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CHAPTER 8

Enterprise Systems

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What is an Enterprise System?

- Enterprise system is a system that ensures information can be shared with authorized users across all business functions to support the running and managing of a business.
- Although Enterprise Systems were initially thought to be cost effective only for very large companies, even small and mid-sized companies are now implementing these systems to reduce costs, speed time to market, and improve service.

Why Learn about Enterprise Systems?

- Service-oriented Economy or Service economy is an economy where the primary economic activity are more focused on providing services rather than producing goods.
- In our service economy, outstanding customer service has become a goal of almost all companies.

Why Learn about Enterprise Systems?

- To provide good customer service, employees who work directly with customers might use an enterprise system to check the inventory status of ordered items, view the production-planning schedule to tell a customer when an item will be in stock, or enter data to schedule a delivery.

Why Learn about Enterprise Systems?

- No matter what your role, it is very likely that you will provide input to or use the output from your organization's enterprise systems.
- Thus, it is important that you understand how these systems work and what their capabilities and limitations are.

Transaction Processing Systems

- A Transaction Processing System (TPS) is a type of information system that ensures the completion of a business transaction.
- Many organizations and enterprise employ transaction processing systems (TPSs).

Traditional Transaction Processing Methods and Objectives

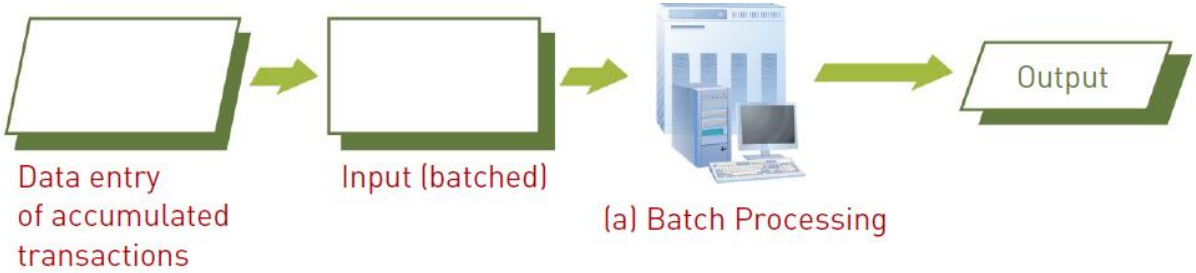
- Organizations expect their TPSs to accomplish a number of specific objectives:
  - Capture, process, and update databases of business data required to support routine business activities
  - Ensure that the data is processed accurately and completely
  - Produce timely user responses and reports
  - Reduce clerical and other labor requirements
  - Help improve customer service
  - Achieve competitive advantage
  - Avoid processing fraudulent transactions

Traditional Transaction Processing Methods and Objectives

- Batch Processing
  - Data processing in which business transactions are accumulated over a period of time and prepared for processing as a single unit or batch.
  - Payroll transactions and billing are typically done via batch processing.

Traditional Transaction Processing Methods and Objectives

- Online Transaction Processing (OLTP)
  - Data processing in which each transaction is processed immediately without the delay of accumulating transactions into a batch.
  - Essential for businesses that require access to current data such as ticket agencies, and stock investment firms.



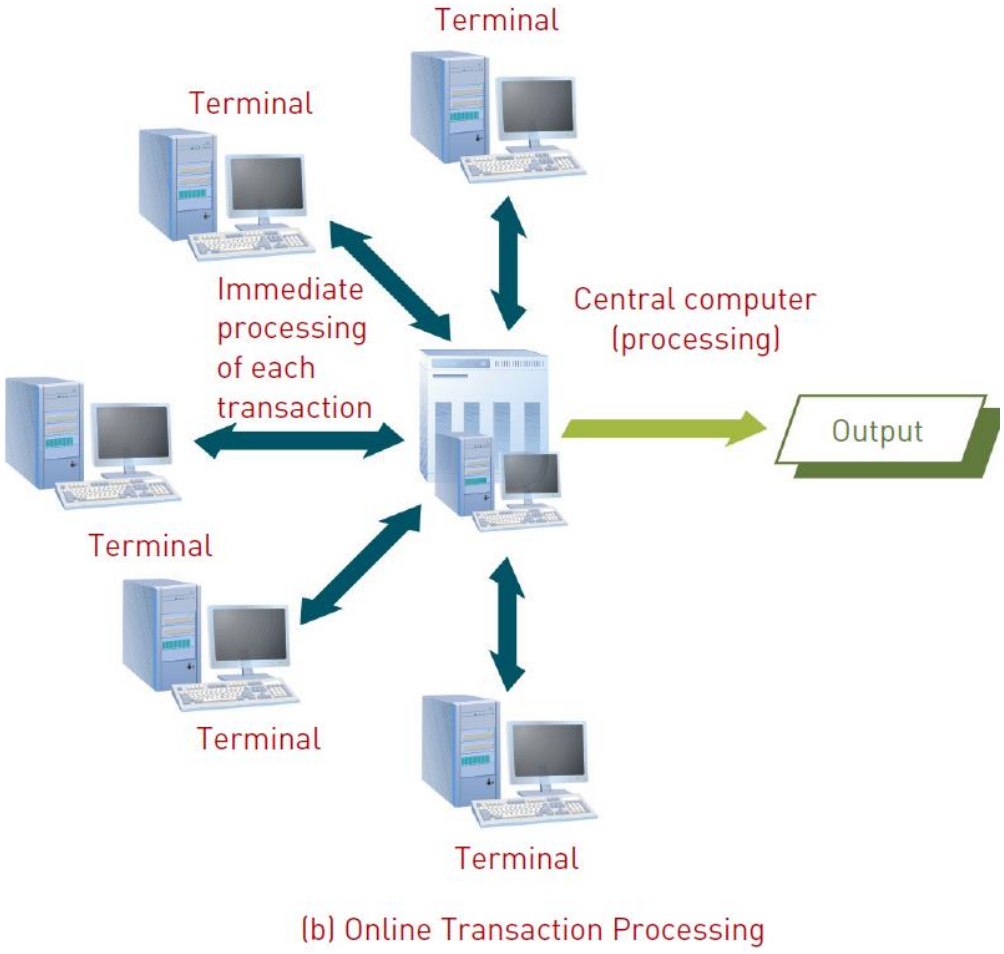


FIGURE **8.2**

Batch versus online transaction processing

(a) Batch processing inputs and processes data in groups. (b) In online processing, transactions are completed as they occur.

Traditional Transaction Processing Methods and Objectives

- Increasingly, the need for current data for decision making is driving many organizations to move from batch processing systems to online transaction processing systems when it is economically feasible.

Transaction Processing Systems for Small and Medium-Size Enterprises (SMEs)

- SME is a legally independent enterprise with no more than 500 employees.
- Many software packages provide integrated transaction processing system solutions for SMEs.
- Transaction processing systems for SMEs are typically easy to install and operate and usually have a low total cost of ownership, with an initial cost of a few hundred to a few thousand dollars.

Transaction Processing Systems for Small and Medium-Size Enterprises (SMEs)

TABLE 8.2 Sample of TPS solutions for SMEs

Vendor	Software	Type of TPS Offered	Target Customers
AccuFund	AccuFund	Financial reporting and accounting	Nonprofit, municipal, and government organizations
OpenPro	OpenPro	Complete ERP solution, including financials, supply chain management, e-commerce, customer relationship management, and retail POS system	Manufacturers, distributors, and retailers
Intuit	QuickBooks	Financial reporting and accounting	Manufacturers, professional services, contractors, nonprofits, and retailers
Sage	Sage 300 Construction and Real Estate	Financial reporting, accounting, and operations	Contractors, real estate developers, and residential builders
Redwing	TurningPoint	Financial reporting and accounting	Professional services, banks, and retailers

Transaction Processing Activities

- All TPSs perform a common set of basic data-processing activities:
  - Capture and process data that describes fundamental business transactions
  - Update databases
  - Produce a variety of reports.
- A TPS also provides valuable input to management information systems, decision support systems, and knowledge management systems.

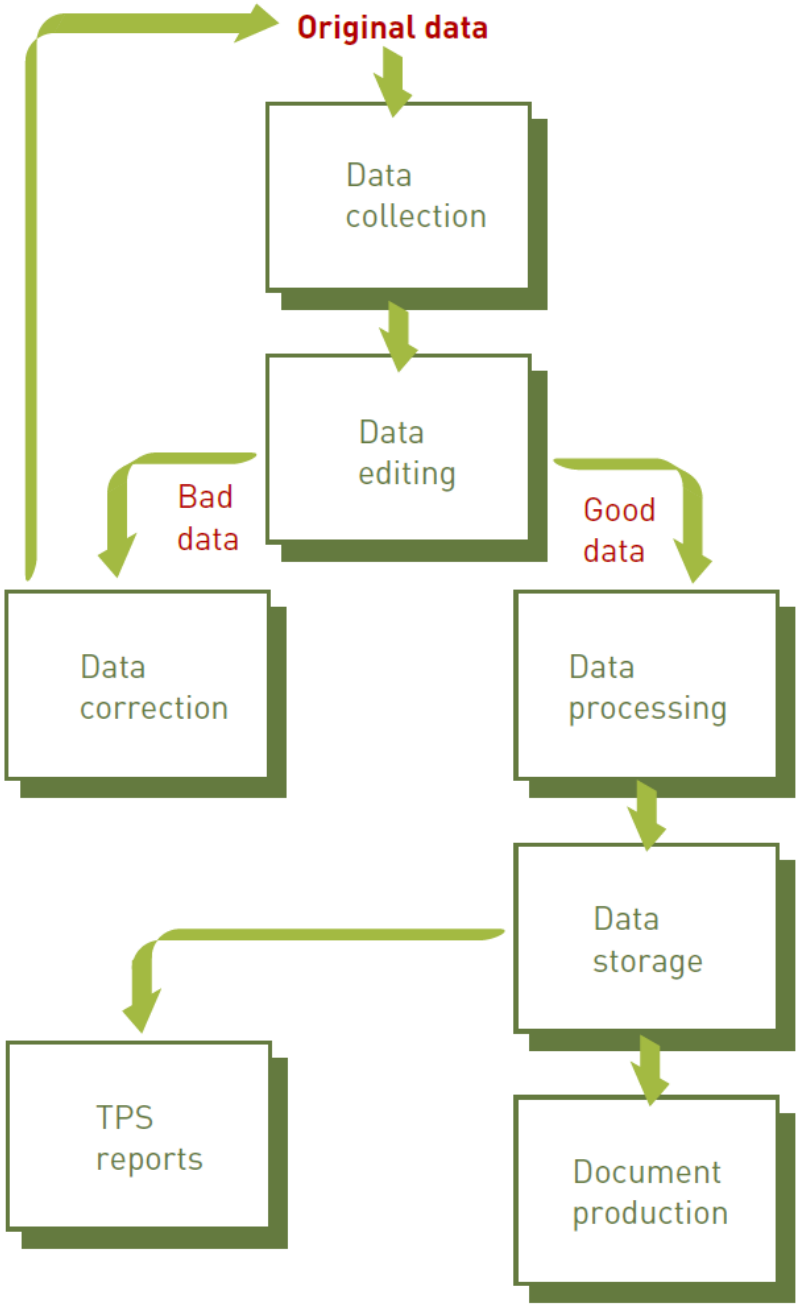


FIGURE **8.5**

Transaction processing activities

A transaction processing cycle includes data collection, data editing, data correction, data processing, data storage, and document production.

Data Collection

- Capturing and gathering all data necessary to complete the processing of transactions.
- Data collection can be:
  - done manually, such as by collecting handwritten sales orders or inventory update forms.
  - automated via special input devices such as scanners and point-of-sale (POS) terminals.

Data Collection

- Data should be captured at its source (their point of origin) in a digital form that can be directly entered into the computer. This approach is called **source data automation**.

Data Editing

- **Data Editing** involves checking data for validity and completeness to detect any problems.
- Examples:
  - Quantity and price must be numeric, and names must be alphabetic; otherwise, the data is not valid.
  - Often, the codes associated with an individual transaction are edited against a database containing valid codes. If any code entered (or scanned) is not present in the database, the transaction is rejected.

Data Correction

- It is not enough simply to reject invalid data. The system should also provide error messages that alert those responsible for editing the data. Error messages must specify the problem so proper corrections can be made.
- **Data Correction** involves reentering data that was not typed or scanned properly.

Data Processing

- **Data Processing** or **Data Manipulation** involves performing calculations and other data transformations related to business transactions.
- Data processing can include:
  - classifying data,
  - sorting data,
  - performing calculations,
  - summarizing results, and
  - storing data in the organization's database for further processing.

Data Storage

- **Data Storage** involves updating one or more databases with new transactions.
- After being updated, this data can be further processed by other systems so that it is available for management reporting and decision making.

Document Production

- **Document production** involves generating output records, documents, and reports. These can be hard-copy paper reports, soft-copy reports, or displays on computer screens.

Enterprise Resource Planning

- Enterprise resource planning (ERP):
  - A set of integrated programs that manage a company's vital business operations for an entire organization.
  - Captures transactions entered by workers in all functional areas of the business.
  - Provides data to enable the managers to make decisions about current and future operations

Enterprise Resource Planning

Enterprise Resource Planning

- At the core of the ERP system is a database that is shared by all users so that all business functions have access to current and consistent data for operational decision making and planning

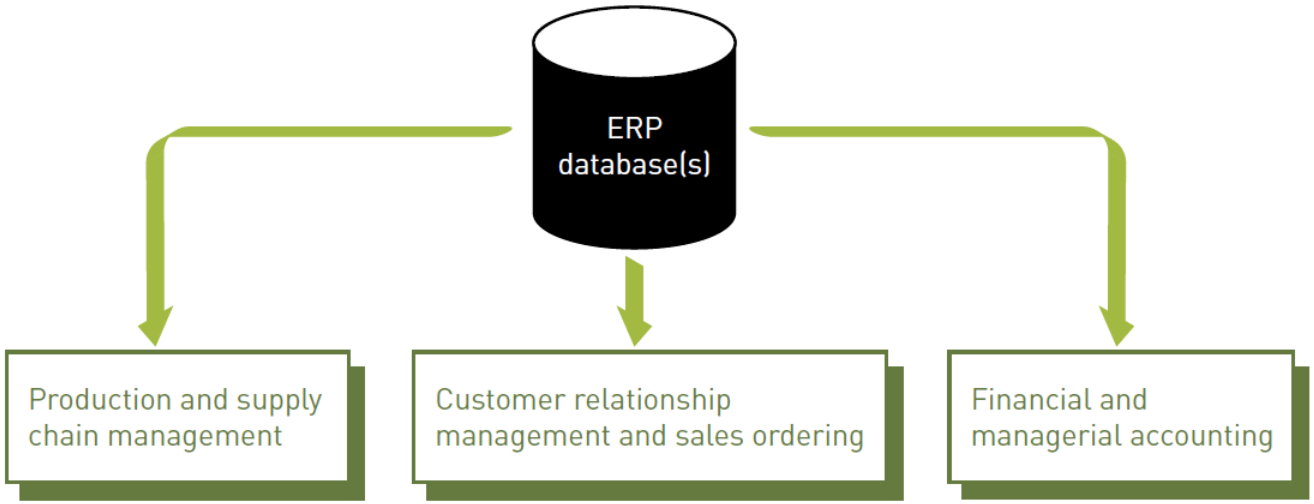


FIGURE 8.7
Enterprise resource planning system
An ERP integrates business processes and the ERP database.

Advantages of ERP

- Improved data security and quality data
- Easy business reporting
- Reduced operating costs
- Increased productivity

Enterprise Resource Planning

- ERP systems was evolved from materials requirement planning systems (MRP) developed in the 1970s. These systems tied together the production planning, inventory control, and purchasing business functions for manufacturing organizations.

Leading ERP Systems

- ERP systems are commonly used in manufacturing companies, colleges and universities, professional service organizations, retailers, and healthcare organizations.
- In addition, the needs of an organization can be far different from the needs of another organization.
- Thus, no one ERP software solution from a single vendor is “best” for all organizations.

Leading ERP Systems

- Large organizations were the first to take on the challenge of implementing ERP systems as only they could afford large hardware and software costs and dedicate sufficient people resources to the implementation and support of these systems.

Leading ERP Systems

- Many large company implementations occurred in the 2000s and involved installing the ERP software on the organizations' large mainframe computers.
- In many cases, this required upgrading the hardware at a cost of millions of dollars.

Leading ERP Systems

- Smaller organizations moved to ERP systems about 10 years after larger organizations did.
- The smaller firms simply could not afford the investment required in hardware, software, and people to implement and support ERP.

Leading ERP Systems

- However, ERP software vendors gradually created new ERP solutions with much lower start-up costs and faster, easier implementations.

Leading ERP Systems

- Some ERP vendors introduced cloud-based solutions, which further reduced the start-up costs by avoiding the need to purchase expensive ERP software and make major hardware upgrades.

Leading ERP Systems

- For example, SAP, one of the largest and most-recognized ERP solution providers.
  - SAP is dedicated to creating easy-to-use, adaptable cloud ERP applications. Whether you want to customize processes, use the public or private cloud, or pay only for what you need.

Leading ERP Systems

- As an alternative, many organizations elect to implement open-source ERP systems from vendors such as Compiere.
- With open-source software, organizations can see and modify the source code to customize it to meet their needs. Such systems are much less costly to acquire and are relatively easy to modify to meet business needs.

Supply Chain Management (SCM)

- An organization can use an ERP system within a manufacturing organization to support supply chain management (SCM).
- SCM systems include:
  - Planning, executing, and controlling all activities involved in raw material sourcing and procurement
  - Converting raw materials to finished products, and
  - warehousing and delivering finished product to customers.

Supply Chain Management (SCM)

- The goal of SCM is to decrease costs and improve customer service, while at the same time reducing the overall investment in inventory in the supply chain.

Supply Chain Management (SCM)

- SCM manages the flow of materials, information, and finances.
  - The **materials flow** includes the inbound movement of raw materials from supplier to manufacturer as well as the outbound movement of finished product from manufacturer to wholesaler, retailer, and customer.

Supply Chain Management (SCM)

- The **information flow** involves capturing orders and invoices among suppliers, manufacturers, wholesalers, retailers, and customers.
- The **financial flow** consists of payment transactions among suppliers, manufacturers, wholesalers, retailers, customers, and their financial institutions.

Process For Developing A Production Plan

- Sales Forecasting
- Sales and operations plan (S&OP)
- Demand management
- Detailed scheduling
- Materials requirement planning (MRP)
- Purchasing
- Production
- Sales ordering

Process For Developing A Production Plan

- The process starts with Sales Forecasting to develop an estimate of future customer demand using an ERP software or specialized software and techniques.
- The Sales and operations plan (S&OP) determines the specific products or services to be produced and when to meet the forecast future demand.

Process For Developing A Production Plan

- Demand management refines the production plan by determining the amount of weekly or daily production needed to meet the demand for individual products.
- Detailed scheduling uses the refined production plan to develop a detailed production schedule.

Process For Developing A Production Plan

- Materials requirement planning (MRP) determines the amount and timing for placing raw material orders with suppliers.
- Purchasing uses the information from MRP to place purchase orders for raw materials with qualified suppliers.

Process For Developing A Production Plan

- Production uses the production schedule to plan the details of running and staffing the production operation by taking into account employees, equipment, raw material availability, etc.
- Sales ordering is the set of activities that must be performed to capture a customer sales order.

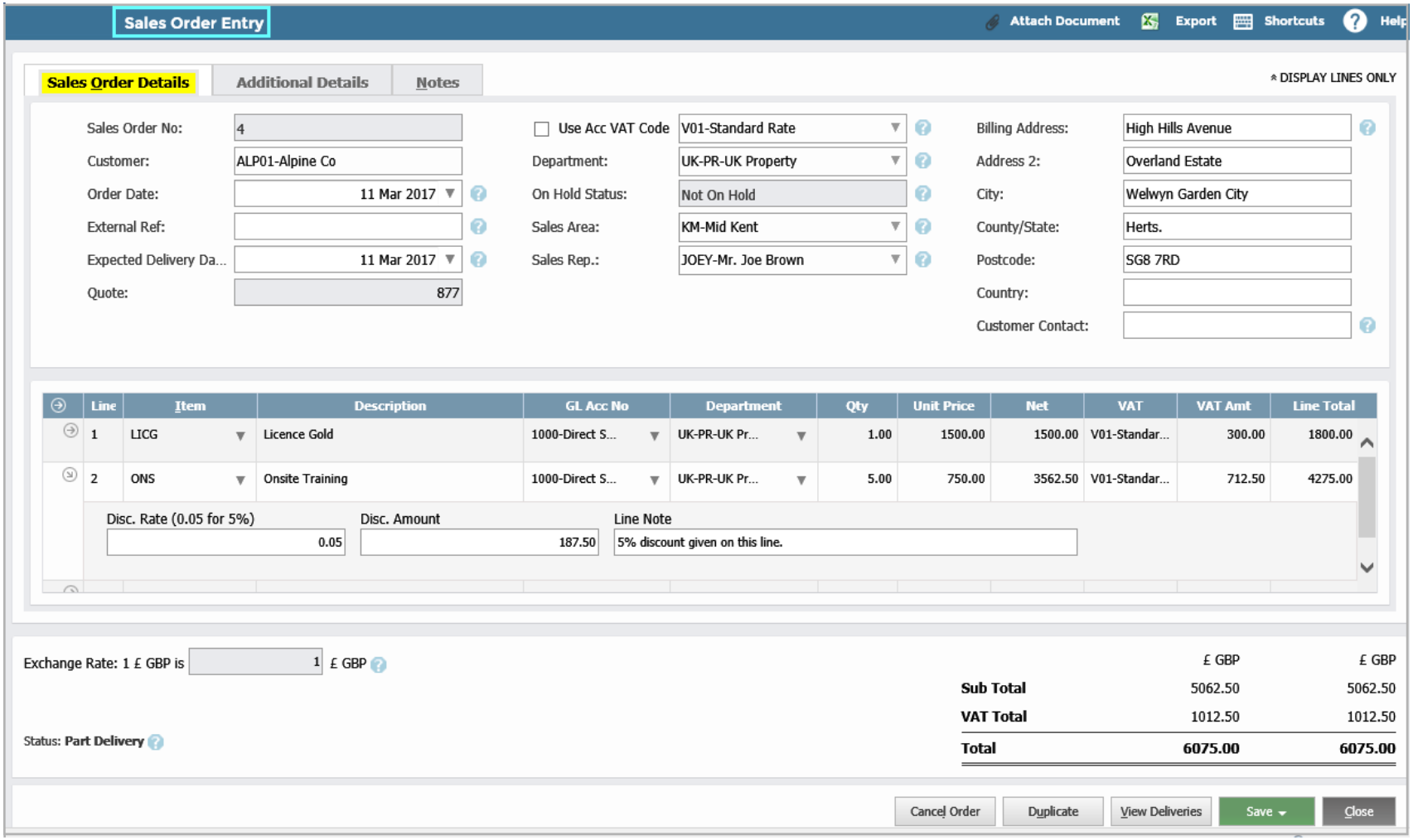


FIGURE **8.9**

Sales order entry window

Sales ordering is the set of activities that must be performed to capture a customer sales order.

Customer Relationship Management

- Organizations can use an ERP system to support their Customer relationship management (CRM).
- CRM is a process in which a business or an organization administers its interactions with customers, typically using data analysis to study large amounts of information.

Customer Relationship Management

- Goal is to understand and anticipate customers' needs.
- CRM is used primarily by people in sales, marketing, and service organizations to capture and view data about customers and to improve communications.

Customer Relationship Management

- CRM software automates and integrates the functions of sales, marketing, and service in an organization.
- The objective is to capture data about every contact a company has with a customer through every channel and to store it in the CRM system so that the company can truly understand customer actions.

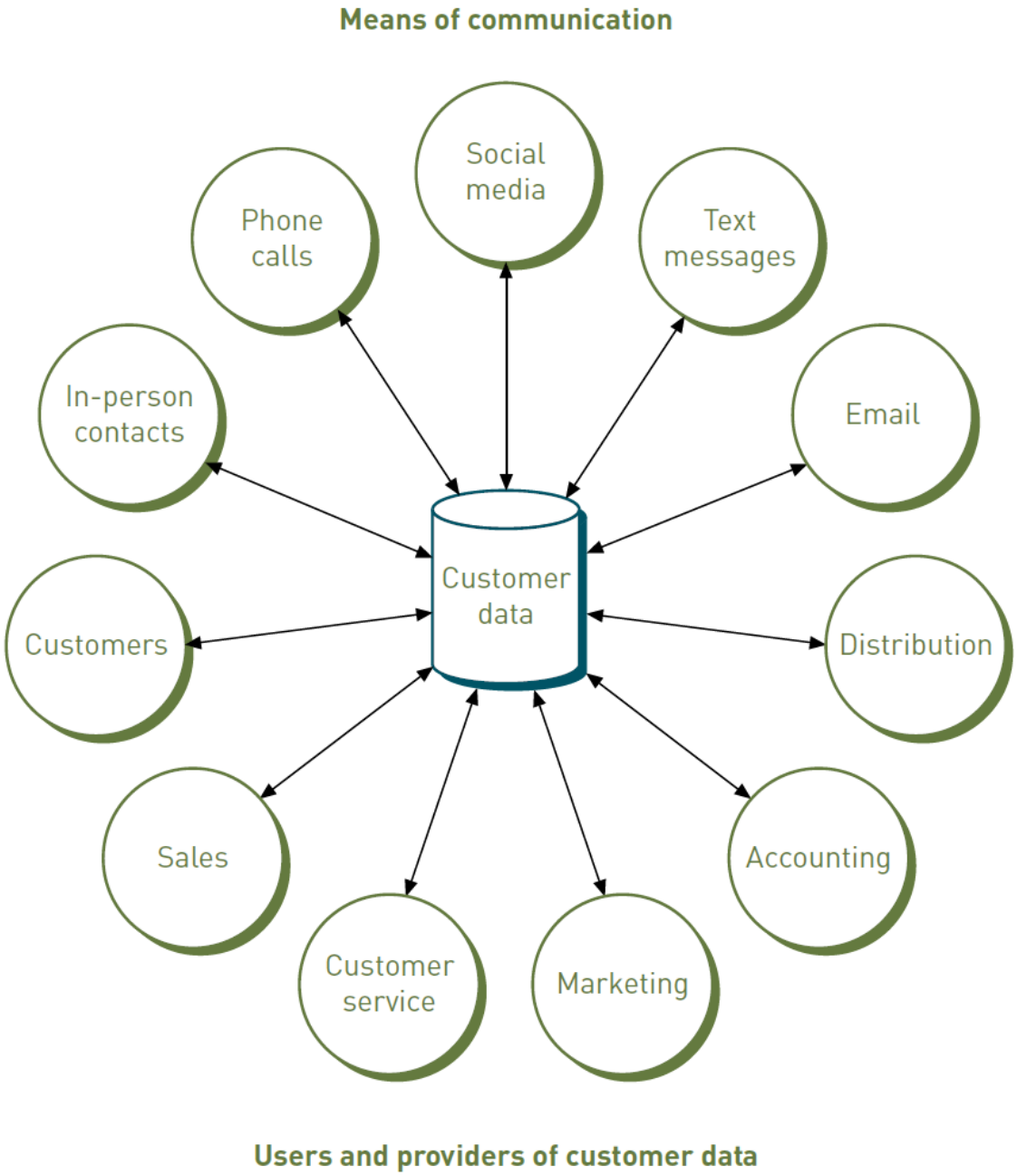


FIGURE **8.10**

Customer relationship management system

A CRM system provides a central repository of customer data used by the organization.

Customer Relationship Management

- Savvy retailers today use their CRM systems to stay on top of what these customers are saying on social networks.
- For instance, Wells Fargo Bank uses social media to keep track of what its customers are saying and then responds quickly to their issues and questions to improve customer satisfaction.

Customer Relationship Management

- Key features of a CRM system:
  - Contact management
  - Sales management
  - Customer support
  - Marketing automation
  - Analysis
  - Social networking
  - Access by mobile devices
  - Import contact data

Product Lifecycle Management

- Product lifecycle management (PLM) is the process of managing the entire lifecycle of a product from its inception through design, and manufacturing, to sales, service, and eventually retirement.


Retire & replace
Sales & marketing
Research & development
Concept development
Product design
Prototype & test
Process design
Production & assembly
Product delivery & installation
Service & support
product development lifecycle

Product Lifecycle Management

- Organizations can use an ERP system to support their PLM.
- ERP system provides a means for managing the data and processes associated with the various phases of the product life cycle.

TABLE 8.4 Highly rated PLM software products

Organization	Primary PLM Software Product	Technology Model
Arena	Cloud PLM	Cloud-based solution
Infor	Optiva	On-premise solution
Integware	Enovia Collaborative PLM	On-premise solution
PTC	Windchill	SaaS solution
SAP	PLM	On-premise solution
Siemens	Teamcenter	On-premise solution
SofTech	ProductCenter PLM	SaaS solution
Sopheon	Accolade	Cloud-based solution

Overcoming Challenges in Implementing Enterprise Systems

- Implementing an enterprise system, particularly for a large organization, is extremely challenging.
- Many enterprise system implementations fail, and problems with an enterprise system implementation can require expensive solutions.

Overcoming Challenges in Implementing Enterprise Systems

- For example, the state of Michigan sued HP over a $49 million IT project for the Secretary of State's office that remains incomplete after 10 years.
- Half of nearly 200 ERP implementations worldwide evaluated by Panorama, an ERP consulting firm, were judged to be failures.

TABLE 8.6 Challenges to successful enterprise system implementation

Challenge	Description
Cost and disruption of upgrades	Most companies have other systems that must be integrated with the enterprise system, such as financial analysis programs, e-commerce operations, and other applications that communicate with suppliers, customers, distributors, and other business partners. Integration of multiple systems adds time and complexity to an ERP implementation.
Cost and long implementation lead time	The average ERP implementation cost is $5.5 million with an average project duration of just over 14 months.
Difficulty in managing change	Companies often must radically change how they operate to conform to the enterprise work processes. These changes can be so drastic to longtime employees that they depart rather than adapt to the change, leaving the firm short of experienced workers.
Management of software customization	The base enterprise system may need to be modified to meet mandatory business requirements. System customizations can become extremely expensive and further delay implementation.
User frustration with the new system	Effective use of an enterprise system requires changes in work processes and in the details of how work gets done. Many users initially balk at these changes and require extensive training and encouragement.

Overcoming Challenges in Implementing Enterprise Systems

- Below are tips for avoiding many common causes for failed enterprise system implementations:
  - Assign a full-time, experienced staffs to manage the project.
  - Allow sufficient time to transition from the old way of doing things to the new system and new processes.

Overcoming Challenges in Implementing Enterprise Systems

- Below are tips for avoiding many common causes for failed enterprise system implementations:
  - Allocate sufficient time and money for training staff; many project managers recommend budgeting 30 to 60 days per employee for training.
  - Assess project progress and identify project-related risks.

Overcoming Challenges in Implementing Enterprise Systems

- Below are tips for avoiding many common causes for failed enterprise system implementations:
  - Keep the scope of the project well defined and contained to essential business processes.
  - Be wary of modifying the enterprise system software to conform to your firm's business practices.

Hosted Software Model for Enterprise Software

- Hosted software means having your software installed in a datacenter, providing online access to the application for users.
- Many business application software vendors are pushing the use of the hosted software model.

Hosted Software Model for Enterprise Software

- The goal is to help customers acquire, use, and benefit from the new technology while avoiding much of the associated complexity and high start-up costs.
- SAP is among the software vendors who offer hosted versions of their ERP or CRM software at a cost of $50 to $200 per month per user.

Hosted Software Model for Enterprise Software

- This pay-as-you-go approach is appealing because organizations can experiment with powerful software capabilities without making a major financial investment.
- Organizations can then dispose of the software without large investments if the software fails to provide value or otherwise misses expectations.

Hosted Software Model for Enterprise Software

- Also, using the hosted software model means the business firm does not need to employ a full-time IT person to maintain key business applications.
- By using a cloud-based PLM, LoneStar was able to avoid close to $40,000 in server installation and maintenance costs annually.

References

- **Reynolds, George Walter, Stair, Ralph M.** "Principles of information systems", 13e – 2017