal seasonal increase in snack bar sales and additional demand from the planned promotional activities. The fourth line is working days, an input based on the company calendar. Using the number of working days in a month, the available capacity each month is calculated in terms of the number of shipping cases.

200 bars perminute × 60minutes per hour × 8 hours per day = 96,000 bars per day, which equals 333.3 cases per day (96,000 bars per day ÷ 24 bars per box ÷ 12 boxes per case).

If you multiply the number of working days in a month by the production capacity of 333.3 shipping cases per day, you get the monthly capacity in shipping cases, which is shown in line 5.

Demand Management

The demand management step of the production planning process links the sales and operations planning process with the detailed scheduling and materials requirements planning processes. The output of the demand management process is the **master production schedule (MPS)**, which is the production plan for all finished goods. For Fitter Snacker, the MPS is an input to detailed scheduling, which determines which bars to make and when to make them. The MPS is also an input to the MRP process, which determines what raw materials to order to support the production schedule.

The demand management process splits FS's monthly production planning values into finer time periods. Figure 4-14 shows January's production plan by week and by day.

Demand Management (cont'd.)

		Week 1	Week 2	Week 3	Week 4	Week 5	
Demand management		1/3–1/7	1/10–1/14	1/17–1/21	1/24–1/28	1/31	2/1–2/4
Monthly demand	NRG-A	4134	4134	4134	4134	4134	4199
	NRG-B	1772	1772	1772	1772	1772	1799
Working days in week		5	5	5	5	1	4
Working days in month		21	21	21	21	21	20
MPS	NRG-A	984	984	984	984	1037	
Weekly demand	NRG-B	422	422	422	422	444	

Demand management		Jan 3	Jan 4	Jan 5	Jan 6	Jan 7
Monthly Demand	NRG-A	4134	4134	4134	4134	4134
	NRG-B	1772	1772	1772	1772	1772
Working days in month		21	21	21	21	21
MPS	NRG-A	197	197	197	197	197
Daily demand	NRG-B	84	84	84	84	84

Figure 4-14 Fitter Snacker's production plan for January: The first five weeks of production are followed by a day-by-day disaggregation of week 1

FS will use the weekly plan to plan materials management for purchasing. Daily plans will be used for the product(s) that are to be produced on the snack bar line. The calculations were performed as follows:

● For the weekly plan, the MPS plan for NRG-A bars in week 1 was calculated as:
4,134 cases in Jan. (monthly demand) × 4 working days in week 1 ÷ 22 working days in month of Jan. = 751.6 cases
This figure was rounded to 752 cases in Figure 4-14.

● Because week 5 consists of the last three days in January and the first two days in February, the MPS for NRG-A bars in week 5 was calculated as:
4,134 cases in Jan. (monthly demand) × 3 working days in week 5 ÷ 22 working days in month of Jan. = 563.7 cases
4,198 cases in Feb. (monthly demand) × 2 working days in week 5 ÷ 20 working days in month of Feb. = 419.8 cases
Total = 563.7 + 419.8 = 983.5 cases

Materials Requirements Planning (MRP)

Materials requirements planning (MRP) is the process that determines the required quantity and timing of the production or purchase of subassemblies and raw materials needed to support the MPS. The MRP process answers the questions, "What quantities of raw materials should we order so we can meet that level of production?" and "When should these materials be ordered?"

Bill of Material

The **bill of material (BOM)** is a list of the materials (including quantities) needed to make a product.

Lead Times

The **lead time** is the cumulative time required for the supplier to receive and process the order, take the material out of stock, package it, load it on a truck, and deliver it to the manufacturer. The manufacturer might also include the time required to receive the material in its warehouse

Lot sizing refers to the process of determining production quantities (for raw materials produced in-house) and order quantities (for purchased items).

Materials Requirements Planning in SAP ERP

The planner can create a purchase requisition or review the planned order and make changes before creating the requisition. SAP ERP also provides the ability to mass-process planned orders, by converting groups of planned orders to purchase orders simultaneously. The materials requirements planning process can also be configured to automatically create purchase requisitions; for example, all planned orders created within one week of the MRP calculation could be automatically created as purchase requisitions.

Once a purchase requisition is created, an employee in the Purchasing department has to turn it into a purchase order. One of the important steps in creating a purchase order is choosing the best vendor to supply the material. An integrated information system such as SAP can facilitate this process. From this screen, the Purchasing employee can view information about each vendor, simulate the price from each vendor (which might include quantity discounts and transportation costs), and also look at the vendor evaluation—the company's rating of the vendor. The SAP ERP system can be configured to rate vendors based on a number of performance criteria, including quality of goods provided and on-time delivery. The evaluation scores for each vendor are updated
automatically as materials are received. The integrated information system allows Purchasing to make the best decision on a vendor based on relevant, up-to-date information.

Once the Purchasing employee decides which vendor to use, the purchase order is transmitted to the vendor. The SAP ERP system can print out a paper order that can be mailed to the vendor. More likely, the system will be configured to either fax the order to the vendor, transmit it electronically through EDI (electronic data interchange), or send it over the Internet.

ERP AND SUPPLIERS

As mentioned in the introduction to this chapter, Fitter Snacker is part of a supply chain that starts with farmers growing oats and wheat and ends with a customer buying an NRG bar from a retail store. Previously, companies used competitive bidding to achieve low prices from suppliers, which frequently led to an adversarial relationship between suppliers and their customers. In recent years, companies have realized that they are part of a supply chain, and if the supply chain is more efficient, all participants in the chain can benefit. Collaboration can frequently achieve more than competition, and ERP systems can play a key role in collaborative planning.

Working with suppliers in a collaborative fashion requires trust among all parties. A company opens its records to its suppliers, and suppliers can read the company's data because of common data formats. Working this way with suppliers cuts down on paperwork and response times. Reductions in paperwork, savings in time, and other efficiency improvements translate into cost savings for the company and the suppliers. ERP lets companies and suppliers share information (sales, inventory, production plans, and so on) in real time throughout the supply chain. This allows all parties (suppliers, manufacturers, and customers) to eliminate from the supply chain costs that don't add value to the product (such as inventory, overtime, changeovers, and spoilage), while simultaneously improving customer service.

The Traditional Supply Chain

The term **supply chain** describes all of the activities that occur between the growing or mining of raw materials and the appearance of finished products on the store shelf. In a traditional supply chain, information is passed through the supply chain reactively as participants increase their product orders—as illustrated in Figure 4-24. For example, a retailer sees an increase in the sales of FS's bars and orders a larger quantity of bars from the wholesaler. If a number of retailers increase their orders, the wholesaler will increase its orders from Fitter Snacker. When FS gets larger orders from wholesalers, it must increase production to meet the increased demand. To increase production, FS will order more raw materials from suppliers.

The Traditional Supply Chain (cont'd.)

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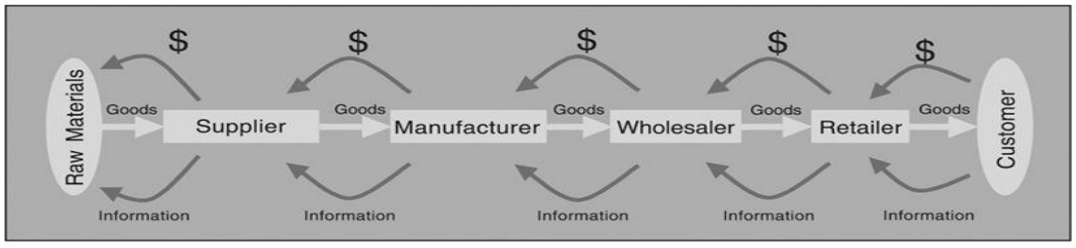

Figure 4-24 Supply chain management (SCM) from raw materials to consumer

Unit – 4

ACCOUNTING ACTIVITIES

Accounting activities can generally be classified as either financial accounting or managerial accounting. An additional area of accounting, tax accounting, is beyond the scope of this text. Because tax accounting is chiefly the external reporting of a business's activities to the Internal Revenue Service, data gathered for financial accounting forms the basis for tax accounting.

Financial accounting consists of documenting all transactions of a company that have an impact on the financial state of the firm, and then using these documented transactions to create reports for external parties and agencies. These reports, or financial statements, must follow the prescribed rules and guidelines of various agencies, such as the Financial Accounting Standards Board (FASB), the Securities and Exchange Commission (SEC), and the Internal Revenue Service (IRS).

Common financial statements include balance sheets and income statements. The **balance sheet** is a statement that shows account balances such as cash held, amounts owed to the company by customers, the cost of raw materials and finished-goods inventory, long term assets such as buildings, amounts owed to vendors, amounts owed to banks and other creditors, and amounts that the owners have invested in the company. A balance sheet is a good overview of a company's financial health at a point in time, a key consideration for a company's creditors and owners.

The **income statement**, or **profit and loss (P&L) statement,** shows the company's sales, cost of sales, and the profit or loss for a period of time (typically a quarter or year). Profitability is important to creditors and owners. It is also important information for managers in charge of day-to-day operations. A manager sees profits as indicators of success and losses as indicators of problems to be solved.

Managerial accounting deals with determining the costs and profitability of the company's activities. While the information in a company's balance sheet and income statement shows whether a firm is making an overall profit, the goal of managerial accounting is to provide managers with detailed information that allows them to determine the profitability of a particular product, sales region, or marketing campaign. Managerial accounting provides information that managers use to control a company's day-to-day activities and to develop long-term plans for operations, marketing, personnel needs, repayment of debt, and other management issues. Because managerial accounting provides reports and analyses for internal use, companies have great flexibility in how they configure their managerial accounting systems.

Using ERP for Accounting Information

Companies have had separate functional information systems: a marketing information system, a manufacturing information system, and so on, each with its own way of gathering data and its own file system for recording data. Companies built these unintegrated systems primarily to handle the needs of the individual functional areas, and secondarily to provide data to Accounting. With unintegrated systems, the functional areas shared their data with Accounting, so Accounting could "keep the books," that is, maintain records of all financial transactions. Data sharing, however, usually did not occur in real time, so Accounting's data were often out of date.

An ERP system, with its centralized database, avoids these problems. For example, suppose finished goods are transferred from the assembly line to the warehouse. An employee in the warehouse can easily record the transaction, using a terminal or a bar-code scanner. In SAP ERP, the Materials Management module would see the transfer event as an increase in finished-goods inventory available for shipment; the Accounting module would see the event as an increase in the monetary value of finished goods. With ERP, everyone uses the same database to record operating data. This database is then used to generate management reports, make financial statements, and create budgets.

In traditional accounting, a company's accounts are kept in a record called the **general ledger**. In the SAP ERP system, input to the general ledger occurs simultaneously with the business transaction in the specific module. Many SAP ERP modules cause transaction data to be entered into the general ledger, including:

● Sales and Distribution (SD), which lets the user record sales and creates an **accounts receivable** entry (a general ledger document that indicates a customer owes money for the goods received).

● Materials Management (MM), which controls purchasing and recording of inventory changes. The creation of a purchase order creates an accounts payable entry in the general ledger, noting that the company has an obligation to pay for goods that it will receive. Whenever material moves into or out of inventory (purchased materials arrive from the vendor, materials are taken out of inventory to support production, or finished goods go from production to inventory), general ledger accounts are affected.

● Financial Accounting (FI), which manages the accounts receivable and accounts payable items created in the SD and MM modules, respectively. The FI module is also where the general ledger accounts are closed at the end of a fiscal period (quarter or year) and financial statements are generated.

● Controlling (CO), which tracks the costs associated with producing products. To make a profit, it is critical for the company to have an accurate picture of its product costs, allowing it to make correct decisions about product pricing and promotions, as well as capital investments.

● Human Resources (HR), which manages the recruiting, hiring, compensation, termination, and severance of employees. The HR module also manages benefits and generates the payroll.

● Asset Management (AM), which manages fixed-asset purchases (plant and machinery) and the related depreciation.

OPERATIONAL DECISION – MAKING PROBLEM:CREDIT MANAGEMENT

Out-of-date or inaccurate accounting data that result from an unintegrated information system can cause problems when a company is making operational decisions.

Industrial Credit Management

Companies routinely sell to customers on credit. Good financial management requires that only so much credit be extended to a customer, however. At some point, the customer must pay off some of the debt to justify the faith the seller has shown.

In practice, sellers manage this relationship by setting a limit on how much money a customer can owe at any one time, and then monitoring that limit as orders come in and payments are received. For example, the seller might tell a buyer that her credit limit is $10,000, which means that the most she can owe the seller is $10,000. If the buyer reaches that amount, the seller will accept no further sales orders until she pays off some of her debt. When making a sale on credit, the seller makes an entry on the books to increase his accounts receivable and his sales. Thus, when the buyer's accounts receivable balance on the seller's books reaches $10,000, the buyer must make some payment.

Continuing the example, assume that the buyer calls the seller to order $3,000's worth of goods, and her credit limit is $10,000. If the seller's records show that the accounts receivable balance for the buyer is already $8,000, then the seller should not accept the $3,000 order, because it would bring the accounts receivable balance to $11,000, which exceeds the buyer's credit limit.

Instead of refusing the order, the seller's sales representative might suggest that the buyer reduce the size of the order, or ask her to send in a payment before processing the order, thus reducing the buyer's debt. Clearly, to make this system work, a sales representative needs to be able to review an up-to-date accounts receivable balance when an order comes in.

Credit Management in SAP ERP

Suppose FS is using SAP ERP as its ERP system. This system would allow FS to set a credit limit for each customer. A company can configure any number of credit-check options in the SAP ERP system. If the order being saved will cause the customer to exceed its credit limit, the system will issue a warning indicating the amount by which the order exceeds the credit limit. Because the system is issuing a warning, the order can be saved, but will be blocked from further processing until the credit problem is cleared. Frequently, companies do not configure the system to provide warnings to sales order clerks because they are not equipped to correct the problem and because the credit problem is an issue between the selling firm's Accounts Receivable department and the customer's Accounts Payable department.

Most companies have an employee who is responsible for reviewing blocked sales orders (perhaps every two hours) and taking corrective action. The advantage of using SAP ERP to manage credit is that the process is automated and the data are available in real time. The user can double-click the sales order to see company information, such as contacts, or to see payment history.

In the case of Fitter Snacker, the sales order clerk must manually check credit. If the clerk fails to do this, then a customer who is a bad risk may receive more credit. However, even when the clerk does perform the manual credit check, the credit decision can frequently be made in error, since the data are not current. Finally, because it is a manual system, blocked orders may erroneously become real orders, so sales may be affected. With the SAP ERP system, the check is automatic, the data are up-to-date, and it is a simple matter to review blocked sales orders.

PRODUCT PROFITABILITY ANALYSIS

Business managers use accounting data to perform profitability analyses of a company and its products. When data are inaccurate or incomplete, the analyses are flawed. There are three main reasons for inaccurate or incomplete data: **inconsistent recordkeeping**, **inaccurate inventory costing systems**, and problems consolidating **data from subsidiaries**.

Inconsistent Recordkeeping

Each of FS's marketing divisions maintains its own records and keeps track of sales data differently. When the Direct Sales Division records a sale, the files include a code for a sales region (Northeast, Southeast, and so on). When the Distributor Division records a sale, the files include a code for the state. Suppose that an FS executive asks for a report that summarizes monthly sales dollars for all states in the Mid-Atlantic region for the previous year.

Neither division's records are set up to answer that question. An FS accountant would need to perform this tedious series of steps:

1. Go to the source sales documents.
2. Code each document by state and region (as the case may be).
3. Summarize the data by state and region to produce the report. This would have to be done by hand, entering the data into a spreadsheet for review, or by some other means.

With an ERP system, however, this sort of effort is minimized or eliminated because both divisions record and store their data in the same way, in the same records. If the company's process was changed to fit the best practices of the software when the system was installed, the managers of each division would have agreed on the way to store and collect data, as part of the system's configuration. Later, questions can be answered in a few minutes by any accountant (or manager or salesperson, for that matter) who understands how to execute a query in the database language, or how to use built-in management reporting tools.

Inaccurate Inventory Costing Systems

Correctly calculating inventory costs is one of the most important and challenging accounting tasks in any manufacturing company. Managers need to know how much it costs to make individual products, so they can identify which products are profitable and which are not.

A manufactured item's cost has three elements: the cost of raw materials, the cost of labour employed directly in the production of the item, and all other costs, which are commonly called **overhead**. Overhead costs include factory utilities, general factory labour (such as custodians or security guards), managers' salaries, storage, insurance, and other manufacturing-related costs.

Materials and labour are often called **direct costs** because the constituent amounts of each in a finished product can be estimated fairly accurately. On the other hand, the overhead items, called **indirect costs**, are difficult to associate with a specific product or a batch of specific products.

Standard costs for a product are established by studying historical direct and indirect cost patterns in a company and taking into account the effects of current manufacturing changes. At the end of an accounting period, if actual costs differ from standard costs, adjustments to the accounts must be made to show the cost of inventory owned on the balance sheet and the cost of inventory sold on the income statement.

Companies with Subsidiaries

Some companies have special operations that make closing their books at the end of an accounting period a challenge. Companies that have subsidiaries or branches face such a challenge. Because company managers want the big picture of overall operations and profitability, account balances for each entity must be compiled and forwarded to the home office. A consolidated statement for the company as a whole must then be created.

You might think this would be merely an arithmetic problem: add up cash for all the entities, accounts receivables for all the entities, and so on through the accounts. The job, however, is more difficult than that. Problems can arise from two sources: accounts stated in another country's currency must be converted to U.S. dollars (in the case of a U.S. parent company), and transactions between companies and their subsidiaries must be eliminated from the accounts.

Currency Translation

The following scenario illustrates the problems of **currency translation**. Assume one euro is worth $1.25. A company's European subsidiary reports cash of 1 million euros at the end of the year. When the European subsidiary's balances are consolidated with those of the U.S. parent company at the end of the year, $1,250,000 will be recorded. The same sort of translation would be done for all the European subsidiary's accounts.

A complicating factor is that exchange rates fluctuate daily. An ERP system can be configured to access daily exchange rates and translate daily transactions automatically.

Intercompany Transactions

Transactions that occur between companies and their subsidiaries, known as **intercompany transactions**, must be eliminated from the books of the parent company because the transaction does not represent any transfer of funds into or out of the company.

MANAGEMENT REPORTING WITH ERP SYSTEMS

The integrated nature of an ERP system and the use of a common database and built-in management reporting create numerous benefits. Although reporting accounting information is commonplace, it is often very challenging for companies to generate the right reports for the right situation. Without an ERP system, the job of tracking all the numbers that need to go into a report is a monumental undertaking. With an ERP system, a vast amount of information is available for reporting purposes. Often companies take years after ERP implementation to figure out which reports are the most critical for decision making. In this section, we will examine some management-reporting and analysis tools available with ERP systems.

Document Flow for Customer Service

When an ERP system is used, all transactions in all areas of a company get posted in a centralized database. Data do not flow from one ERP module to another because they are all in one place—the database. Each area views the same records. It might be better to speak of "data access" than of "data flows" when talking about how these areas use the common database. In SAP ERP, document numbers for related transactions are associated in the database. This provides an electronic audit trail for analysts trying to determine the status of an order.

The best example of this concept is the linkage of document numbers for a sales order.

1. When the order was placed, sales order document 142 was created.
2. The system recorded the delivery, which is the transfer of the order's requirements to the Materials Management module. It is denoted by document 80000001.
3. The picking request, which is the document that tells warehouse personnel which items make up the order, was created on Dec. 28, 2008, and given document number 20041228.
4. The goods were removed from inventory on the same day, an event recorded by document number 4900000101.
5. After the goods were issued, an invoice was generated so that the customer would be billed. The invoice was given document number 90000001.
6. At the same time, the accounting entries for the sale were generated. The posting document number is 9000481.

Users can access the document flow from any SAP screen. If a customer were to call and ask about the status of an order, the clerk could access the document flow and see whether the goods had been shipped. If the customer called with an invoice number and questions about the billing, the customer service representative could use the document flow to access the appropriate documents in the chain of events, such as the original order or the picking request. This sort of research can be done quickly with SAP ERP. With unintegrated systems, establishing the audit trail and researching source documents can be very difficult and time-consuming.

Unit – 5

HUMAN RESOURCES PROCESSES WITH ERP:

A company's employees are its most important resources. The Human Resources (HR) department is responsible for many of the activities that a company performs to attract, hire, reward, train, and, occasionally, terminate employees. The decisions made in the HR department can affect every department in the company. Companies are increasingly aware of the importance of an experienced, well-trained workforce and have begun using the term **human capital management (HCM)** to describe the tasks associated with managing a company's workforce.

The responsibilities of an HR department usually include:

- Attracting, selecting, and hiring new employees using information from resumes, references, and the interview process
- Communicating information regarding new positions and hires throughout the organization and beyond
- Ensuring that employees have the proper education, training, and certification to successfully complete their duties
- Handling issues related to employee conduct
- Making sure employees understand the responsibilities of their jobs
- Using an effective process to review employee performance and determine salary increases and bonuses
- Managing the salary and benefits provided to each employee and confirming that the proper benefits are disbursed to new and current employees
- Communicating changes in salaries, benefits, or policies to employees
- Supporting management plans for changes in the organization (expansion, retirements, and so on) so that competent employees are available to support business processes

HUMAN RESOURCES WITH ERP SOFTWARE

ERP software can improve the processes of HR, leading to overall improvements in a company's performance. With an integrated system, a company can store employee information electronically, eliminating the piles of papers and files that make the retrieval of information difficult or tedious. A good information system allows all relevant information for an employee to be retrieved in a matter of seconds. An integrated information system is a key component in this process.

The SAP ERP Human Resources (HR) module provides tools for managing an organization's roles and responsibilities, definitions, personal employee information, and tasks related to time management, payroll, travel management, and employee training.

SAP ERP provides an Organization and Staffing Plan tool that is used to define a company's management structure and the positions within the organizational structure as a whole. The Organization and Staffing Plan tool also names the person who holds each position. Fitter Snacker organization consists of three main organizational units: Manufacturing, Marketing, and Administrative. The organizational units Accounting and Human Capital Management are part of the Administrative organization. Within the Human Capital Management organization are three positions: the HCM Manager and two Analysts.

SAP ERP distinguishes between **task**, **job**, **position**, and **person**. In SAP, an employee is a person who performs tasks, which can be assigned either to a job, which is a generic description of an employee's work responsibilities, or to the specific position that the individual person holds.

The job of administrative assistant is assigned a number of tasks such as reviewing employee time charges, reviewing employee expense reports, and preparing monthly budget reports for the department. These are tasks that the company requires of any administrative assistant, whether that job is in Marketing, Engineering, Production, or another department. The job of administrative assistant can be defined once in SAP by assigning it tasks; then, that definition can be used to create administrative assistant positions in different organizational units. The administrative assistant job in Marketing is one position, while the administrative assistant job in Accounting is a different position. Additional tasks can be added to an administrative assistant position to tailor it to the specific requirements of the organizational unit.

ADVANCED SAP ERP HUMAN RESOURCES FEATURES

Time Management

Hourly employees, who are paid for each hour worked, must record the time that they work so that they can be paid. Salaried employees are not paid based on hours worked, but their time must usually be tracked as well. For cost-accounting purposes, it is important to be able to attribute an employee's time to a cost object (such as cost center, project, or production order), and any time not worked must be attributed to vacation or leave. The SAP ERP system uses Cross Application Time Sheets (CATS) to record employee working times and provide the data to applications that include:

- The SAP Controlling module, for cost management
- The SAP Payroll module, for calculating employee pay and transferring the data to the Financial Accounting module
- The SAP Production Planning module, to determine whether enough labour is available to support production plans

Payroll

Payroll is probably the most important Human Resources function. Employees are, not surprisingly, very particular about being paid the correct amount at the correct time! Many people live paycheck-to-paycheck, meaning that getting paid correctly and on time is crucial. Without proper management of the payroll process, employees might not be paid for all of the

hours they worked, they might not be paid at the appropriate rate, or they might have too much or too little money withheld from their pay for taxes and benefits. Mistakes in payroll can cause significant job dissatisfaction. The two key processes in determining the pay an employee receives are calculation of the remuneration elements and determination of statutory and voluntary deductions. The **remuneration elements** of an employee's pay include the base pay, bonuses, gratuities, overtime, sick pay, and vacation allowances that the employee has earned during the pay period. The **statutory and voluntary deductions** include taxes (federal, state, local, Social Security, and Medicare), company loans, and benefit contributions. Properly determining the pay for an employee requires accurate input data and correct evaluation of remuneration elements and deductions.

The process of determining each employee's pay is called a **payroll run**. In the payroll run, the SAP ERP system evaluates the input data and notes any discrepancies in an **error log**. Payroll employees review the error log, make the necessary corrections, and repeat the payroll run until no errors are recorded. Then the payroll run is used to generate information for accounting, electronic funds transfers, employee pay statements, withholding tax payments, and other calculations.

Travel Management

Companies can spend a significant amount of money on employee travel, and managing travel and its associated expenses can be a significant task. A travel request, which may originate with the employee or the employee's manager, is the first step in the travel management process. Travel requests usually require management approval, and the level at which travel must be approved may depend on the duration and location of the travel. Once management has approved the travel, travel reservations must be made. Because airfare, hotel, and rental car costs can vary widely, companies frequently require employees to make reservations through either a company travel office or a travel agency under contract to the company. The employee must keep receipts for expenses incurred during the trip in order to complete an expense report and receive reimbursement. The SAP ERP Travel Management system facilitates this process by maintaining travel data for each employee, including flight, hotel, and car preferences, and integrating this data with the Payroll module (for reimbursements) and with the Financial Accounting and Controlling modules, to properly record travel expenses. Submitting an expense report can be simplified using a Web-based application that allows employees to submit reports through a Web browser.

Training and Development

The Personnel Development component of the SAP ERP Human Resources module supports the planning and implementation of employee development and training activities. Such education maximizes an employee's ability to contribute to the organization. Because advances in technology quickly render an employee's knowledge obsolete, employees will not be productive without continuing development and training efforts. In addition, many positions require certifications that must be updated, and continuing education is frequently required for recertification. Without an effective Human Resources information system, managing the training, development, and certification needs for a company's employees can be both time-consuming and error-prone.

In the SAP ERP system, employee development is driven by qualifications and requirements. **Requirements** are skills or abilities associated with a position, while **qualifications** are skills or abilities associated with a specific employee. Requirements and qualifications refer to the same concept from a different perspective. Using the Personnel Development tool allows a manager to compare an employee's qualifications with the requirements for a position to which the employee aspires. This comparison enables the manager to identify gaps and to plan development and training efforts to close the gaps. It can also serve as a basis for employee evaluation, and can motivate the employee by providing a goal and the means to achieve it.

Management by Objectives

The concept of management by objectives (MBO) was first outlined by Peter Drucker in his 1954 book *The Practice of Management*. In MBO, managers are encouraged to focus on results, not activities, and to "negotiate a contract of goals" with their subordinates without dictating the exact methods for achieving them. SAP ERP provides a comprehensive process to support the MBO approach that incorporates performance appraisal. The appraisal results can affect an employee's compensation, generating annual pay raises that can be either significant or insignificant, depending on the employee's performance. The MBO process in SAP ERP also allows managers to include the results of achieved objectives in the employee's qualifications profile.

PROCESS MODELING

A process model can be as simple as a diagram with boxes and arrows or as complex as computer software that allows for simulation of the process. Process modelling tools provide a way to describe a business process so that all participants can understand the process. Frequently, process models are developed by a team of employees involved in the process. The interaction required to develop a process model often reveals misunderstandings and ensures that all team members are "on the same page." Graphical representations are usually easier to understand than written descriptions. A well-developed process model provides a good starting point for analyzing a process so that participants can design and implement improvements. Process models also document the business process, making it easier to train employees to support the business process.

Flowcharting Process Models

Flowcharts are the simplest of the process-modelling tools. A **flowchart** can be defined as any graphical representation of the movement or flow of concrete or abstract items—materials, documents, logic, and so on. Flowcharts originated with computer programmers and mathematicians, who used them to trace the logical path of an algorithm. A flowchart is a clear, graphical representation of a process from beginning to end, regardless of whether that process is an algorithm or a manufacturing procedure. Flowcharting uses a standardized set of symbols to represent various business activities.