CHAPTER 11

Information Systems within the Organization

CHAPTER OUTLINE

1. Transaction Processing Systems
2. Functional Area Information Systems
3. Enterprise Resource Planning (ERP) Systems
4. ERP Support for Business Processes

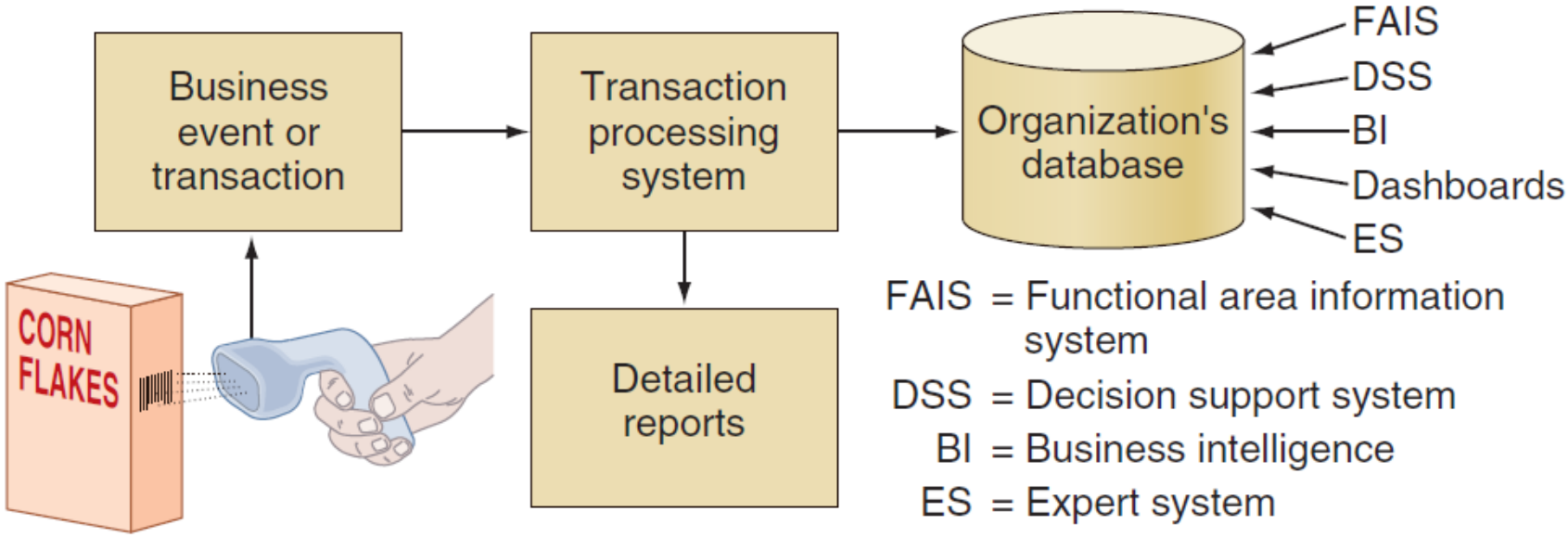
LEARNING OBJECTIVES

1. Explain the purpose of transaction processing systems.
2. Explain the types of support that information systems can provide for each functional area of the organization.
3. Identify advantages and drawbacks to businesses implementing an enterprise resource planning system.
4. Describe the three main business processes supported by ERP systems.

11.1 Transaction Processing Systems

- **Transaction:** any business event that generates data worthy of being captured and stored in a database (e.g., product manufactured, a service sold, a person hired, and a payroll check generated)
- **Transaction Processing System (TPS):** supports the monitoring, collection, storage, and processing of data from the organization's basic business transactions, each of which generates and collects data continuously, in real time.
- **Source Data Automation:** a process in which organizations try to automate the TPS data entry as much as possible because of the large volume involved.
- **Batch Processing:** the firm collects data from transactions as they occur, placing them in groups or batches then prepares and processes the batches periodically.
- **Online Transaction Processing (OLTP):** business transactions are processed online as soon as they occur and system performs these tasks in real time by means of online technologies.

Figure 11.1: How TPS Manage Data



11.2 Functional Area Information Systems

- IS for Accounting and Finance
- IS for Marketing
- IS for Production/Operations Management
- IS for Human Resource Management
- Reports

IS for Accounting and Finance

Financial Planning and Budgeting: Appropriate management of financial assets and is an important part of managerial planning for both acquiring and utilizing resources.
Managing Financial Transactions: accounting/finance software packages that are integrated with other functional areas (e.g., Peachtree offers a sales ledger, a purchase ledger, a cash book, sales order processing, invoicing, stock control, a fixed assets register, etc.). Organizations, business processes, and business activities operate with, and manage, financial transactions.
Investment Management: Systems for managing organization investments in in stocks, bonds, real estate, and other assets that are subject to complex regulations and tax laws, which vary from one location to another.
Control and Auditing: effectively control their finances and financial statements. Let us examine some of the most common forms of financial control.

Financial Planning and Budgeting

- **Financial Planning and Budgeting:** Appropriate management of financial assets and is an important part of managerial planning for both acquiring and utilizing resources.
  - **Financial and Economic Forecasting:** Knowledge about the availability and cost of money a key ingredient for successful financial planning including flow projections which inform organizations what funds they need, when they need them, and how they will acquire them.
  - **Budgeting:** allocates the organization's financial resources among participants and activities allowing management to distribute resources in the way that best supports the organization's mission and goals.

Managing Financial Transactions

- **Managing Financial Transactions:** accounting/finance software packages that are integrated with other functional areas (e.g., Peachtree offers a sales ledger, a purchase ledger, a cash book, sales order processing, invoicing, stock control, a fixed assets register, etc.). Organizations, business processes, and business activities operate with, and manage, financial transactions.
  - **Global stock exchanges:** Financial markets operate in global, 24/7/365, distributed electronic stock exchanges that use the Internet both to buy and sell stocks and to broadcast real-time stock prices
  - **Managing multiple currencies:** Financial and accounting systems utilize financial data from different countries to convert currencies (with conversion ratios that constantly flux) in seconds.
  - **Virtual close:** the ability the books(accounting records) quickly at any time, on very short notice (rather than quarterly) which provides almost real-time information on the organization's financial health.
  - **Expense management automation (EMA):** systems that automate the data entry and processing of travel and entertainment expenses through Web-based applications that enable companies to quickly and consistently collect expense information, enforce company policies and contracts, and reduce unplanned purchases as well as airline and hotel expenses.

Control and Auditing

- **Investment Management:** Organizations invest large amounts of money in stocks, bonds, real estate, and other assets.
- **Control and Auditing:** effectively control their finances and financial statements. Let us examine some of the most common forms of financial control.
  - **Budgetary control:** managers at various levels monitor departmental expenditures and compare them against the budget and the operational progress of corporate plans.
  - **Auditing:** monitoring how the organization's moneys are being spent and assessing the organization's financial health.
  - **Financial ratio analysis:** monitoring the company's financial health by assessing a set of financial ratios including liquidity ratios (the availability of cash to pay debt), activity ratios (how quickly a firm converts noncash assets to cash assets), debt ratios (measure the firm's ability to repay long-term debt), and profitability ratios (measure the firm's use of its assets and control of its expenses to generate an acceptable rate of return).

IS for Marketing and Sales

Customer Relations: Knowing who customers are and treating them appropriately
Customer profiles and preferences:
Salesforce automation: using software to automate the business tasks of sales, thereby improving the productivity of salespeople

IS for Production/Operations Management (POM)

- **In-House Logistics and Materials Management:** Logistics management deals with ordering, purchasing, inbound logistics (receiving), and outbound logistics (shipping) activities. Related activities include inventory management and quality control.
- **Inventory Management:** determines how much inventory an organization should maintain. Both excessive inventory and insufficient inventory create problems. Overstocking can be expensive because of storage costs and the costs of spoilage and obsolescence. However, keeping insufficient inventory is also expensive because of last-minute orders and lost sales.
- **Quality Control:** systems used by manufacturing units provide information about the quality of incoming material and parts, as well as the quality of in-process semifinished and finished products. These systems record the results of all inspections and then compare these results with established metrics.

IS for Production/Operations Management (POM)

- **Planning Production and Operations (POM):** supported by IT, POM planning has evolved from material requirements planning (MRP) to manufacturing resource planning (MRP II), to enterprise resource planning (ERP).
- **Computer-Integrated Manufacturing (CIM) (also called digital manufacturing):** an approach that integrates various automated factory systems. CIM has three basic goals: (1) to simplify all manufacturing technologies and techniques, (2) to automate as many of the manufacturing processes as possible, and (3) to integrate and coordinate all aspects of design, manufacturing, and related functions via computer systems.
- **Product Lifecycle Management (PLM):** a business strategy that enables manufacturers to share product-related data that support product design and development and supply chain operations.

IS for Human Resource Management

- **Recruitment:** systems that assist human resource personnel in finding potential employees, evaluating them, and deciding which ones to hire.
- **Human Resources Development:** IS that assist human resource personnel in helping new hires become part of the corporate human resources pool through evaluation and development.
- **Human Resources Planning and Management:** Managing human resources in large organizations requires extensive planning and detailed strategy.

Three Areas of IT support in HR Planning and Management

- IT support is particularly valuable in the following three areas:

1. Payroll and employees' records
   - The HR department is responsible for payroll preparation. This process is typically automated, meaning that paychecks are printed or money is transferred electronically into employees' bank accounts.
2. Benefits administration
   - In return for their work contributions to their organizations, employees receive wages, bonuses, and various benefits. The benefits include healthcare and dental care, pension contributions, wellness centers, and child care centers. Managing benefits is a complex task because multiple options are available and organizations typically allow employees to choose and trade off their benefits.
3. Employee relationship management
   - Companies are developing *employee relationship management* (ERM) applications, for example, a call center for employees' to discuss problems.

Figure 11.2: Systems supporting functional Areas

	ACCOUNTING	FINANCE	HUMAN RESOURCES	PRODUCTION/ OPERATIONS	MARKETING
STRATEGIC	Profitability Planning	Financial Planning	Employment Planning, Outsourcing	Product Life Cycle Management	Sales Forecasting, Advertising Planning
TACTICAL	Auditing, Budgeting	Investment Management	Benefits Administration, Performance Evaluation	Quality Control, Inventory Management	Customer Relations, Sales Force Automation
OPERATIONAL	Payroll, Accounts Payable, Accounts Receivable	Manage Cash, Manage Financial Transactions	Maintain Employee Records	Order Fulfillment, Order Processing	Set Pricing, Profile Customers

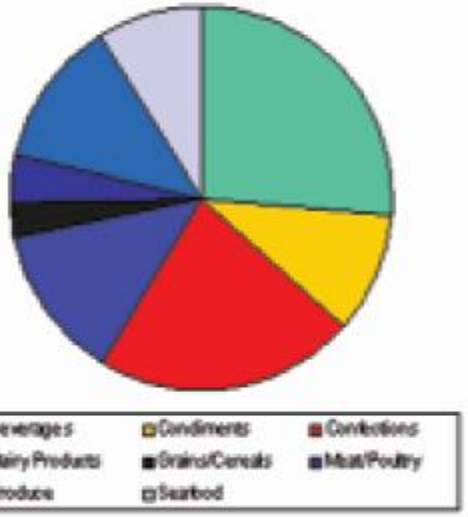
Reports

- **Routine Reports:** reports produced at scheduled intervals.
- **Ad-hoc Reports:** out-of-the routine reports.
  - **Drill-Down Reports:** display a greater level of detail.
  - **Key Indicator Reports:** summarize the performance of critical activities.
  - **Comparative Reports:** compare and contrast the performances of different business units or of a single unit during different time periods.
  - **Exception Reports:** include only information that falls outside certain threshold standards.

Monthly Sales Report

Sales by Categories

Category Name	Quantity	Amount
Beverages	925	$27,761.57
Condiments	378	$10,773.27
Confections	880	$22,877.18
Dairy Products	581	$13,685.32
Grains/Cereals	189	$3,325.40
Meat/Poultry	92	$4,083.66
Produce	351	$13,031.20
Seafood	669	$9,316.54
Total	**4,065**	**$194,854.15**



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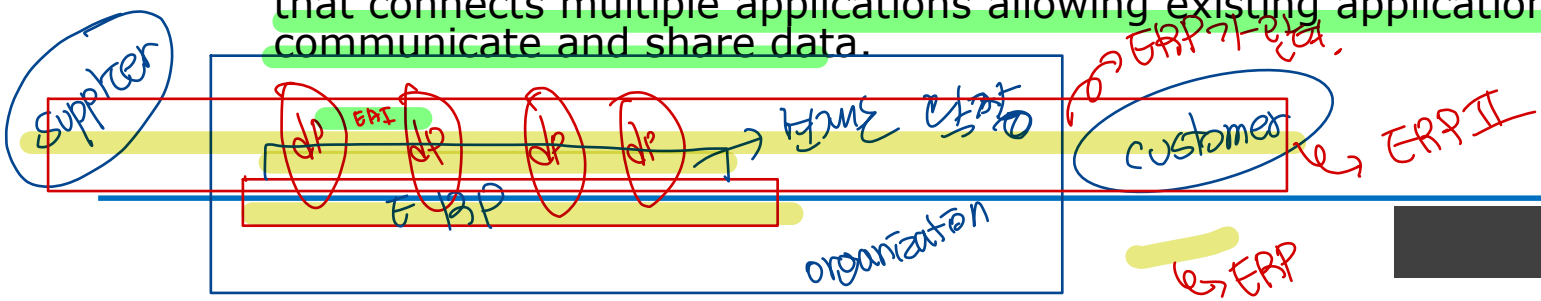
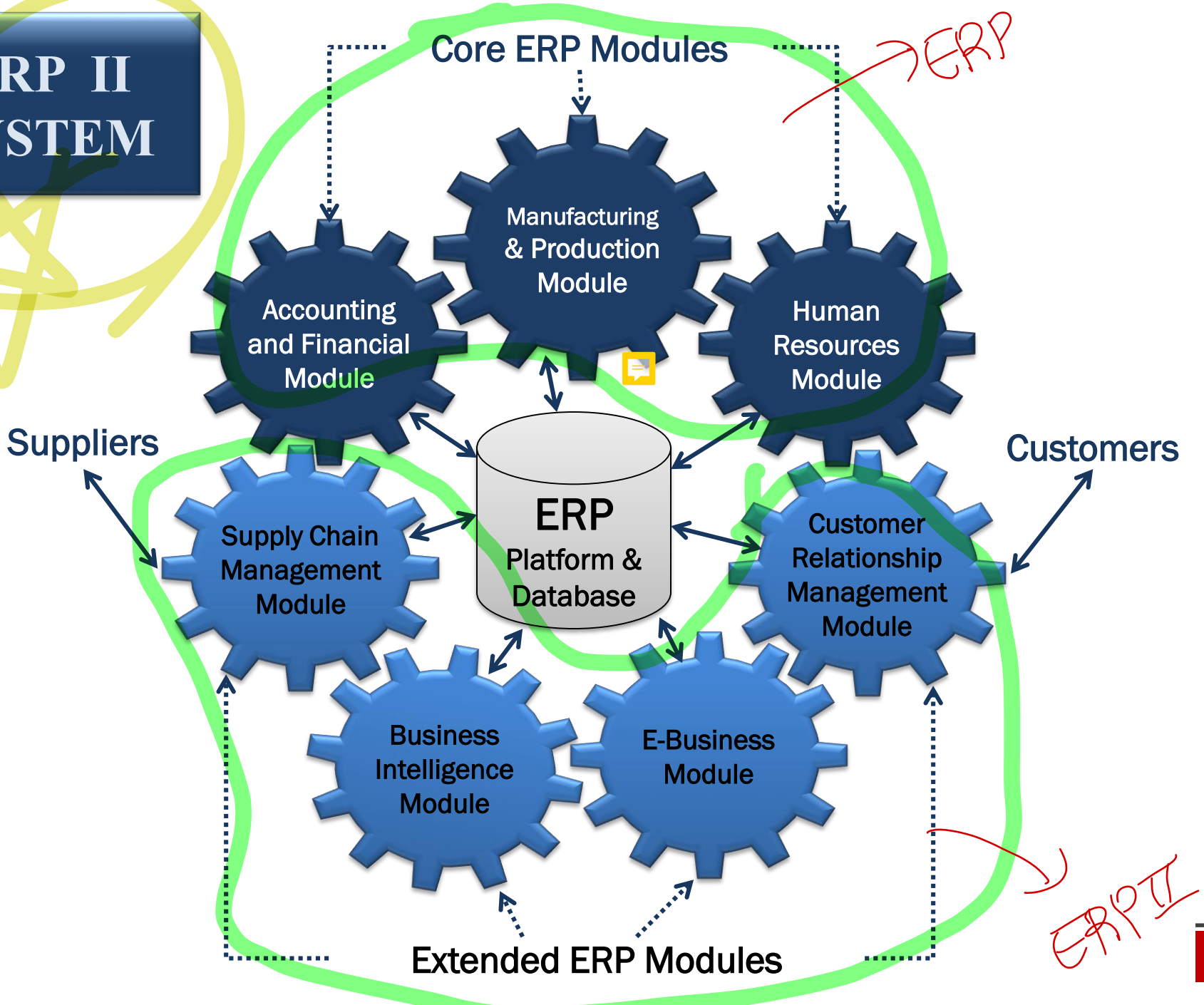
1.3 Enterprise Resource Planning (ERP) Systems

- **Enterprise Resource Planning (ERP) Systems:**
  - systems designed to correct a lack of communication among the functional area IS and they adopt a business process view of the overall organization to integrate the planning, management, and use of all of an organization's resources, employing a common software platform and database.
  - The major objectives of ERP systems are to tightly integrate the functional areas of the organization and to enable information to flow seamlessly across them.
- **ERP II Systems**
  - interorganizational ERP systems that provide Web-enabled links among a company's key business systems—such as inventory and production—and its customers, suppliers, distributors, and other relevant parties.
- **Enterprise Application Integration(EAI)**
  - integrates existing systems by providing software, called middleware, that connects multiple applications allowing existing applications to communicate and share data.



ERP II SYSTEM



11.3 Enterprise Resource Planning (ERP) Systems

- ERP Modules

Core ERP Modules
Financial Management. These modules support accounting, financial reporting, performance management, and corporate governance. They manage accounting data and financial processes such as general ledger, accounts payable, accounts receivable, fixed assets, cash management and forecasting, product-cost accounting, cost-center accounting, asset accounting, tax accounting, credit management, budgeting, and asset management.
Operations Management. These modules manage the various aspects of production planning and execution such as demand forecasting, procurement, inventory management, materials purchasing, shipping, production planning, production scheduling, materials requirements planning, quality control, distribution, transportation, and plant and equipment maintenance.
Human Resource Management. These modules support personnel administration (including workforce planning, employee recruitment, assignment tracking, personnel planning and development, and performance management and reviews), time accounting, payroll, compensation, benefits accounting, and regulatory requirements.
Extended ERP Modules
Customer Relationship Management. (Discussed in detail in Chapter 12.) These modules support all aspects of a customer's relationship with the organization. They help the organization to increase customer loyalty and retention, and thus improve its profitability. They also provide an integrated view of customer data and interactions, helping organizations to be more responsive to customer needs.
Supply Chain Management. (Discussed in detail in Chapter 13.) These modules manage the information flows between and among stages in a supply chain to maximize supply chain efficiency and effectiveness. They help organizations plan, schedule, control, and optimize the supply chain from the acquisition of raw materials to the receipt of finished goods by customers.
Business Intelligence. (Discussed in detail in Chapter 5.) These modules collect information used throughout the organization, organize it, and apply analytical tools to assist managers with decision making.
E-Business. (Discussed in detail in Chapter 9.) Customers and suppliers demand access to ERP information including order status, inventory levels, and invoice reconciliation. Furthermore, they want this information in a simplified format that can be accessed via the Web. As a result, these modules provide two channels of access into ERP system information—one channel for customers (B2C) and one for suppliers and partners (B2B).

ERP Systems: Benefits

- **Organizational Flexibility and Agility:** ERP systems break down many former departmental and functional silos of business processes, information systems, and information resources making organizations more flexible, agile, and adaptive.
- **Decision Support:** provide essential information on business performance across functional areas which significantly improves managers' ability to make better, more timely decisions.
- **Quality and Efficiency:** ERP systems integrate and improve an organization's business processes, generating significant improvements in the quality of production, distribution, and customer service.

ERP Systems: Limitations

- **Business Processes Predefined by Best Practices:** may require companies need to change their existing business processes to fit the predefined business processes incorporated into the ERP software.
- **Difficult to Implement:** ERP systems can be extremely complex, expensive, and time consuming to implement.
- **Potential for Failure**

Major Causes of ERP Implementation Failure

- Failure to involve affected employees in planning and development phases and in change management processes
- Attempting too much too fast in conversion process
- Insufficient training in the new tasks required by the ERP system
- Failure to perform proper data conversion and testing for the new system

Implementing ERP Systems

- On-Premise ERP Implementation
  - **Vanilla Approach:** a company implements a standard ERP package, using the package's built-in configuration options.
  - **Custom Approach:** a company implements a more customized ERP system by developing new ERP functions designed specifically for that firm.
  - **Best of Breed Approach:** combines the benefits of the vanilla and customized systems while avoiding the extensive costs and risks associated with complete customization. Companies that adopt this approach mix and match core ERP modules as well as other extended ERP modules from different software providers to best fit their unique internal processes and value chains.
- Software-as-a-Service (SaaS) ERP Implementation
  - a cloud based solution in which the company rents the software from an ERP vendor who offers its products over the Internet, manages software updates, and is responsible for the system's security and availability.

Advantages and disadvantages of using cloud-based ERP system

- **Advantages**
  - The system can be used from any location that provides Internet access. Consequently, users can work from any location using online shared and centralized resources (data and databases). Users access the ERP system via a secure virtual private network (VPN) connection with the provider.
  - Companies using cloud-based ERP avoid the initial hardware and software expenses that are typical of on-premise implementations. For instance, to run SAP on-premise, a company must purchase SAP software as well as a license to use SAP. The magnitude of this investment can hinder small-to medium-sized enterprises (SMEs) from adopting ERP.
  - Cloud-based ERP solutions are scalable, meaning it is possible to extend ERP support to new business processes and new business partners (e.g., suppliers) by purchasing new ERP modules.
- **Disadvantages**
  - It is not clear whether cloud-based ERP systems are more secure than on-premise systems. In fact, a survey conducted by North Bridge Venture Partners indicated that security was the primary reason why organizations did not adopt cloud-based ERP.
  - Companies that adopt cloud-based ERP systems sacrifice their control over a strategic IT resource. For this reason, some companies prefer to implement an on-premise ERP system, utilizing a strong in-house IT department that can directly manage the system.
  - A direct consequence of the lack of control over IT resources occurs when the ERP system experiences problems, for example, some ERP functions are temporarily slow or are not available. In such cases, having an internal IT department that can solve problems immediately rather than dealing with the cloud vendor's system support can speed up the system recovery process.

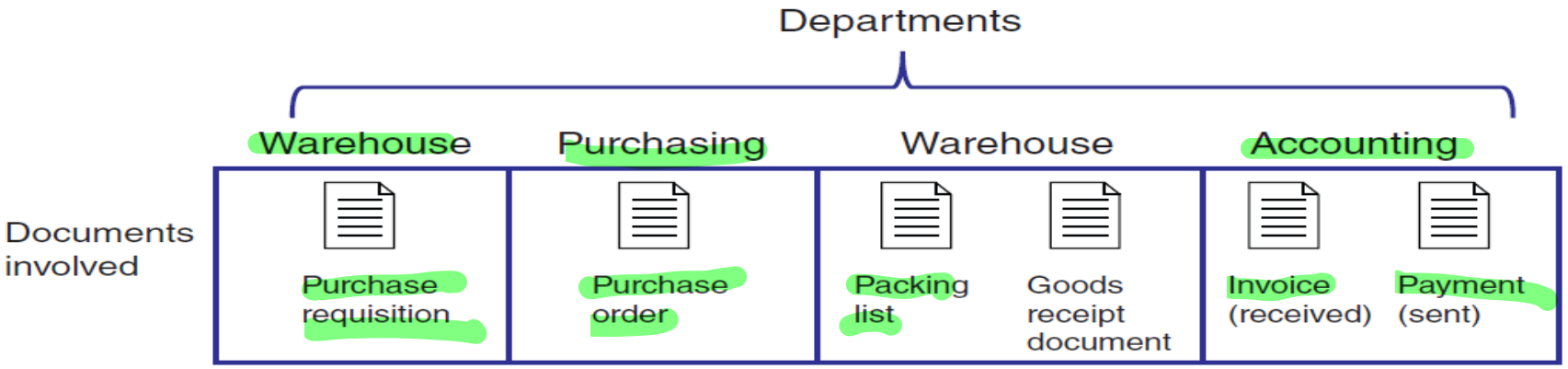
11.4 ERP Support for Business Processes

- The Procurement, Fulfillment, and Production Processes
- Interorganizational Processes: ERP with SCM and CRM

The Procurement, Fulfillment, and Production Processes

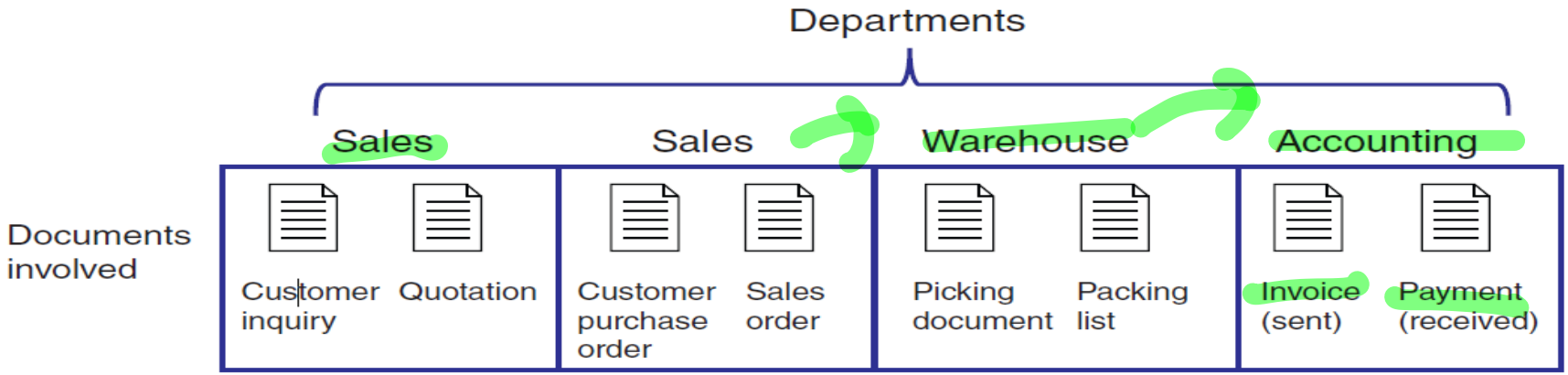
- **Procurement Process:** originates when a company needs to acquire goods or services from external sources, and it concludes when the company receives and pays for them.
- **Order Fulfillment Process:** (order-to-cash process) process in which the company sells goods to a customer originating when the company receives a customer order, and concluding when the company receives a payment from the customer.
- **Production Process:** occurring only in companies that produce physical goods, this process follows one of two strategies: make-to-stock and make-to-order.

Figure 11.4: Departments & Documents Flow in Procurement



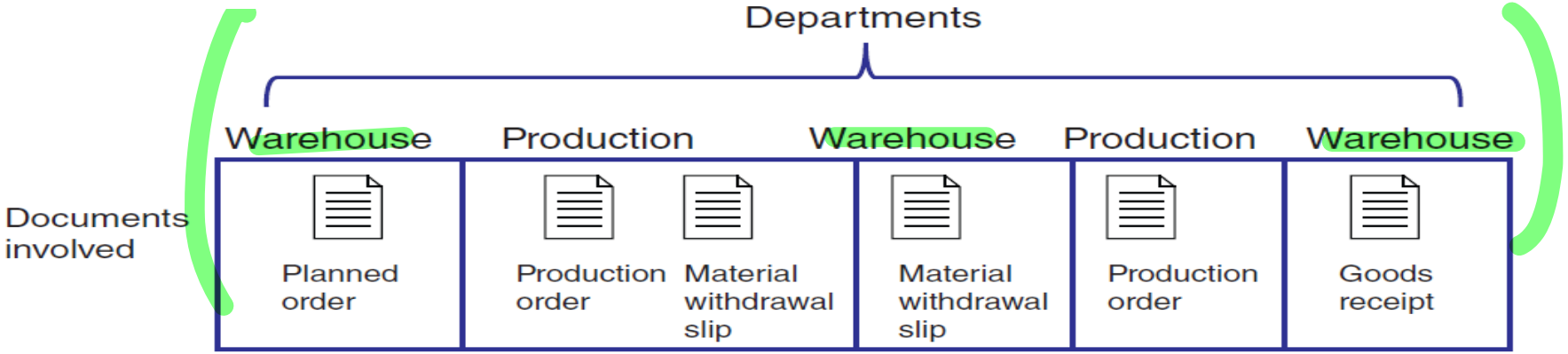
1. The process originates in the Warehouse department, which generates a purchase requisition to buy the needed products.
2. The Warehouse forwards the requisition to the Purchasing department, which creates a purchase order (PO) and forwards it to a vendor. Generally, companies can choose from a number of vendors, and they select the one that best meets their requirements in terms of convenience, speed, reliability, and/or other characteristics.
3. After the company places the order, it receives the goods in its Warehouse department, where someone physically checks the delivery to make certain that it corresponds to what the company ordered. He or she performs this task by comparing a packing list attached to the shipment against the PO.
4. If the shipment matches the order, then the Warehouse issues a goods receipt document.
5. At the same time or shortly thereafter, the Accounting department receives an invoice from the vendor. Accounting then checks that the PO, the goods receipt document, and the invoice match. This process is called the *three-way-match*.
6. After Accounting verifies the match, it processes the payment and sends it to the vendor.

Figure 11.5: Departments & Documents Flow in Fulfillment



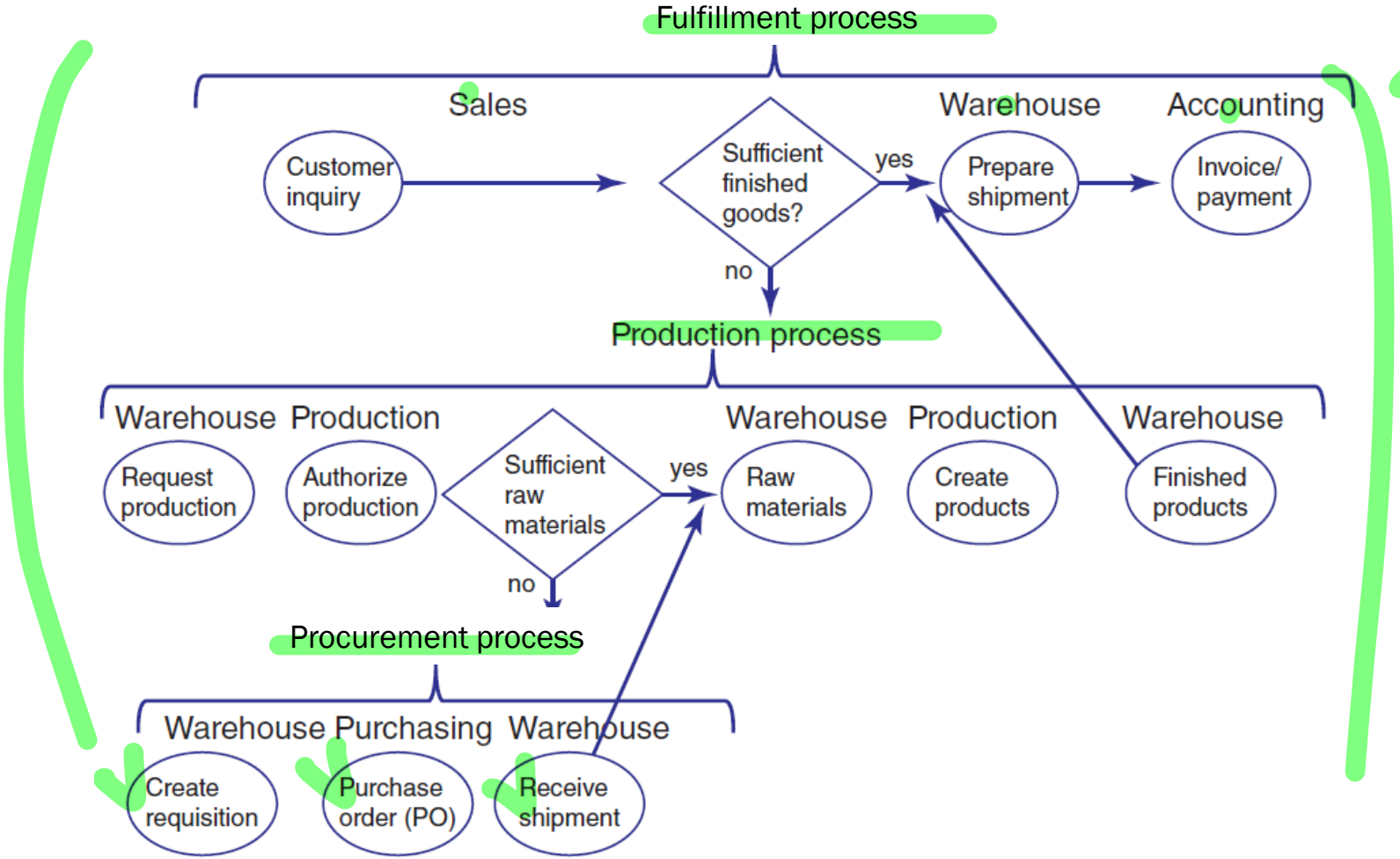
1. The Sales department receives a customer inquiry, which essentially is a request for information concerning the availability and price of a specific good. (We restrict our discussion here to fulfilling a customer order for physical goods rather than services.)
2. After Sales receives the inquiry, it issues a quotation that indicates availability and price.
3. If the customer agrees to the price and terms, then Sales creates a customer purchase order (PO) and a sales order.
4. Sales forwards the sales order to the Warehouse. The sales order is an interdepartmental document that helps the company keep track of the internal processes that are involved in fulfilling a specific customer order. In addition, it provides details of the quantity, price, and other characteristics of the product.
5. The Warehouse prepares the shipment and produces two other internal documents: the picking document, which it uses to remove goods from the Warehouse, and the packing list, which accompanies the shipment and provides details about the delivery.
6. At the same time, Accounting issues an invoice for the customer.
7. The process concludes when Accounting receives a payment that is consistent with the invoice.

Figure 11.6: Departments & Documents Flow in Production



1. The Warehouse department issues a planned order when the company needs to produce a finished product, either because the Warehouse has insufficient inventory or because the customer placed a specific order for goods that are not currently in stock.
2. Once the planned order reaches Production, the production controller authorizes the order and issues a production order, which is a written authorization to start the production of a certain amount of a specific product.
3. To assemble a finished product, Production requires a number of materials (or parts). To acquire these materials, Production generates a material withdrawal slip, which lists all of the needed parts, and forwards it to the Warehouse.
4. If the parts are available in the Warehouse, then the Warehouse delivers them to Production. If the parts are not available, then the company must purchase them via the procurement process.
5. After Production has created the products, it updates the production order specifying that, as planned, a specific number of units of product can now be shipped to the Warehouse.
6. As soon as the Warehouse receives the finished goods, it issues a goods receipt document that certifies how many units of a product it received that are available for sales.

Figure 11.7: Integrated Processes with ERP Systems



Interorganizational Processes: ERP with SCM and CRM

- **SCM and CRM Processes:** help multiple firms in an industry coordinate activities such as the production-to-sale of goods and services.
- **ERP SCM Systems:** have the capability to place automatic requests to replinish raw materials/goods based on established criteria (e.g., below minimum quantity, expiration dates on perishable goods, etc.).
- **ERP CRM Systems:** generate forecasting analyses of product consumption based on critical variables such as geographical area, season, day of the week, and type of customer; and, identify particular customer needs and then utilize this information to suggest specific product campaigns.