

Concepts in Enterprise Resource Planning

Business Functions and Business Processes- (Chapter-1)

Dr.A. Sasi Kumar

Objectives

- Name the main functional areas of operation used in business
- Differentiate between a business process and a business function
- Identify the kinds of data each main functional area produces
- Identify the kinds of data each main functional area needs
- Define integrated information systems, and explain why they are essential in today's globally competitive business environment

Introduction

- **Enterprise Resource Planning (ERP)** programs: Core software used by companies to coordinate information in every area of business
 - Help manage companywide business processes
 - Use common database and shared management reporting tools
- **Business process:** Collection of activities that takes some input and creates an output that is of value to the customer

Functional Areas and Business Processes

- To understand ERP, you must understand how a business works
 - Functional areas of operation
 - Business processes

Functional Areas of Operation

- Marketing and Sales (M/S)
- Supply Chain Management (SCM)
- Accounting and Finance (A/F)
- Human Resources (HR)
- **Business functions:** Activities specific to a functional area of operation

Functional Areas of Operation (cont'd.)

| Functional area of operation | Marketing and Sales | Supply Chain Management | Accounting and Finance | Human Resources |
|------------------------------|----------------------------------|------------------------------------|--|-----------------------|
| Business functions | Marketing a product | Purchasing goods and raw materials | Financial accounting of payments from customers and to suppliers | Recruiting and hiring |
| | Taking sales orders | Receiving goods and raw materials | Cost allocation and control | Training |
| | Customer support | Transportation and logistics | Planning and budgeting | Payroll |
| | Customer relationship management | Scheduling production runs | Cash-flow management | Benefits |
| | Sales forecasting | Manufacturing goods | | Government compliance |
| | Advertising | Plant maintenance | | |

Figure 1-1 Examples of functional areas of operation and their business functions

Functional Areas of Operation (cont'd.)

- Functional areas are interdependent
 - Each requires data from the others
- Better integration of functional areas leads to improvements in communication, workflow, and success of company
- **Information system (IS):** Computers, people, procedures, and software that store, organize, and deliver information

Business Processes

- Collection of activities that takes one or more kinds of input and creates an output that is of value to customer
 - Customer can be traditional external customer or internal customer
- Thinking in terms of business processes helps managers to look at their organization from the customer's perspective

Business Processes (cont'd.)

| Input | Functional area responsible for input | Process | Output |
|--------------------------------|---------------------------------------|------------------------------|--|
| Request to purchase smartphone | Marketing and Sales | Sales order | Order is generated |
| Financial help for purchase | Accounting and Finance | Arranging financing in-house | Customer finances through the smartphone company |
| Fulfillment of order | Supply Chain Management | Shipping and delivery | Customer receives smartphone |
| Technical support | Marketing and Sales | 24-hour help line available | Customer's technical query is resolved |

Figure 1-2 Sample business processes related to the sale of a personal smartphone

Business Processes (cont'd.)

- Businesses must always consider customer's viewpoint in any transaction
- Successful customer interaction
 - Customer (either internal or external) is not required to interact with each business function involved in the process
- Successful business managers view business operations from the perspective of a satisfied customer

Business Processes (cont'd.)

- Sharing data effectively and efficiently between and within functional areas leads to more efficient business processes
- **Integrated information systems:** Systems in which functional areas share data

Business Processes (cont'd.)

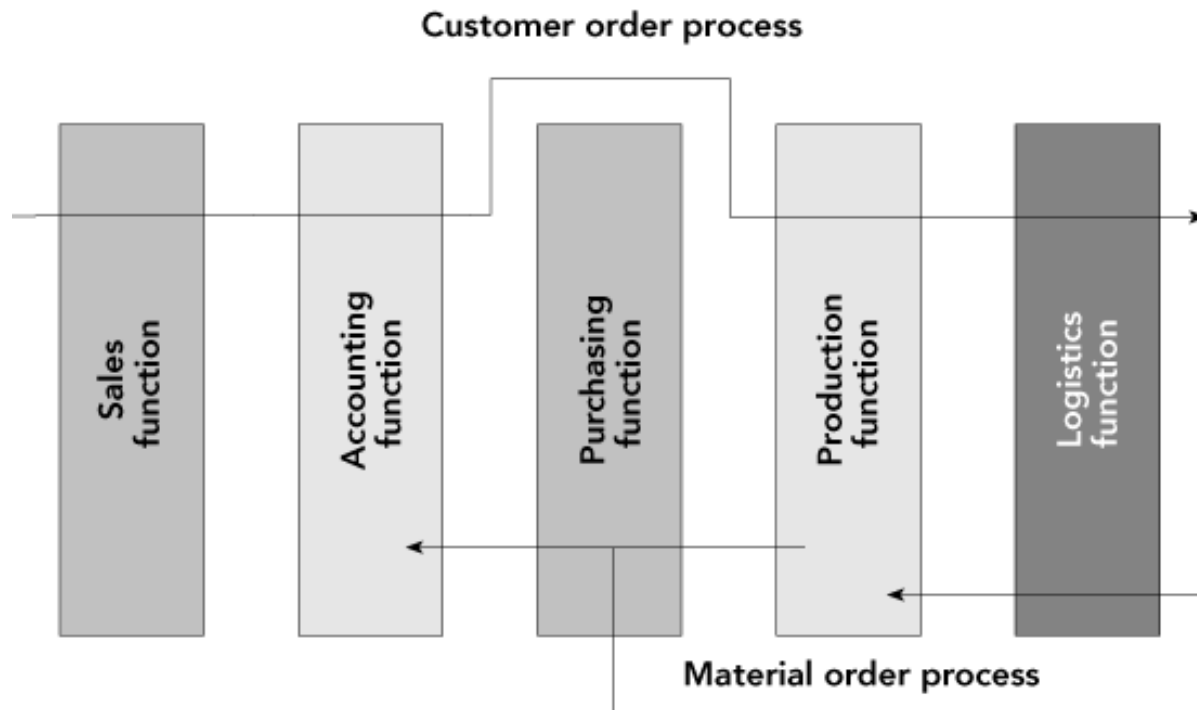


Figure 1-3 A process view of business

Business Processes (cont'd.)

- Businesses take inputs (resources) and transform these inputs into goods and services for customers
 - Inputs: Material, people, equipment
- Managing inputs and business processes effectively requires accurate and up-to-date information

Functional Areas and Business Processes of a Very Small Business

- Example: A fictitious coffee shop
 - Examine business processes of the coffee shop
 - See why coordination of functional areas helps achieve efficient and effective business processes
 - Look at how integration of the information system improves the business

Marketing and Sales

- Functions of Marketing and Sales
 - Developing products
 - Determining pricing
 - Promoting products to customers
 - Taking customers' orders
 - Helping create a sales forecast

Marketing and Sales (cont'd.)

- Marketing and Sales tasks for the coffee shop
 - Formal recordkeeping not required
 - Need to keep track of customers
 - Product development can be done informally
 - Good repeat customers allowed to charge purchases—up to a point
 - Records must show how much each customer owes and his or her available credit

Supply Chain Management

- Functions within Supply Chain Management
 - Making the coffee (manufacturing/production)
 - Buying raw materials (purchasing)
- Production planning requires sales forecasts from M/S functional area
 - **Sales forecasts:** Analyses that attempt to predict the future sales of a product

Supply Chain Management (cont'd.)

- Production plans used to develop requirements for raw materials and packaging
 - Raw materials: Bottled spring water, fresh lemons, artificial sweetener, raw sugar
 - Packaging: Cups, straws, napkins
- SCM and M/S must choose a recipe for each coffee product sold

Accounting and Finance

- Functions within Accounting and Finance
 - Recording raw data about transactions (including sales), raw material purchases, payroll, and receipt of cash from customers
- **Raw data:** Numbers collected from sales, manufacturing and other operations, without any manipulation, calculation, or arrangement for presentation

Accounting and Finance (cont'd.)

- Data from Accounting and Finance used by Marketing and Sales and Supply Chain Management
 - Sales records are important component of sales forecast
 - Sales forecast is used in making staffing decisions and in production planning
 - Records from accounts receivable used to monitor the overall credit-granting policy of the coffee shop

Human Resources

- Functions of Human Resources
 - Recruit, train, evaluate, and compensate employees
- HR uses sales forecasts developed by the individual departments to plan personnel needs
- Systems integrated using ERP software provide the data sharing necessary between functional areas

Functional Area Information Systems

- Potential inputs and outputs for each functional area described next
- Note the kinds of data needed by each area and how people use the data
- Information systems maintain relationships between all functional areas and processes

Marketing and Sales

- Needs information from all other functional areas
- Customers communicate orders to M/S in person or by telephone, e-mail, fax, the Web, etc.
- M/S has a role in determining product prices
 - Pricing might be determined based on a product's unit cost, plus some percentage markup
 - Requires information from Accounting and Finance, and Supply Chain Management data

Marketing and Sales (cont'd.)

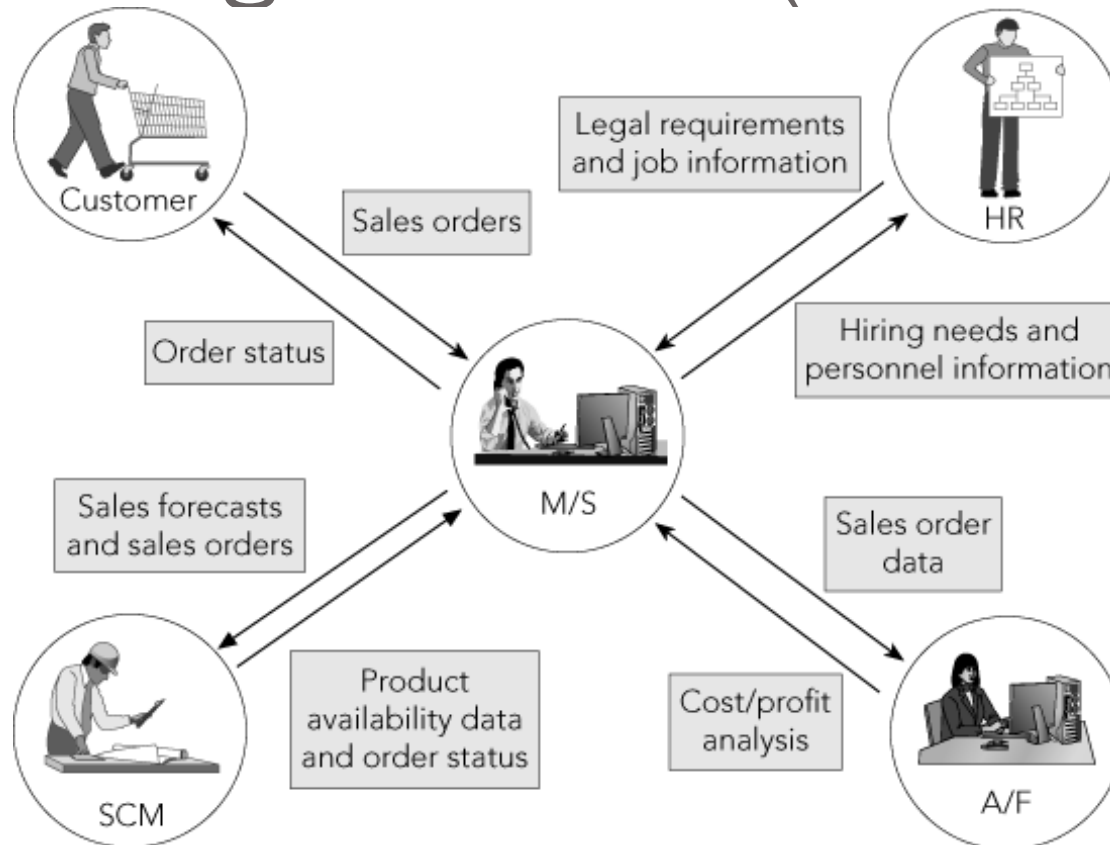


Figure 1-4 The Marketing and Sales functional area exchanges data with customers and with the Human Resources, Accounting and Finance, and Supply Chain Management functional areas

Marketing and Sales (cont'd.)

- M/S needs to interact with Human Resources to exchange information on hiring needs, legal requirements, etc.
- Inputs for M/S
 - Customer data
 - Order data
 - Sales trend data
 - Per-unit cost
 - Company travel expense policy

Marketing and Sales (cont'd.)

- Outputs for M/S
 - Sales strategies
 - Product pricing
 - Employment needs

Supply Chain Management

- Needs information from various functional areas
- Production plans based on information about product sales (actual and projected) that comes from Marketing and Sales
- With accurate data about required production levels:
 - Raw material and packaging can be ordered as needed
 - Inventory levels can be kept low, saving money

Supply Chain Management (cont'd.)

- Supply Chain Management data and records can:
 - Provide data needed by Accounting and Finance to determine how much of each resource was used
 - Support the M/S function by providing information about what has been produced and shipped
- Supply Chain Management interacts in some ways with Human Resources

Supply Chain Management (cont'd.)

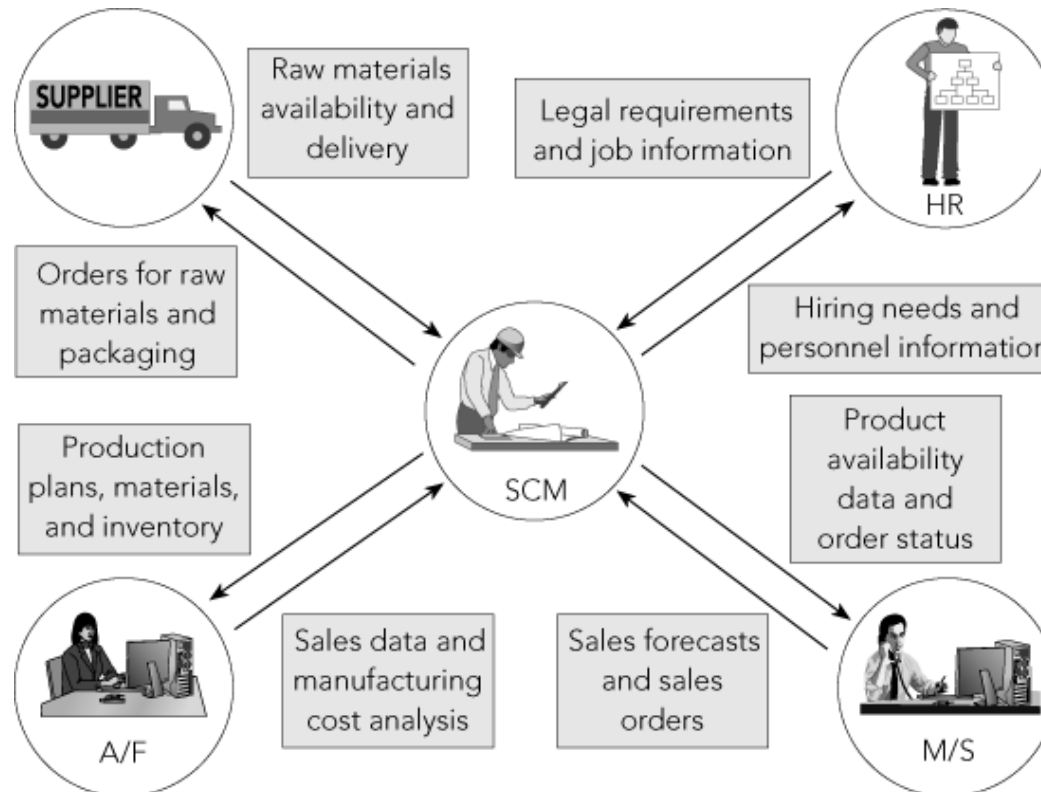


Figure 1-5 The Supply Chain Management functional area exchanges data with suppliers and with the Human Resources, Marketing and Sales, and Accounting and Finance functional areas

Supply Chain Management (cont'd.)

- Inputs for SCM
 - Product sales data
 - Production plans
 - Inventory levels
 - Layoff and recall company policy

Supply Chain Management (cont'd.)

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

Accounting and Finance

- Needs information from all other functional areas
- A/F personnel:
 - Record company's transactions in the books of account
 - Record accounts payable when raw materials are purchased and cash outflows when they pay for materials
 - Summarize transaction data to prepare reports about company's financial position and profitability

Accounting and Finance (cont'd.)

- People in other functional areas provide data to A/F
 - M/S provides sales data
 - SCM provides production and inventory data
 - HR provides payroll and benefit expense data
- M/S personnel require data from A/F to evaluate customer credit

Accounting and Finance (cont'd.)

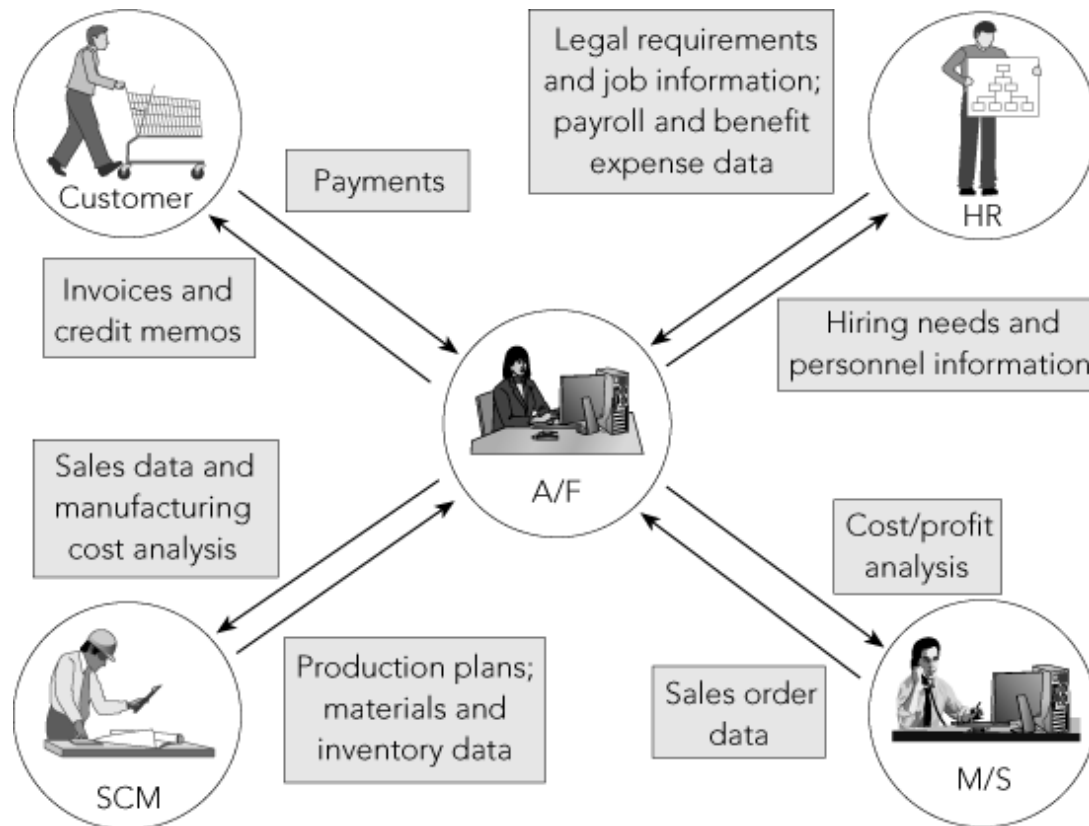


Figure 1-6 The Accounting and Finance functional area exchanges data with customers and with the Human Resources, Marketing and Sales, and Supply Chain Management functional areas

Accounting and Finance (cont'd.)

- Inputs for A/F
 - Payments from customers
 - Accounts receivable data
 - Accounts payable data
 - Sales data
 - Production and inventory data
 - Payroll and expense data

Accounting and Finance (cont'd.)

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

Human Resources

- HR needs information from the other departments
- Tasks related to employee hiring, benefits, training, and government compliance are all responsibilities of HR
- HR needs accurate forecasts of personnel needs from all functional units
- HR needs to know what skills are needed to perform a particular job and how much the company can afford to pay employees

Human Resources (cont'd.)



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

Human Resources (cont'd.)

- Observing governmental regulations in recruiting, training, compensating, promoting, and terminating employees
- Inputs for HR
 - Personnel forecasts
 - Skills data

Human Resources (cont'd.)

- Outputs for HR
 - Regulation compliance
 - Employee training and certification
 - Skills database
 - Employee evaluation and compensation

Human Resources (cont'd.)

- Significant amount of data is maintained by and shared among the functional areas
- Timeliness and accuracy of these data critical to each area's success and to company's ability to make a profit and generate future growth
- ERP software allows all functional areas to share a common database
 - Allows accurate, real-time information to be available

Summary

- Basic functional areas: Marketing and Sales, Supply Chain Management, Accounting and Finance, and Human Resources
- Marketing and Sales: Sets product prices, promotes products through advertising and marketing, takes customer orders, supports customers, and creates sales forecasts
- Supply Chain Management: Develops production plans, orders raw materials from suppliers, receives raw material, manufactures products, maintains facilities, and ships products to customers

Summary (cont'd.)

- Accounting and Finance: Financial accounting to provide summaries of operational data in managerial reports, controlling accounts, planning and budgeting, and cash-flow management
- Human Resources: Recruits, hires, trains, and compensates employees, ensures compliance with government regulations, and oversees the evaluation of employees
- Information systems capture, process, and store data to provide information needed for decision making

Summary (cont'd.)

- Employees working in one functional area need data from employees in other functional areas
 - Functional area information systems should be integrated, so shared data are accurate and timely
- Managers think in terms of business processes that integrate the functional areas
 - Need to share information between functions and functional areas
 - ERP software provides this capability by means of a single common database

Concepts in Enterprise Resource Planning

*The Development of Enterprise Resource Planning
Systems*

Dr.A.Sasi Kumar

Objectives

- Identify the factors that led to the development of Enterprise Resource Planning (ERP) systems
- Describe the distinguishing modular characteristics of ERP software
- Discuss the pros and cons of implementing an ERP system
- Summarize ongoing developments in ERP

Introduction

- Efficient, integrated information systems are very important for companies to be competitive
- An Enterprise Resource Planning (ERP) system can help integrate a company's operations
 - Acts as a company-wide computing environment
 - Includes a database that is shared by all functional areas
 - Can deliver consistent data across all business functions in real time

The Evolution of Information Systems

- **Silos**

- Information systems configuration used until recently
- Companies had unintegrated information systems that supported only the activities of individual business functional areas

- Current ERP systems evolved as a result of:

- Advancement of hardware and software technology
- Development of a vision of integrated information systems
- Reengineering of companies to shift from a functional focus to a business process focus

Computer Hardware and Software Development

- Computer hardware and software developed rapidly in the 1960s and 1970s
- First practical business computers were the mainframe computers of the 1960s
- Over time, computers got faster, smaller, and cheaper
- Moore's Law
 - Number of transistors that could be built into a computer chip doubled every 18 months

Computer Hardware and Software Development

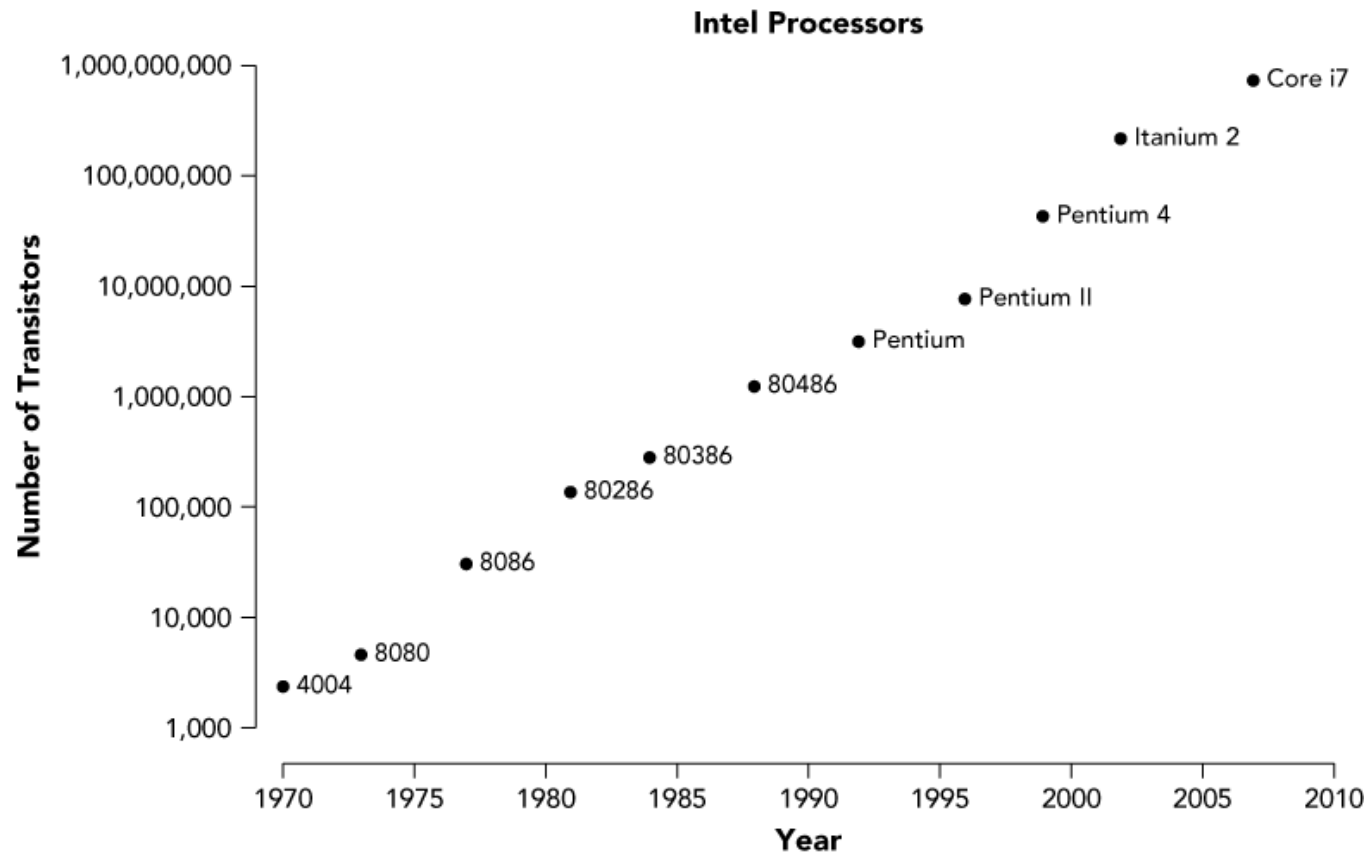


Figure 2-1 The actual increase in transistors on a chip approximates Moore's Law

Computer Hardware and Software Development (cont'd.)

- Advancements in computer software
 - 1970s: relational database software developed
 - Provide businesses the ability to store, retrieve, and analyze large volumes of data
 - 1980s: spreadsheet software became popular
 - Managers can easily perform complex business analyses

Early Attempts to Share Resources

- By the mid-1980s, telecommunications developments allowed users to share data and peripherals on local networks
 - **Client-server architecture**
- By the end of the 1980s, the hardware needed to support development of ERP systems was in place
- By the mid-1980s, **database management system (DBMS)** required to manage development of complex ERP software existed

The Manufacturing Roots of ERP

- Manufacturing software developed during the 1960s and 1970s
 - Evolved from simple inventory-tracking systems to **material requirements planning (MRP)** software
- **Electronic data interchange (EDI)**
 - Direct computer-to-computer exchange of standard business documents
 - Allowed companies to handle the purchasing process electronically

Management's Impetus to Adopt ERP

- Hard economic times of the late 1980s and early 1990s caused many companies to downsize and reorganize
 - Stimulus to ERP development
- Inefficiencies caused by the functional model of business organization
 - Silos of information
 - Limits the exchange of information between the lower operating levels

Management's Impetus to Adopt ERP (cont'd.)

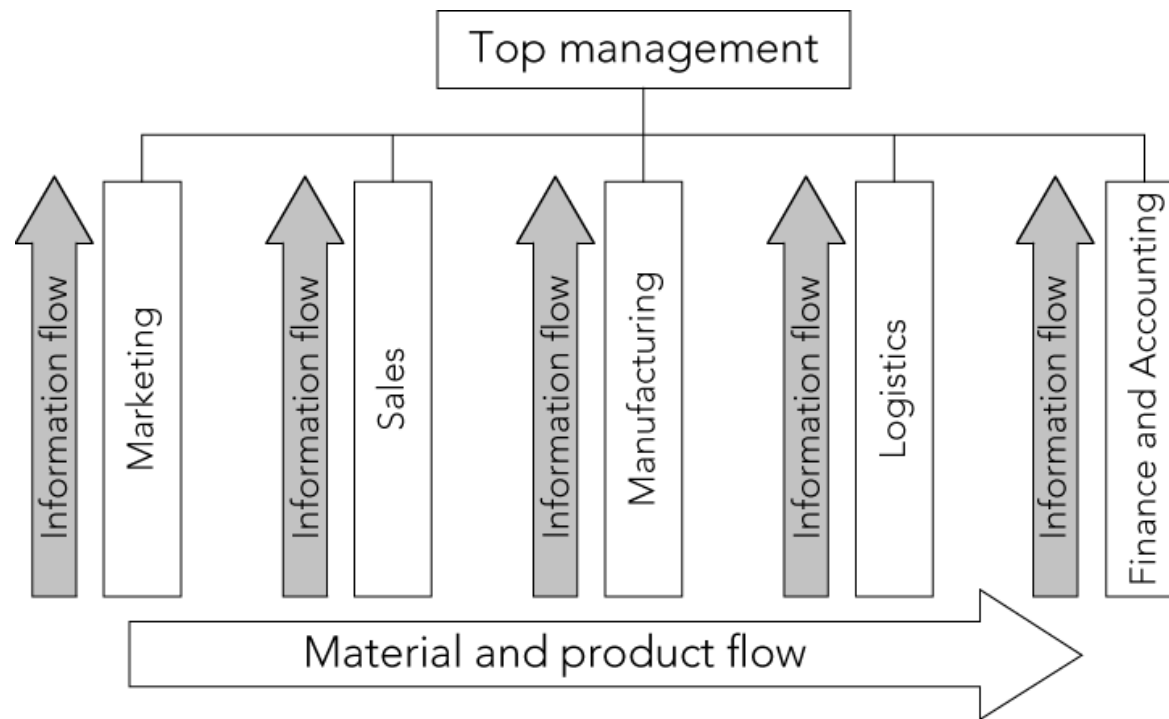


Figure 2-2 Information and material flows in a functional business model

Management's Impetus to Adopt ERP (cont'd.)

- Functional model led to top-heavy and overstaffed organizations incapable of reacting quickly to change
- Process business model
 - Information flows between the operating levels without top management's involvement
- Further impetus for adopting ERP systems has come from compliance with the Sarbanes-Oxley Act of 2002
 - Requires companies to substantiate internal controls on all information

Management's Impetus to Adopt ERP (cont'd.)

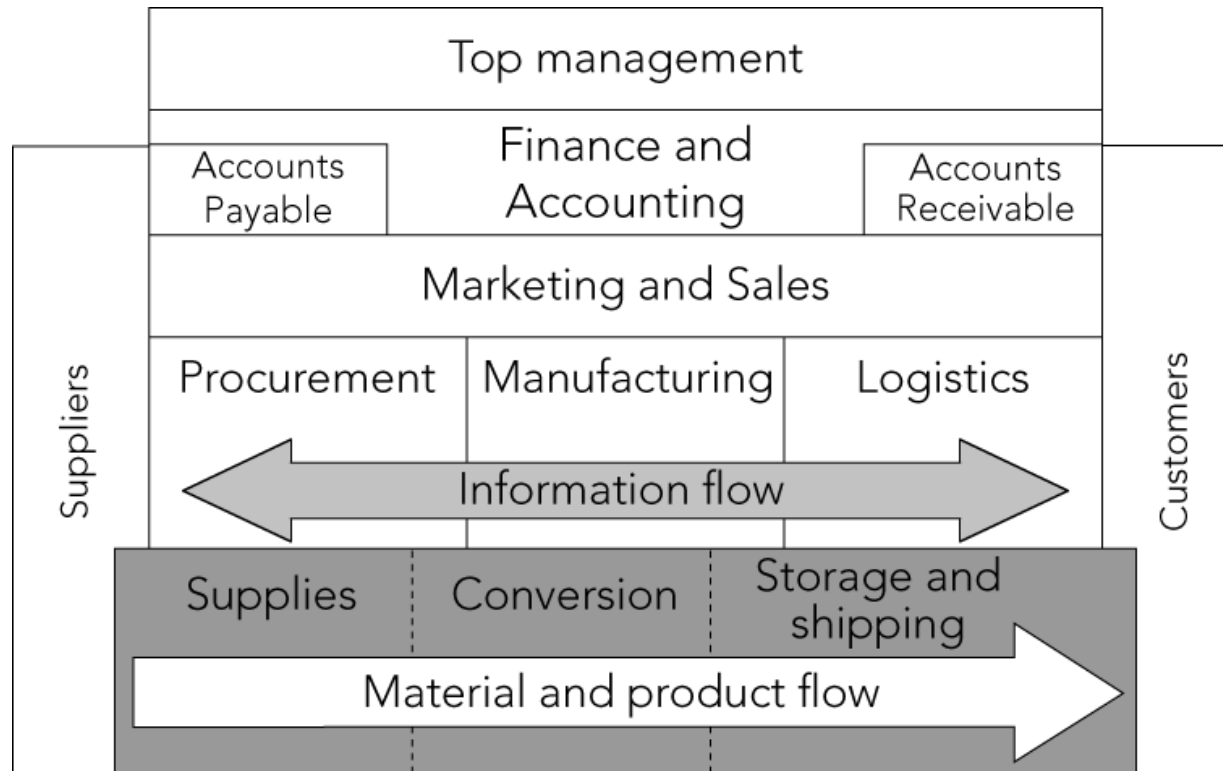


Figure 2-3 Information and material flows in a process business model

ERP Software Emerges: SAP and R/3

- 1972: five former IBM systems analysts in Mannheim, Germany formed *Systemanalyse und Programmentwicklung* (Systems Analysis and Program Development, or SAP)
- SAP's goals:
 - Develop a standard software product that could be configured to meet the needs of each company
 - Data available in real time
 - Users working on computer screens, rather than with voluminous printed output

SAP Begins Developing Software Modules

- During their work for German chemical company ICI, Plattner and Hopp had developed the idea of modular software development
- Software **modules**: individual programs that can be purchased, installed, and run separately, but that all extract data from the common database
- 1982: SAP released its R/2 mainframe ERP software package

SAP Begins Developing Software Modules (cont'd.)

- 1980s: sales grew rapidly; SAP extended its software's capabilities and expanded into international markets
- By 1988, SAP had established subsidiaries in numerous foreign countries

SAP R/3

- 1988: SAP began development of its **R/3** system to take advantage of client-server technology
- 1992: first version of SAP R/3 released
- SAP R/3 system was designed using an open architecture approach
- **Open architecture:** third-party software companies encouraged to develop add-on software products that can be integrated with existing software

New Directions in ERP

- Late 1990s: Year 2000 (or Y2K) problem motivated many companies to move to ERP systems
- By 2000, SAP AG had 22,000 employees in 50 countries and 10 million users at 30,000 installations around the world
- By 2000, SAP's competition in the ERP market:
 - Oracle
 - PeopleSoft
- Late 2004: Oracle succeeded in its bid to take over PeopleSoft

New Directions in ERP (cont'd.)

- PeopleSoft
 - Founded by David Duffield, a former IBM employee
 - Today, PeopleSoft, under Oracle, is a popular software choice for managing human resources and financial activities at universities
- Oracle
 - SAP's biggest competitor
 - Began in 1977 as Software Development Laboratories (SDL)
 - Founders: Larry Ellison, Bob Miner, and Ed Oates

New Directions in ERP (cont'd.)

- SAP ERP
 - Latest versions of ERP systems by SAP and other companies allow:
 - All business areas to access the same database
 - Elimination of redundant data and communications lags
 - Data to be entered once and then used throughout the organization

New Directions in ERP (cont'd.)

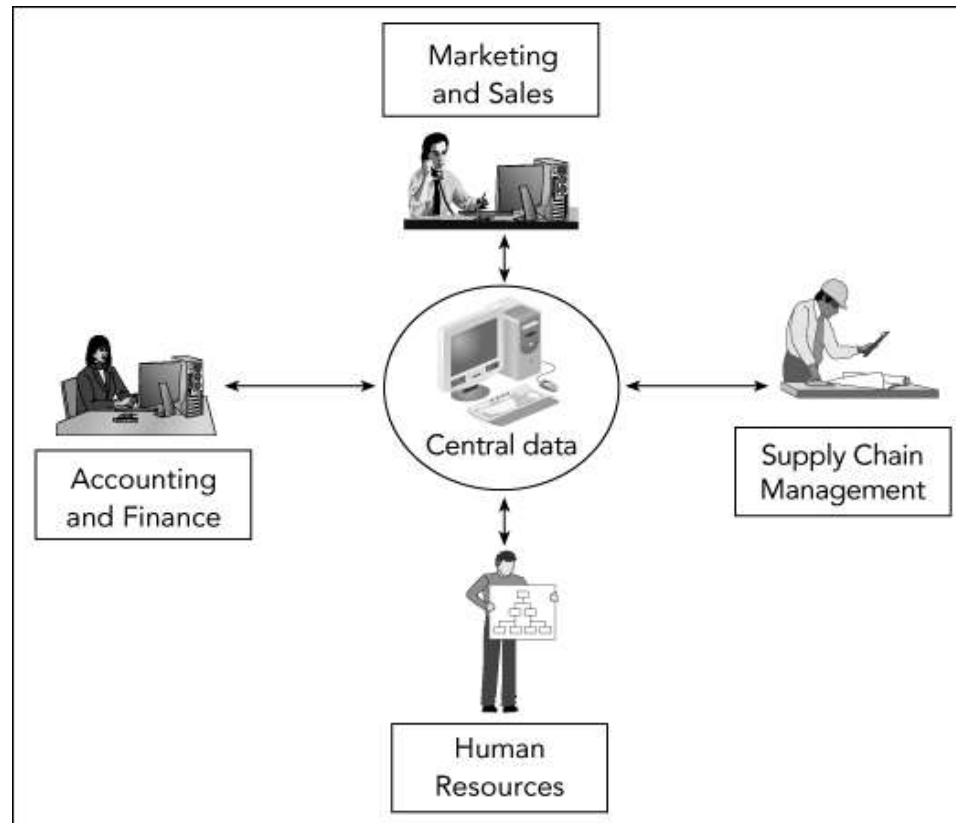


Figure 2-4 Data flow within an integrated information system

New Directions in ERP (cont'd.)

- Current SAP ERP system: SAP ECC 6.0 (Enterprise Central Component 6.0)
 - Sales and Distribution (SD) module
 - Materials Management (MM) module
 - Production Planning (PP) module
 - Quality Management (QM) module
 - Plant Maintenance (PM) module
 - Asset Management (AM) module

New Directions in ERP (cont'd.)

- Current SAP ERP system: SAP ECC 6.0 (Enterprise Central Component 6.0) (cont'd.)
 - Human Resources (HR) module
 - Project System (PS) module
 - Financial Accounting (FI) module
 - Controlling (CO) module
 - Workflow (WF) module

New Directions in ERP (cont'd.)

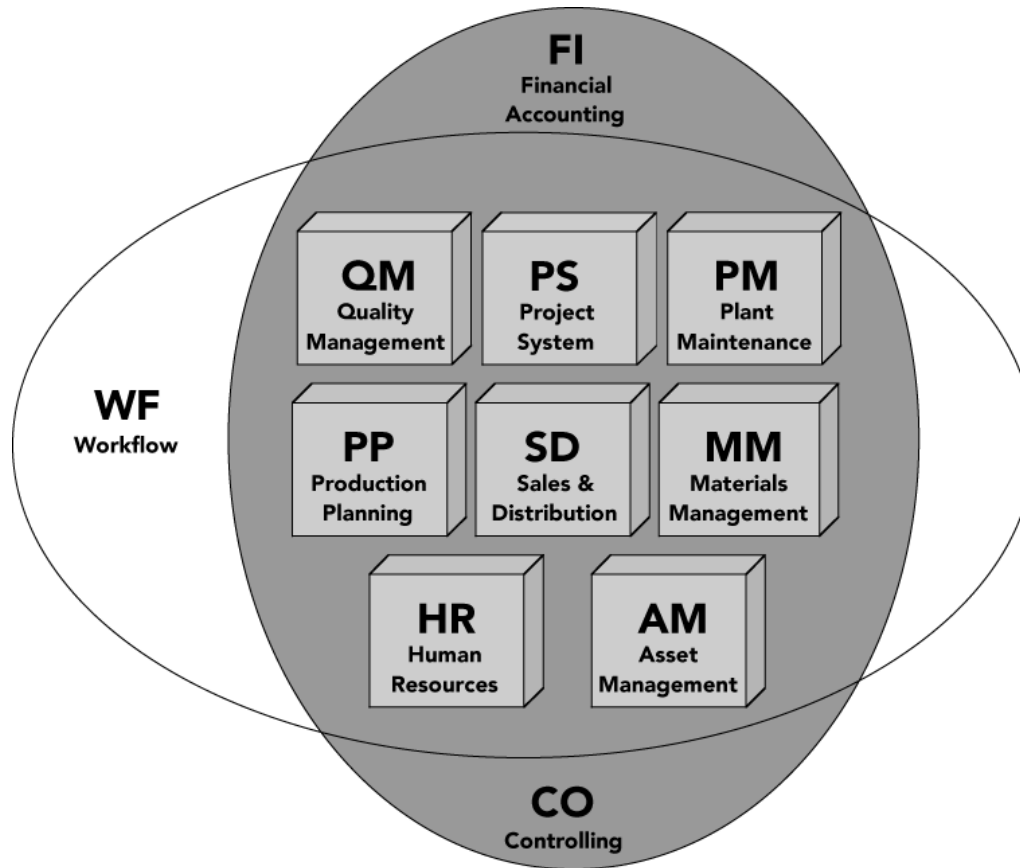


Figure 2-5 Modules within the SAP ERP integrated information systems environment (Courtesy of SAP AG)

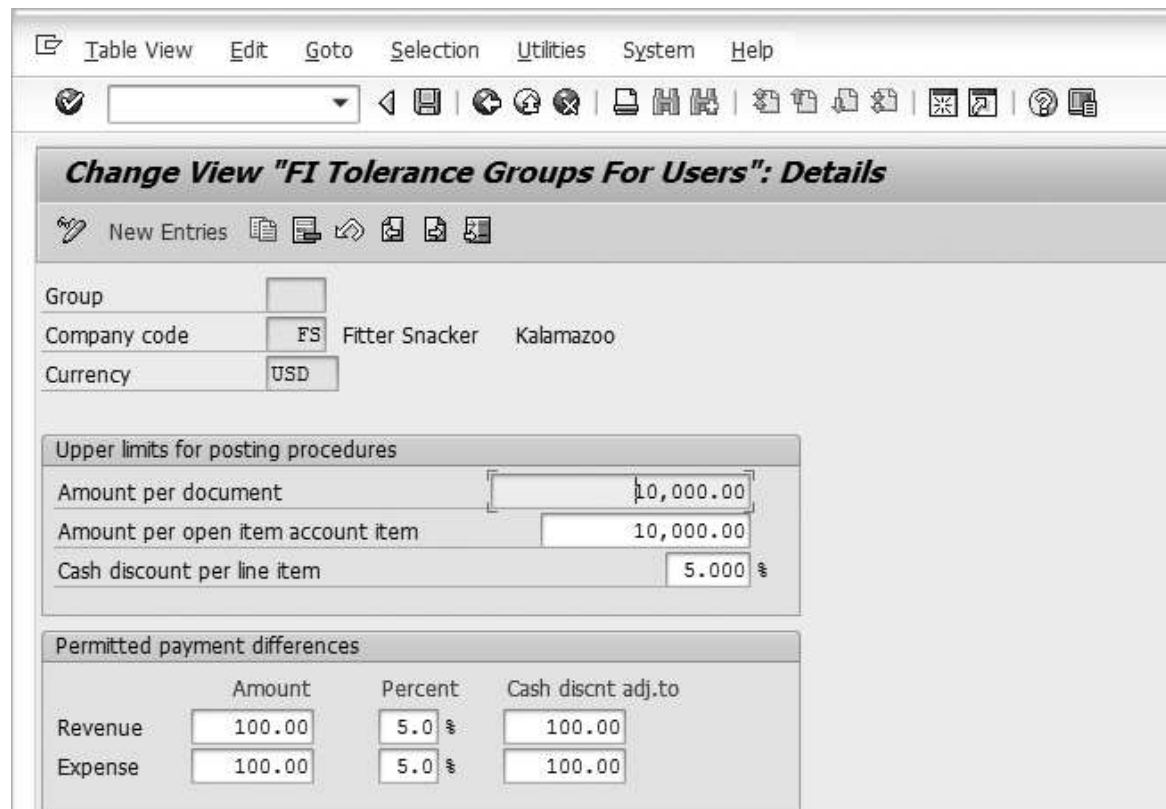
SAP ERP Software Implementation

- Not all companies that use SAP use all of the SAP ERP modules
- Company's level of data integration is highest when it uses one vendor to supply all of its modules
- Configuration options allow the company to customize the modules it has chosen to fit the company's needs

SAP ERP Software Implementation (cont'd.)

- Tolerance groups
 - Specific ranges that define transaction limits
 - SAP has defined the tolerance group methodology as its method for placing limits on an employee
 - Configuration allows the company to further tailor tolerance group methodology

SAP ERP Software Implementation (cont'd.)



The screenshot shows the SAP 'Change View "FI Tolerance Groups For Users": Details' screen. The interface includes a menu bar (Table View, Edit, Goto, Selection, Utilities, System, Help) and a toolbar with various icons. The main area is divided into sections for user selection, posting limits, and payment differences.

Change View "FI Tolerance Groups For Users": Details

New Entries

Group:
Company code: FS Fitter Snacker Kalamazoo
Currency: USD

Upper limits for posting procedures

| | |
|-----------------------------------|-----------|
| Amount per document | 10,000.00 |
| Amount per open item account item | 10,000.00 |
| Cash discount per line item | 5.000 % |

Permitted payment differences

| | Amount | Percent | Cash discnt adj.to |
|---------|--------|---------|--------------------|
| Revenue | 100.00 | 5.0 % | 100.00 |
| Expense | 100.00 | 5.0 % | 100.00 |

Figure 2-6 A customization example: tolerance groups to set transaction limits

SAP ERP Software Implementation (cont'd.)

- Features of SAP ERP
 - First software that could deliver real-time ERP integration
 - Usability by large companies
 - High cost
 - Automation of data updates
 - Applicability of best practices
 - **Best practices:** SAP's software designers choose the best, most efficient ways in which business processes *should* be handled

ERP for Midsized Companies

- By 1998
 - Most of the Fortune 500 companies had already installed ERP systems
 - ERP vendors refocused their marketing efforts on midsized companies
- SAP All-in-One
 - Single package containing specific, preconfigured bundles of SAP ERP tailored for particular industries
 - Can be installed more quickly than the standard ERP product

ERP for Midsized Companies (cont'd.)

- Application hosting
 - Third-party company provides the hardware and software support
 - Makes ERP systems like SAP more appealing to midsized companies
- SAP and Oracle are facing competition from smaller providers of ERP software

Responses of the Software to the Changing Market

- In mid-1990s, many companies complained about the difficulty of implementing SAP R/3 system
- SAP responded by developing Accelerated SAP (ASAP) implementation methodology
 - Eases the implementation process
- SAP continues to extend capabilities of SAP ERP with additional, separate products that run on separate hardware and extract data from the SAP ERP system

Choosing Consultants and Vendors

- One person cannot fully understand a single ERP system
- Before choosing a software vendor, most companies:
 - Study their needs
 - Hire an external team of software consultants to help choose the right software vendor(s) and the best approach to implementing ERP

The Significance and Benefits of ERP Software and Systems

- More efficient business processes that cost less than those in unintegrated systems
- Easier global integration
- Integrates people and data while eliminating the need to update and repair many separate computer systems
- Allows management to manage operations, not just monitor them
- Can dramatically reduce costs and improve operational efficiency

Questions About ERP

- How much does an ERP system cost?
- Should every business buy an ERP package?
- Is ERP software inflexible?
- What return can a company expect from its ERP investment?
- How long does it take to see a return on an ERP investment?
- Why do some companies have more success with ERP than others?

How Much Does an ERP System Cost?

- Size of the ERP software
 - Corresponds to the size of the company it serves
- Need for new hardware that is capable of running complex ERP software
- Consultants' and analysts' fees
- Time for implementation
 - Causes disruption of business
- Training
 - Costs both time and money

Should Every Business Buy an ERP Package?

- Some of a business's operations, and some segments of its operations, might not be a good match with the constraints of ERP
- Sometimes, a company is not ready for ERP
- ERP implementation difficulties result when management does not fully understand its current business processes and cannot make implementation decisions in a timely manner

Is ERP Software Inflexible?

- Many people claim that ERP systems, especially the SAP ERP system, are rigid
- Options for customization offered by SAP ERP
 - Numerous configuration options that help businesses customize the software to fit their needs
 - Programmers can write specific routines using **Advanced Business Application Programming (ABAP)**
- Once an ERP system is in place, trying to reconfigure it while retaining data integrity is expensive and time-consuming

What Return Can a Company Expect from Its ERP Investment?

- ERP eliminates redundant efforts and duplicated data; can generate savings in operations expense
- ERP system can help produce goods and services more quickly
- Company that doesn't implement an ERP system might be forced out of business by competitors that have an ERP system
- Smoothly running ERP system can save a company's personnel, suppliers, distributors, and customers much frustration

Expect from Its ERP Investment?

(cont'd.)

- Cost savings and increased revenues occur over many years
 - Difficult to put an exact dollar figure to the amount accrued from the original ERP investment
- ERP implementations take time
 - Other business factors may be affecting the company's costs and profitability
 - Difficult to isolate the impact of the ERP system alone
- ERP systems provide real-time data
 - Improve external customer communications

How Long Does It Take to See a Return on an ERP Investment?

- **Return on investment (ROI):** assessment of an investment project's value
 - Calculated by dividing the value of the project's benefits by the project's cost
- ERP system's ROI can be difficult to calculate
- Peerstone Research study
 - 63 percent of companies that performed the calculation reported a positive ROI for ERP
 - Most companies felt that nonfinancial goals were the reason behind their ERP installations

More Success with ERP Than Others?

- Usually, a bumpy rollout and low ROI are caused by *people* problems and misguided expectations, not computer malfunctions
 - Executives blindly hoping that new software will cure fundamental business problems that are not curable by any software
 - Executives and IT managers not taking enough time for a proper analysis during planning and implementation phase
 - Executives and IT managers skimping on employee education and training

More Success with ERP Than Others? (cont'd.)

- Usually, a bumpy rollout and low ROI are caused by *people* problems and misguided expectations, not computer malfunctions (cont'd.)
 - Companies not placing ownership or accountability for the implementation project on the personnel who will operate the system
 - Unless a large project such as an ERP installation is promoted from the top down, it is doomed to fail
 - ERP implementation brings a tremendous amount of change for users

More Success with ERP Than Others? (cont'd.)

- For many users, it takes years before they can take advantage of many of an ERP system's capabilities
- Most ERP installations do generate returns

The Continuing Evolution of ERP

- Understanding the social and business implications of new technologies is not easy
- ERP systems have been in common use only since the mid-1990s
- ERP vendors are working to solve adaptability problems that plague customers

Summary

- Speed and power of computing hardware increased exponentially, while cost and size decreased
- Early client-server architecture provided the conceptual framework for multiple users sharing common data
- Increasingly sophisticated software facilitated integration, especially in two areas: A/F and manufacturing resource planning

Summary (cont'd.)

- Growth of business size, complexity, and competition made business managers demand more efficient and competitive information systems
- SAP AG produced a complex, modular ERP program called R/3
 - Could integrate a company's entire business by using a common database that linked all operations
- SAP R/3, now called SAP ERP, is modular software offering modules for Sales and Distribution, Materials Management, Production Planning, Quality Management, and other areas

Summary (cont'd.)

- ERP software is expensive to purchase and time-consuming to implement, and it requires significant employee training—but the payoffs can be spectacular
 - For some companies, ROI may not be immediate or even calculable
- Experts anticipate that ERP's future focus will be on managing customer relationships, improving planning and decision making, and linking operations to the Internet and other applications through service-oriented architecture

Concepts in Enterprise Resource Planning

*Unit-2: Marketing Information Systems and
the Sales Order Process*

Dr.A.Sasi Kumar

Objectives

- Describe the unintegrated sales processes of the fictitious Fitter Snacker company
- Explain why unintegrated Marketing and Sales information systems lead to company-wide inefficiency, higher costs, lost profits, and customer dissatisfaction
- Discuss sales and distribution in the SAP ERP system, and explain how integrated data sharing increases company-wide efficiency

Objectives (cont'd.)

- Describe how SAP ERP processes a standard sales order
- Describe the benefits of customer relationship management (CRM) software

Introduction

- Fitter Snacker (FS)
 - Fictitious company that makes healthy snack bars
 - Does not have an integrated information system
- Marketing and Sales (M/S) is the focal point of many of FS's activities
- FS's M/S information systems are not well integrated with company's other information systems
 - Company-wide use of transaction data is inefficient

Overview of Fitter Snacker

- Manufactures and sells two types of nutritious snack bars:
 - NRG-A: “advanced energy”
 - NRG-B: “body building proteins”
- Has organized its sales force into two groups, known as divisions:
 - Wholesale Division
 - Direct Sales Division

Overview of Fitter Snacker (cont'd.)

- The two sales divisions differ in terms of quantities of orders and pricing terms
- Sells snack bars under the Fitter Snacker brand name
- Packages the bars in store-brand wrappers for some chain stores

Problems with Fitter Snacker's Sales Process

- Many of Fitter Snacker's sales orders have problems, such as:
 - Incorrect pricing
 - Excessive calls to the customer for information
 - Delays in processing orders
 - Missed delivery dates

Problems with Fitter Snacker's Sales Process (cont'd.)

- Reasons for problems:
 - FS has separate information systems throughout the company for three functional areas:
 - Sales order system
 - Warehouse system
 - Accounting system
 - High number of transactions that are handled manually
 - Information stored in the three systems is not available in real time

Problems with Fitter Snacker's Sales Process (cont'd.)

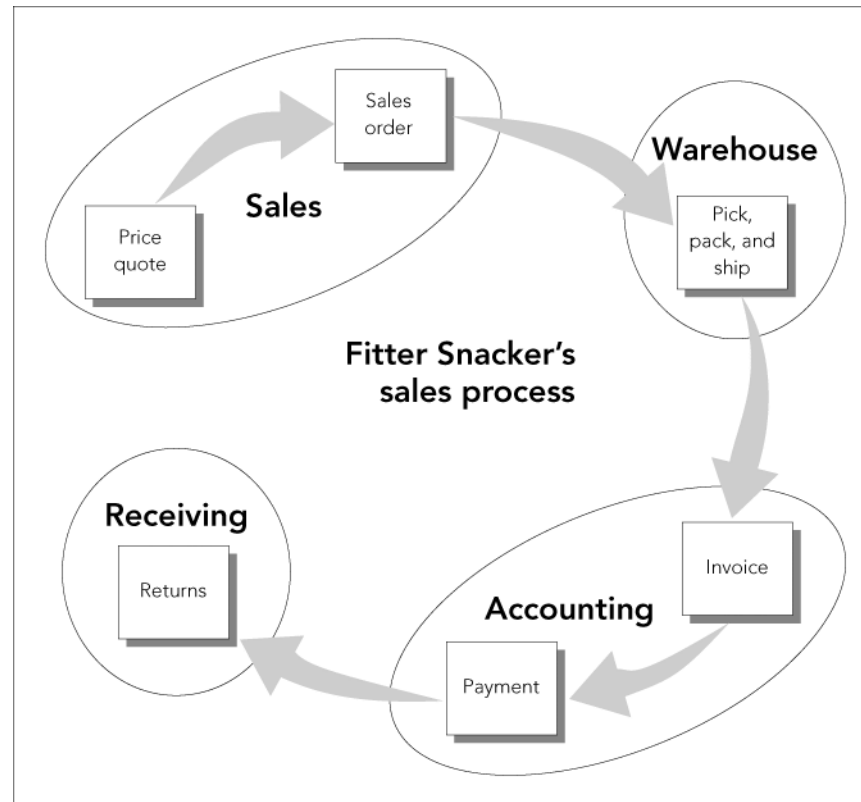


Figure 3-1 The sales process

Sales Quotations and Orders

- Giving a customer a price quotation and then taking the customer's order at FS
 - Sales call: salesperson either telephones the customer or visits in person
 - At the end of sales call, salesperson prepares a handwritten quotation on a form that generates two copies
 - Original sheet goes to the customer
 - Middle copy is first faxed and then mailed to the sales office
 - Salesperson keeps the bottom copy for his or her records

Sales Quotations and Orders (cont'd.)

- Giving a customer a price quotation and then taking the customer's order at FS (cont'd.)
 - Quotation form has an 800 number that the customer can call to place an order
- Problems can occur with this process
- Inefficiencies in the rest of the ordering process
 - Determining the delivery date
 - Checking customer's credit status
 - Entering customer's order into the current order entry system

Order Filling

- Packing lists and shipping labels
 - Printed twice a day
 - Hand-carried to the warehouse
 - At warehouse, hand-sorted into small orders and large orders
- Warehouse
 - Small-order packing area
 - Large-order packing area
- FS uses a PC database program to manage inventory levels in the warehouse

Order Filling (cont'd.)

- FS keeps inventory levels fairly low, and inventory levels change rapidly during the day
 - Picker might go to the shelves to pick an order and discover that there are not enough of the desired type of snack bars to fill the order
 - To determine what to do in this situation, order picker might have conversations with warehouse supervisor, production supervisor, and sales clerks

Accounting and Invoicing

- Invoicing the customer is problematic
- Sales clerks send the Accounting department the sales order data for customer invoices
- Accounting department loads the data into PC-based accounting program
- Clerks manually make adjustments for partial shipments and any other changes
- Sometimes, order corrections are delayed and don't catch up to the invoicing process
 - Results in late or inaccurate invoices

Payment and Returns

- Problems with procedure for processing payments
 - If any errors have occurred in the sales process, customer will receive an incorrect invoice
 - Many customers don't return a copy of the invoice with their payment; errors can result

Payment and Returns (cont'd.)

- FS's returns processing is flawed
 - Many customers do not call for the RMA number, or fail to include it with their returned material
 - Makes it more difficult for Accounting department to credit the appropriate account
 - Poor penmanship on the returned material sheet can create problems for Accounting
- If a customer's account has not been properly credited, customer may receive a dunning letter in error

Sales and Distribution in ERP

- ERP systems can minimize data entry errors and provide accurate information in real time to all users
- ERP systems can track all transactions (such as invoices, packing lists, RMA numbers, and payments) involved in the sales order

Sales and Distribution in ERP (cont'd.)

- SAP ERP Sales and Distribution module treats the sales order process as a cycle of events:
 - Pre-sales activities
 - Sales order processing
 - Inventory sourcing
 - Delivery
 - Billing
 - Payment

Pre-Sales Activities

- Customers can get pricing information about the company's products:
 - Through an inquiry or a price quotation
- Marketing activities such as tracking customer contacts, including sales calls, visits, and mailings
- Company can maintain data about customers and generate mailing lists based on specific customer characteristics

Sales Order Processing

- Sales order processing: series of activities that must take place to record a sales order
- Sales order can start from a quotation or inquiry generated in the pre-sales step
- Information collected from the customer to support the quotation is immediately included in sales order
- Critical steps in sales order processing:
 - Recording the items to be purchased
 - Determining the selling price
 - Recording the order quantities

Sales Order Processing (cont'd.)

- Users can define various pricing alternatives in the SAP ERP system
- SAP ERP system checks the Accounts Receivable tables in the SAP ERP database to confirm the customer's available credit
- If customer has sufficient credit available
 - Order is completed
- If customer does not have sufficient credit available
 - SAP ERP system prompts sales personnel to take one of the possible appropriate actions

Inventory Sourcing

- Available-to-Promise (ATP) check
 - SAP ERP system checks company's inventory records and production planning records to see whether:
 - Requested material is available
 - Requested material can be delivered on the date the customer desires
 - Includes expected shipping time
- System can recommend an increase in planned production if a shortfall is expected

Delivery

- **Delivery** in SAP ERP system
 - Releasing the documents that the warehouse uses to pick, pack, and ship orders
- Delivery process allows deliveries to be created so that the warehouse and shipping activities are carried out efficiently
- Once the system has created documents for picking, packing, and shipping, documents are transferred to Materials Management module

Billing

- SAP ERP system creates an invoice by copying 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 updated at this point

Payment

- When the customer sends in a payment, it is automatically processed by the SAP ERP system
 - Debits cash and credits (reduces) customer's account
- Timely recording of this transaction has an effect on the timeliness and accuracy of any subsequent credit checks for the customer

A Standard Order in SAP ERP

- How Fitter Snacker's sales order process would work with an SAP ERP system in place
- How the ERP system would make FS's sales order process more accurate and efficient
- ERP allows business processes to cut across functional area lines

Taking an Order in SAP ERP

- Order entry screen in SAP ERP's 4.7 Enterprise system
- A unique number is assigned by the company to each customer in the database
- For most data entry fields, SAP ERP system determines whether an entry is valid
- Search screen for customers

Taking an Order in SAP ERP (cont'd.)

The screenshot shows the 'Create Standard Order: Overview' screen in SAP ERP. The interface includes a menu bar at the top with options like 'Sales document', 'Edit', 'Goto', 'Extras', 'Environment', 'System', and 'Help'. Below the menu is a toolbar with various icons. The main area is divided into several sections. The top section contains fields for 'Standard Order', 'Net value' (0.00), 'Sold-To Party', 'Ship-To Party', 'P.O. Number', and 'P.O. date'. Below this is a tabbed interface with tabs for 'Sales', 'Item overview', 'Item data', 'Ordering party', 'Procurement', 'Shipping', and 'Reason for rejection'. The 'Item data' tab is currently selected, showing fields for 'Req. deliv. date' (10/10/2011), 'Deliver Plant', 'Total Weight' (0.000), 'Volume' (0.000), 'Billing block', 'Pricing date' (10/10/2011), 'Exp. date', 'Payment card', 'Card Verif Code', 'Payment terms', 'Incoterms', and 'Order reason'. At the bottom is a table titled 'All items' with columns: 'Item', 'Material', 'Order Quantity', 'Un', 'S', 'Description', 'Customer Material Numb', 'ItCa', 'DG...', and 'Hi'. The table is currently empty. On the right side of the screen, there are five callout boxes with lines pointing to specific fields: 'Sold-To Party: Where the customer's identification number is entered' points to the 'Sold-To Party' field; 'PO Number: The number assigned by the customer to this sales order' points to the 'P.O. Number' field; 'Req. deliv. date: The date when the customer would like to receive the order' points to the 'Req. deliv. date' field; and 'Material and Order Quantity: What the customer is ordering' points to the 'Material' and 'Order Quantity' columns of the 'All items' table. The SAP logo is visible at the bottom center of the screen.

Create Standard Order: Overview

Standard Order: [] Net value: 0.00

Sold-To Party: []

Ship-To Party: []

P.O. Number: [] P.O. date: []

Sales | Item overview | **Item data** | Ordering party | Procurement | Shipping | Reason for rejection

Req. deliv. date: 10/10/2011 Deliver Plant: []

☐ Complete deliv. Total Weight: 0.000

Delivery block: [] Volume: 0.000

Billing block: [] Pricing date: 10/10/2011

Payment card: [] Exp. date: []

Card Verif Code: []

Payment terms: [] Incoterms: []

Order reason: []

All items

| Item | Material | Order Quantity | Un | S | Description | Customer Material Numb | ItCa | DG... | Hi |
|------|----------|----------------|----|---|-------------|------------------------|------|-------|----|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

SAP 529 fs2 OVR

Sold-To Party: Where the customer's identification number is entered

PO Number: The number assigned by the customer to this sales order

Req. deliv. date: The date when the customer would like to receive the order

Material and Order Quantity: What the customer is ordering

Figure 3-2 SAP ERP order entry screen

Taking an Order in SAP ERP (cont'd.)

| Data entry field | Explanation |
|------------------|---|
| Sold-To Party | Identification number assigned to customer |
| PO Number | The number assigned by the customer to the sales transaction; this is different from the sales order number assigned by the seller (using SAP ERP) to the sales transaction. In a paper process, the purchase order number is usually a sequential number preprinted on the purchase order form |
| Req. deliv. date | The delivery date for the order requested by the customer; the SAP ERP system will evaluate the ability to meet this date and suggest alternatives, if necessary |
| Material | The identification number assigned in the SAP ERP system to the item requested by the customer |
| Order Quantity | The number of units of the material the customer is requesting |

Figure 3-3 Data entry fields in the order entry screen

Taking an Order in SAP ERP (cont'd.)

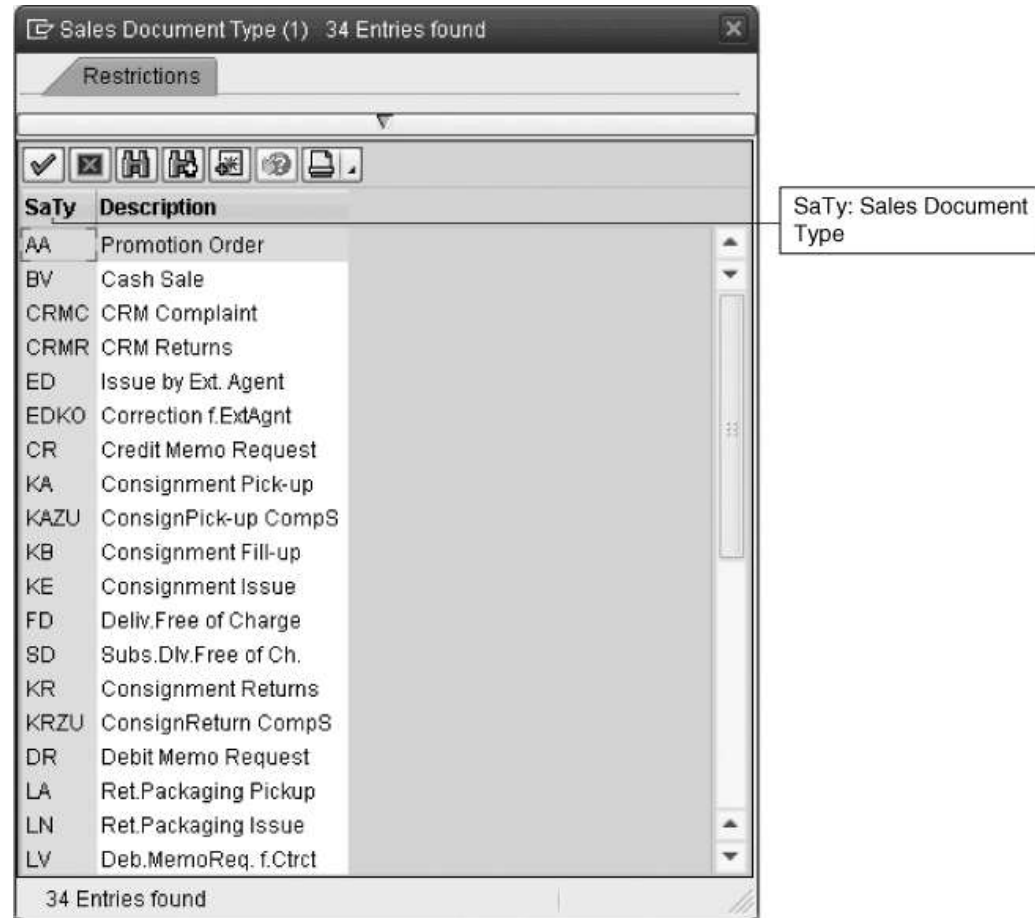


Figure 3-4 Some of the sales order document types predefined in SAP ERP

Taking an Order in SAP ERP (cont'd.)

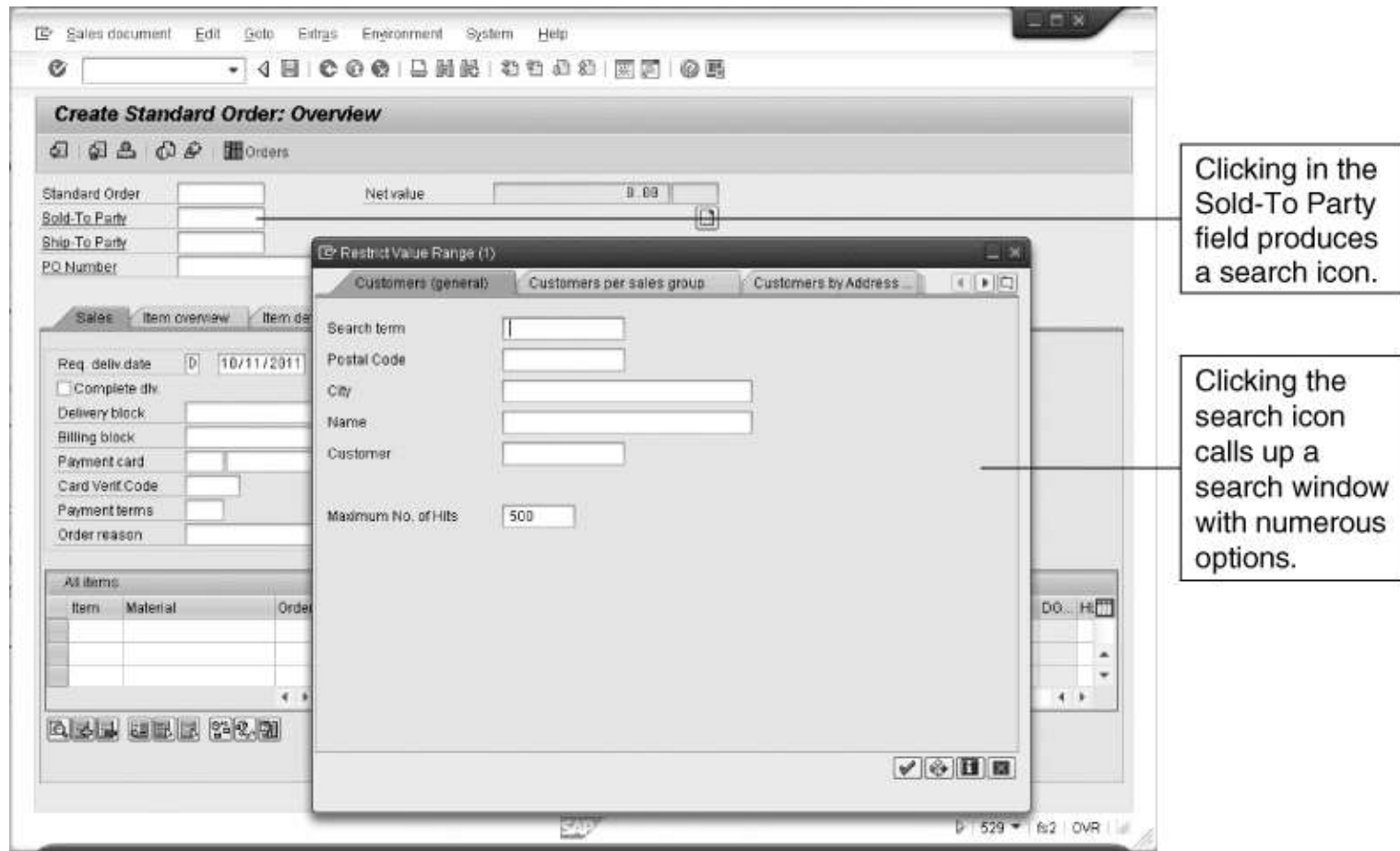
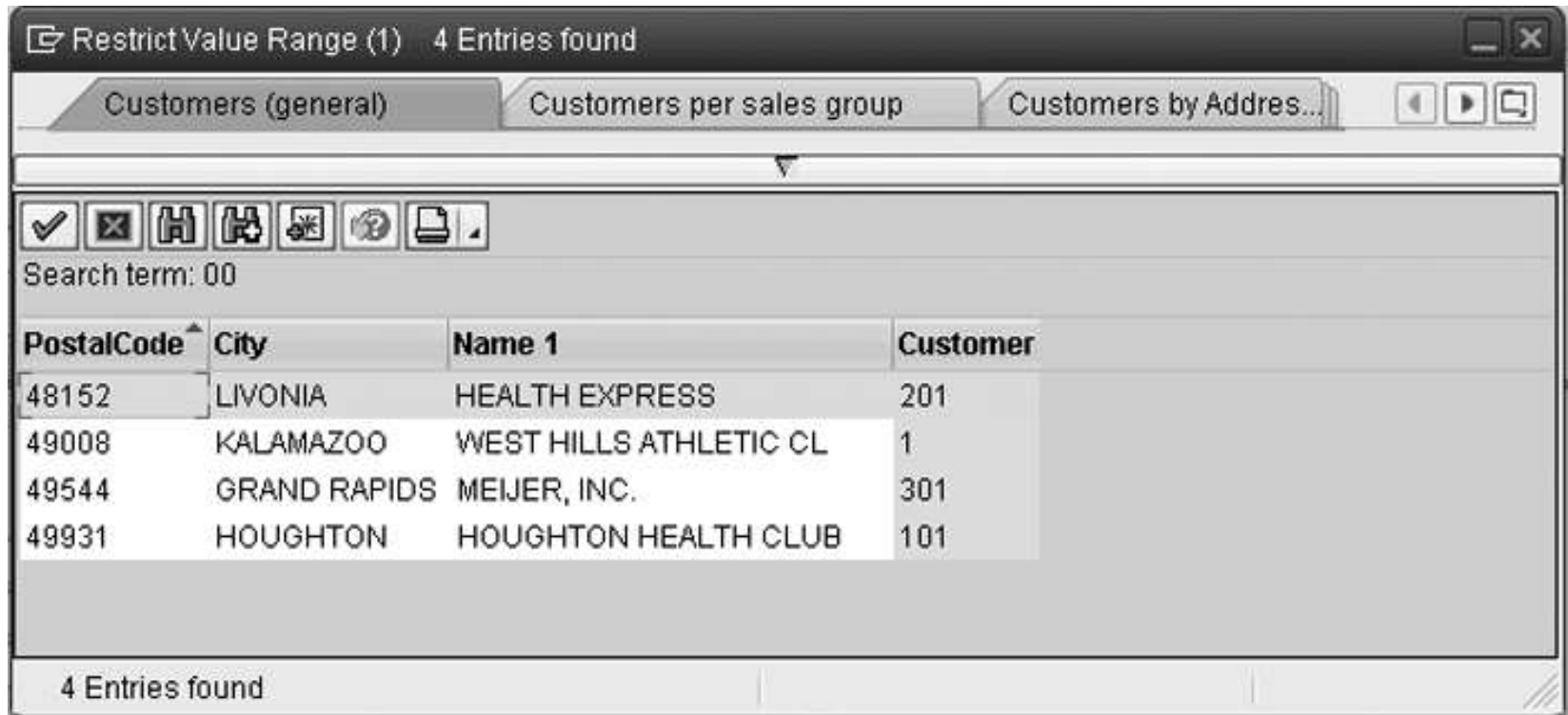


Figure 3-5 Search screen for customers

Taking an Order in SAP ERP (cont'd.)



The screenshot shows the 'Restrict Value Range (1)' window in SAP ERP. The window title is 'Restrict Value Range (1) 4 Entries found'. It has three tabs: 'Customers (general)', 'Customers per sales group', and 'Customers by Address...'. The 'Customers (general)' tab is selected. Below the tabs is a search bar with the text 'Search term: 00'. Below the search bar is a table with four columns: 'PostalCode', 'City', 'Name 1', and 'Customer'. The table contains four rows of data. At the bottom of the window, it says '4 Entries found'.

| PostalCode | City | Name 1 | Customer |
|------------|--------------|------------------------|----------|
| 48152 | LIVONIA | HEALTH EXPRESS | 201 |
| 49008 | KALAMAZOO | WEST HILLS ATHLETIC CL | 1 |
| 49544 | GRAND RAPIDS | MEIJER, INC. | 301 |
| 49931 | HOUGHTON | HOUGHTON HEALTH CLUB | 101 |

Figure 3-6 Result of customer search

Taking an Order in SAP ERP (cont'd.)

Create Standard Order: Overview

Standard Order: [] Net value: 4,815.00 USD

Sold-To Party: 1 West Hills Athletic Club / 2001 S. 11th St. / Kalamazoo MI 49

Ship-To Party: 1 West Hills Athletic Club / 2001 S. 11th St. / Kalamazoo MI 49

PO Number: WH83128 PO date: []

Sales Item overview Item detail Ordering party Procurement Shipping Reason for rejection

Req. deliv. date: D 10/11/2011 Deliver.Plant: []

☐ Complete dlv. Total Weight: 1,440 LB

Delivery block: [] Volume: 0.000

Billing block: [] Pricing date: 10/11/2011

Payment card: [] Exp. date: []

Card Verif.Code: []

Payment terms: 0001 Pay immediately w/... Incoterms: FOB Receiving Dock

Order reason: []

| Item | Material | Order Qua... | Un | S | Description | Customer Material Numb | ItCa | DG... | HL itm | C Fir |
|------|----------|--------------|----|-------------------------------------|-------------|------------------------|------|-------|--------|-------|
| 10 | F100 | 10 | CS | <input checked="" type="checkbox"/> | NRG-A | | TAN | | | D 10. |
| 20 | F110 | 10 | CS | <input type="checkbox"/> | NRG-B | | TAN | | | D 10. |

SAP 529 fs2 OVR

Figure 3-7 Order screen with complete date

Taking an Order in SAP ERP (cont'd.)

The screenshot displays the 'Standard Order: Availability Control' window in SAP ERP. The window has a menu bar (Edit, Goto, System, Help) and a toolbar. Below the title bar, there are tabs for 'One-time delivery', 'Complete dlv.', 'Delivery proposal', 'ATP quantities', 'Scope of check', and 'Other plants'. The 'Delivery proposal' tab is active. The main area contains fields for 'Item' (10), 'Schd. Line' (1), 'Material' (F100), 'Plant' (PT), 'Req. deliv. date' (10/30/2011), 'End lead time' (11/02/2011), 'Open Quantity' (10 CS), and 'Max. Part. Deliveries' (9). Below these fields, there are three sections for delivery proposals, each with a 'Dely/Conf. Date' and a 'Confirmed Quantity' (5). The first section is 'One-time del. on req. del. dte' with a date range of 10/30/2011 / 10/30/2011. The second section is 'Complete delivery' with a date range of 11/02/2011 / 11/02/2011. The third section is 'Dely proposal' with a date range of 10/30/2011 / 10/30/2011. Each section has a checkbox for confirmation, which is checked in all three cases. A callout box on the right points to these three checkboxes with the text 'Three options proposed by SAP ERP'.

| Delivery Type | Dely/Conf. Date | Confirmed Quantity | Confirmed |
|--------------------------------|-------------------------|--------------------|-------------------------------------|
| One-time del. on req. del. dte | 10/30/2011 / 10/30/2011 | 5 | <input checked="" type="checkbox"/> |
| Complete delivery | 11/02/2011 / 11/02/2011 | | <input checked="" type="checkbox"/> |
| Dely proposal | 10/30/2011 / 10/30/2011 | 5 | <input checked="" type="checkbox"/> |
| | 11/02/2011 / 11/02/2011 | 5 | <input type="checkbox"/> |
| | | | <input type="checkbox"/> |

Figure 3-8 Order proposals

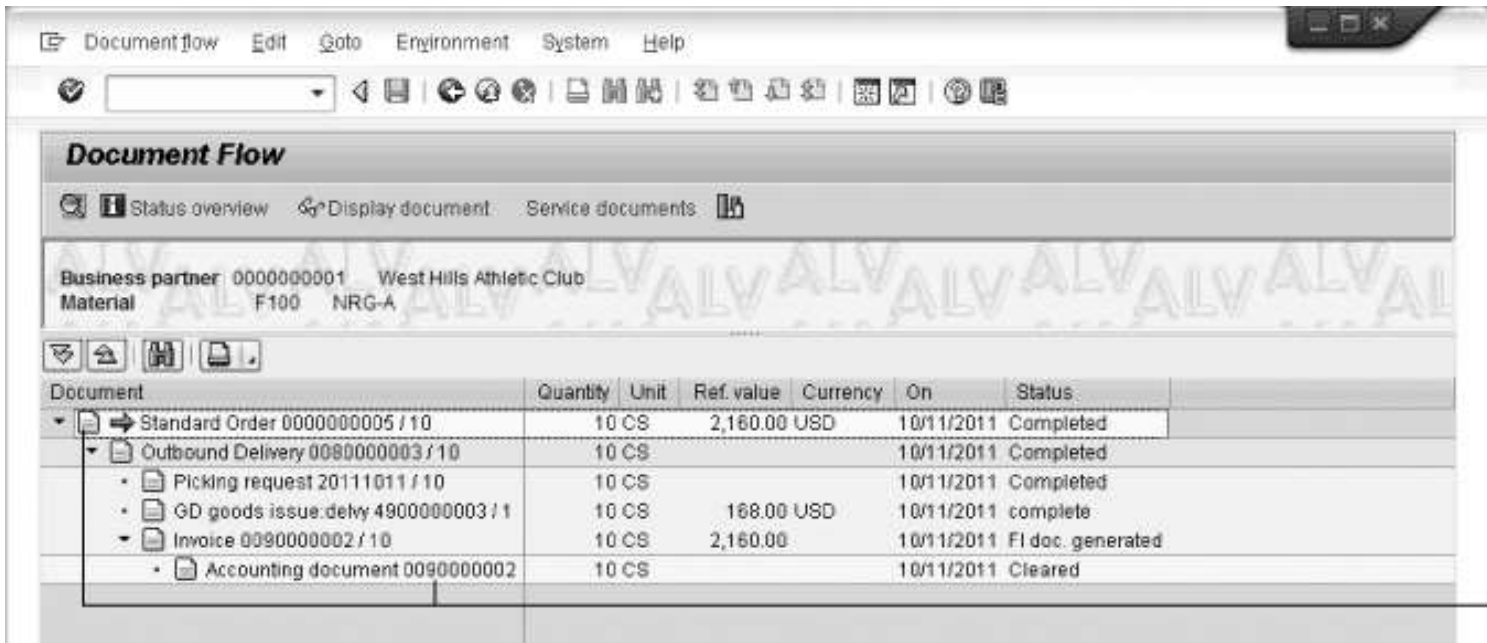
Taking an Order in SAP ERP (cont'd.)

- **Customer master data**
- Master data: data that remain fairly stable
 - Maintained in the central database and available to all SAP ERP modules
- **Material master data**
- **Organizational structures**
 - SAP ERP system allows the user to define various ways to group customers and salespeople
 - Distribution Channel

Taking an Order in SAP ERP (cont'd.)

- When a sales order is saved, SAP ERP system assigns a document number to the sales order transaction
- SAP ERP system keeps track of the document numbers for the sales order
 - Employees can track status of an order while it is in process or research it after shipping
- **Document flow** in SAP ERP: linked set of document numbers related to an order

Taking an Order in SAP ERP (cont'd.)



The screenshot displays the SAP Document Flow tool interface. At the top, there is a menu bar with options: Document flow, Edit, Goto, Environment, System, and Help. Below the menu is a toolbar with various icons. The main area is titled "Document Flow" and contains a sub-header with "Status overview" and "Display document". Below this, the business partner is listed as "0000000001 West Hills Athletic Club" and the material as "F100 NRG-A".

The document flow is shown in a table with the following columns: Document, Quantity, Unit, Ref. value, Currency, On, and Status. The documents are listed in a hierarchical manner, with the sales order at the top and its associated documents below it.

| Document | Quantity | Unit | Ref. value | Currency | On | Status |
|------------------------------------|----------|------|------------|----------|------------|-------------------|
| Standard Order 0000000005 / 10 | 10 | CS | 2,160.00 | USD | 10/11/2011 | Completed |
| Outbound Delivery 0090000003 / 10 | 10 | CS | | | 10/11/2011 | Completed |
| Picking request 20111011 / 10 | 10 | CS | | | 10/11/2011 | Completed |
| GD goods issue:delv 4900000003 / 1 | 10 | CS | 168.00 | USD | 10/11/2011 | complete |
| Invoice 0090000002 / 10 | 10 | CS | 2,160.00 | | 10/11/2011 | FI doc. generated |
| Accounting document 0090000002 | 10 | CS | | | 10/11/2011 | Cleared |

A callout box on the right side of the screenshot contains the text: "accounting document 90000002 is linked to sales order 5".

Figure 3-9 The Document Flow tool, which links sales order documents

Discount Pricing in SAP ERP

- When a company installs an ERP system, it can configure it for a number of pricing strategies
- Various kinds of discounts can be allowed
- As a safeguard, system can enforce limits on the size of discounts
- **Condition technique**
 - Control mechanism developed by SAP to accommodate various ways that companies offer price discounts

Discount Pricing in SAP ERP (cont'd.)

Create Standard Order: Item Data

Sales Document Item: 10 Item category: TAN Standard Item
Material: F180 NRG-A

Sales A Sales B Shipping Billing Document Conditions Account assignment Schedule lines Partners Texts

Qty: 10 CS Net: 2,160.00 USD Tax: 9.00

| N. | ConTy | Name | Amount | Crcy | per | U. | Condition value | Curr | Status | Num. | OUn | CCon | Un | Condition |
|------|-------|---------------------|--------|------|-----|------|-----------------|------|--------|------|------|------|------|-----------|
| PR00 | | Price | 240.00 | USD | | 1 CS | 2,400.00 | USD | | | 1 CS | | 1 CS | |
| | | Gross | 240.00 | USD | | 1 CS | 2,400.00 | USD | | | 1 CS | | 1 CS | |
| K007 | | Customer Discount | 19.000 | USD | | 1 CS | 240.00 | USD | | | 0 | | 0 | |
| | | Discount Amount | 24.00 | USD | | 1 CS | 240.00 | USD | | | 1 CS | | 1 CS | |
| | | Rebate Basis | 216.00 | USD | | 1 CS | 2,160.00 | USD | | | 1 CS | | 1 CS | |
| | | Net Value for Item | 216.00 | USD | | 1 CS | 2,160.00 | USD | | | 1 CS | | 1 CS | |
| | | Net Value 2 | 216.00 | USD | | 1 CS | 2,160.00 | USD | | | 1 CS | | 1 CS | |
| | | Total | 216.00 | USD | | 1 CS | 2,160.00 | USD | | | 1 CS | | 1 CS | |
| SKT0 | | Cash Discount | 9.000 | USD | | 1 CS | 9.00 | USD | | | 0 | | 0 | |
| VPRS | | Cost | 168.00 | USD | | 1 CS | 168.00 | USD | | | 1 CS | | 1 CS | |
| | | Standard - USA Avth | 199.20 | USD | | 1 CS | 1,992.00 | USD | | | 1 CS | | 1 CS | |

Condition rec. Analysis Update

528 fs2 OVR

net price for order, including discounts

base price is \$240/case

discount is 10 percent

the production cost of the 10 cases is \$1,992

Figure 3-10 Pricing conditions for sales order

Integration of Sales and Accounting (cont'd.)

Display Customer Discount Condition (K007) : Scales

Variable key

| SOrg. | DChl | Customer | ReSt | Description |
|-------|------|----------|------|--------------------------|
| FS | DI | 1 | | West Hills Athletic Club |

Validity

| Valid From | Valid to |
|------------|------------|
| 08/12/2004 | 12/31/9999 |

Control

| ScaleBasis | Check |
|---------------|-------------------------------|
| B Value scale | <input type="checkbox"/> None |

Scales

| Scale Type | Scale value | ScCur | Amount | Unit | per | U... |
|------------|-------------|-------|--------|------|-----|------|
| From | 1,000.00 | USD | 5.000 | % | | |
| | 1,500.00 | | 10.000 | % | | |

if a line in the order is over \$1,000, the discount is 5 percent

if a line in the order is over \$1,500, the discount is 10 percent

Figure 3-11 West Hills Athletic Club price Discount

Integration of Sales and Accounting

- ERP systems integrate Accounting with all business processes
- When a sales order is recorded, related accounting data are updated automatically

Integration of Sales and Accounting (cont'd.)

The screenshot displays the SAP 'Display Document: Data Entry View' interface. The top menu bar includes Document, Edit, Goto, Extras, Settings, Environment, System, and Help. Below the menu is a toolbar with various icons. The main area is divided into two sections: 'Data Entry View' and 'General Ledger View'. The 'Data Entry View' section contains fields for Document Number (90000002), Company Code (00FS), Fiscal Year (2011), Document Date (10/11/2011), Posting Date (10/11/2011), Period (10), Reference (MH83128), Cross-CC no., Currency (USD), and Ledger Group. The 'General Ledger View' section displays a table of accounting entries. The table has columns for C. (Company Code), Item, PK (Primary Key), S (Sales Order), Account, Description, Amount, Curr. (Currency), and Tx (Transaction). The table shows five entries: 1. Item 01, Account 1, Description '00 West Hills Athletic Cl...', Amount 4,815.00, Curr. USD, Tx. 2. Item 50, Account 600000, Description 'Sales Revenue', Amount 2,400.00, Curr. USD, Tx. 3. Item 40, Account 610000, Description 'Sales Discount', Amount 240.00, Curr. USD, Tx. 4. Item 50, Account 600000, Description 'Sales Revenue', Amount 2,950.00, Curr. USD, Tx. 5. Item 40, Account 610000, Description 'Sales Discount', Amount 295.00, Curr. USD, Tx.

accounting document 90000002, accessible from the document flow screen

accounts affected by the sales order

Figure 3-12 Accounting detail for the West Hills sales order

Customer Relationship Management

- Companies without a good connection between their workers and their customers run the risk of losing business
- **Customer relationship management (CRM) software** can help companies streamline their interactions with customers
- **On-demand CRM:** software and computer equipment reside with CRM provider

Core CRM Activities

- One-to-one marketing
- Sales force automation (SFA)
- Sales campaign management
- Marketing encyclopedias
- Call center automation

SAP's CRM Software

- Examples of tools that provide CRM functionality within the SAP ERP system
 - Contact management tool
 - To make sure that information about sales contacts is available throughout the organization
 - Sales activity manager
 - Supports a strategic and organized approach to sales activity planning and can help make sure that follow-up activities are accomplished
- Employing a separate CRM system that communicates with the ERP system

SAP's CRM Software

The screenshot displays the 'Contact Person Create' interface in SAP CRM. The top menu bar includes 'Contact Person', 'Edit', 'Goto', 'Extras', 'Environment', 'System', and 'Help'. Below the menu is a toolbar with various icons. The main form area is titled 'Contact Person Create' and contains several tabs: 'Visiting Hours...', 'Business Address...', and 'Home Address...'. The 'Business Address...' tab is active, showing fields for 'Customer' (1), '00 West Hills Athletic Club', and 'Kalamazoo'. Below this, the 'Contact person' section includes 'NEW 001', 'VIP' (1), 'Department' (0002), 'Function' (02), 'Power of att.' (H), 'Higher partner', and 'Rep. number'. The 'Gender' is set to 'Female' and 'Date of birth' is '01/17/1977'. The 'Call frequency' is '0003' and 'Advertising mat' is checked. The 'Buying habits' field is empty. The 'Remarks' field contains 'Sole Procurement Professional'. A 'Preview' button is located below the main form. The preview window shows a 'Person' card with fields for 'Title' (Ms.), 'Last name' (Terns), 'First name' (Trisha), 'Academic Title', 'Format', 'Function' (Procurement Manager), 'Department' (Supply Chain), 'Room Number' (45A), 'Floor' (2nd), 'Building' (600), and 'Communication'. The SAP logo is visible at the bottom center, and the status bar at the bottom right shows '529', 'fs2', and 'OVR'.

Menu: Contact Person Edit Goto Extras Environment System Help

Toolbar: [Icons]

Contact Person Create

Visiting Hours... Business Address... Home Address...

Customer: 1 00 West Hills Athletic Club Kalamazoo

Contact person: NEW 001

VIP: 1 Gender: Female

Department: 0002 Date of birth: 01/17/1977

Function: 02 Marital Status: [Dropdown]

Power of att.: H

Higher partner: [Field]

Rep. number: [Field]

Call frequency: 0003 [X] Advertising mat

Buying habits: [Field]

Remarks: Sole Procurement Professional

Preview [Icon]

Person

Title: Ms. [Dropdown]

Last name: Terns

First name: Trisha

Academic Title: [Field]

Format: [Field]

Function: Procurement Manager

Department: Supply Chain

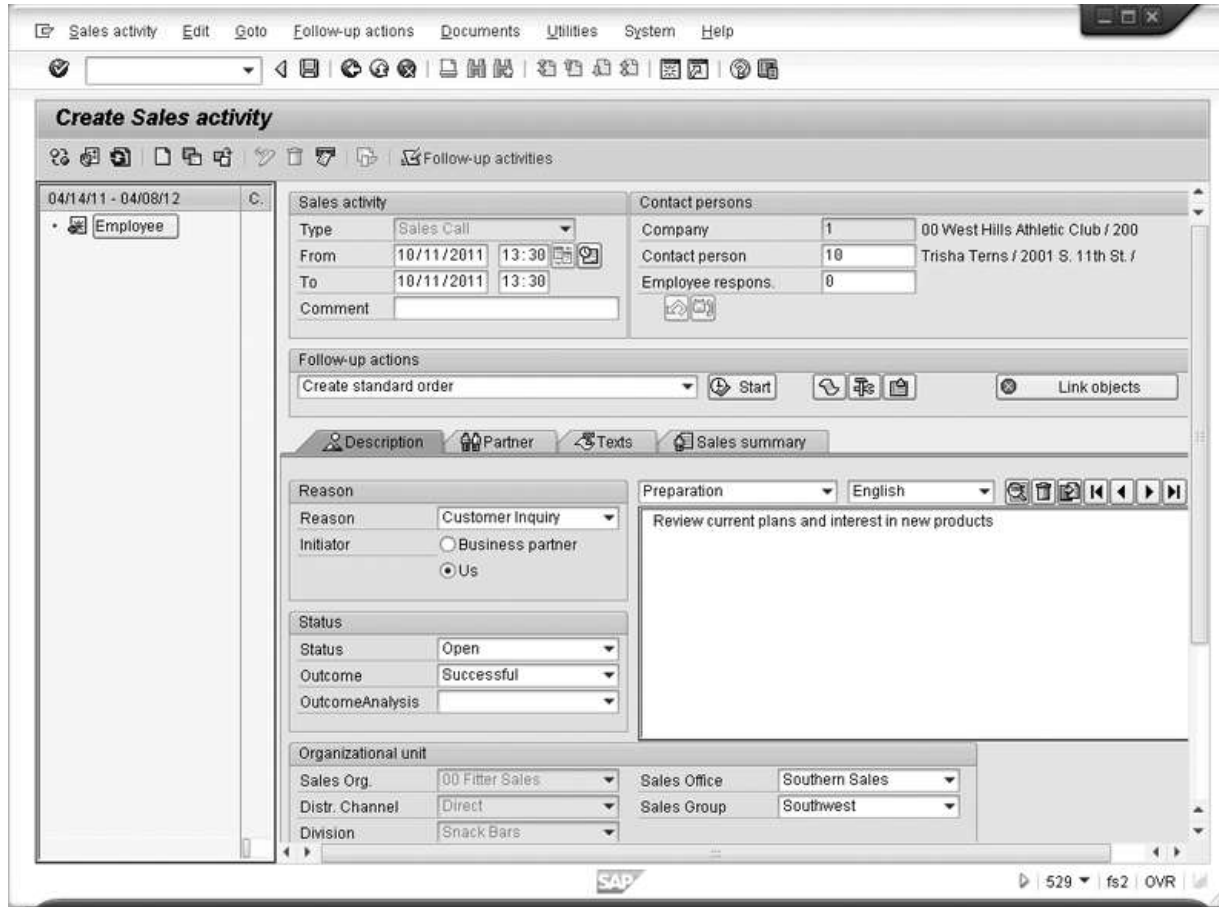
Room Number: 45A Floor: 2nd Building: 600 [Field]

Communication: [Field]

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Figure 3-13 SAP ERP contact manager

SAP's CRM Software



The screenshot displays the 'Create Sales activity' window in SAP CRM. The interface includes a menu bar at the top with options like 'Sales activity', 'Edit', 'Goto', 'Follow-up actions', 'Documents', 'Utilities', 'System', and 'Help'. Below the menu is a toolbar with various icons. The main area is divided into several sections:

- Sales activity:** Contains fields for 'Type' (Sales Call), 'From' (10/11/2011 13:30), 'To' (10/11/2011 13:30), and 'Comment'.
- Contact persons:** Contains fields for 'Company' (1), 'Contact person' (10), and 'Employee respons.' (0).
- Follow-up actions:** Includes a dropdown menu set to 'Create standard order', a 'Start' button, and a 'Link objects' button.
- Description:** Contains a 'Reason' dropdown (Customer Inquiry), an 'Initiator' section with radio buttons for 'Business partner' and 'Us' (selected), a 'Status' section with dropdowns for 'Status' (Open), 'Outcome' (Successful), and 'OutcomeAnalysis', and an 'Organizational unit' section with dropdowns for 'Sales Org.' (00 Fitter Sales), 'Distr. Channel' (Direct), 'Division' (Snack Bars), 'Sales Office' (Southern Sales), and 'Sales Group' (Southwest).
- Preparation:** Includes a dropdown for 'Preparation' and a language dropdown set to 'English'. Below these is a text area containing the text 'Review current plans and interest in new products'.

The bottom of the window shows the SAP logo and a status bar with the text '529 | fs2 | OVR'.

Figure 3-14 SAP ERP sales activity manager

SAP's CRM Software (cont'd.)

- SAP ERP system processes business transactions and provides much of the raw data for CRM
- SAP's Business Warehouse: system for reporting and analysis of transactional data
- Advanced Planner and Optimizer (APO): system that supports efficient planning of the supply chain
- SAP's view of CRM is to provide a set of tools to manage the three basic task areas, or jobs:
 - Marketing, sales, and service

SAP's CRM Software (cont'd.)

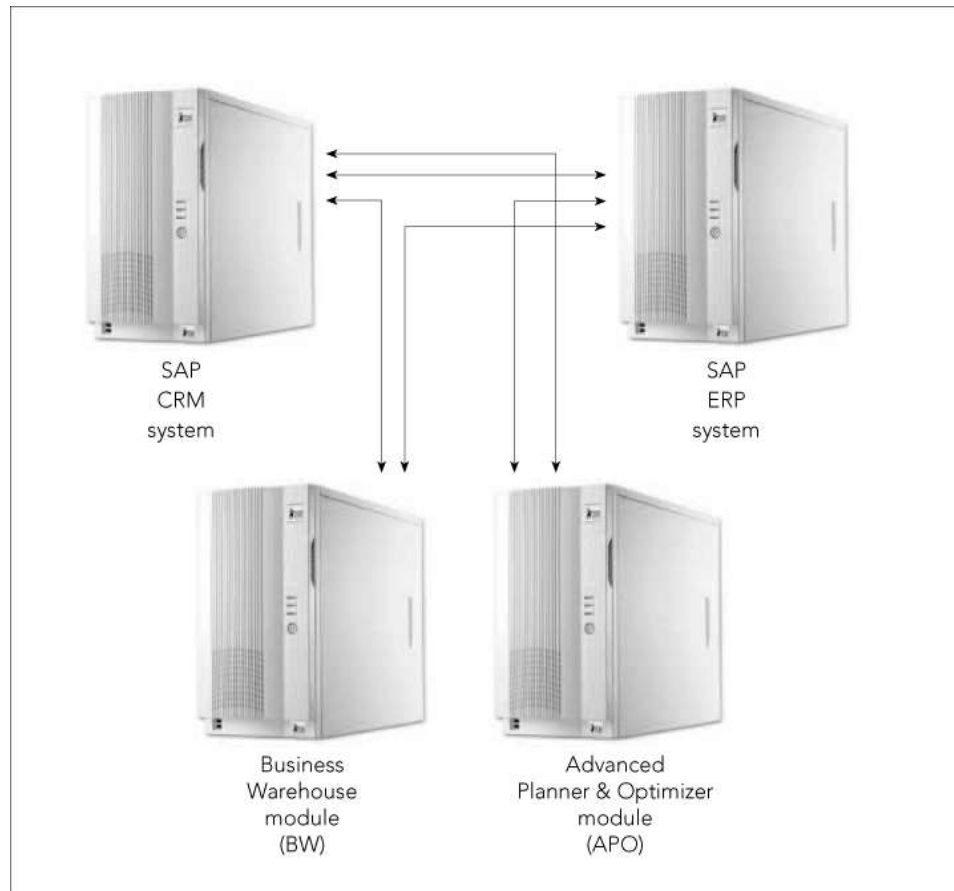


Figure 3-15 SAP CRM system landscape

SAP's CRM Software (cont'd.)

- Four phases of the cultivation of customer relationship:
 - Prospecting
 - Acquiring
 - Servicing
 - Retaining
- Contact Channels
- Marketing and Campaign Management
- Campaign Execution Activity Management
- Campaign Analysis tool

SAP's CRM Software (cont'd.)

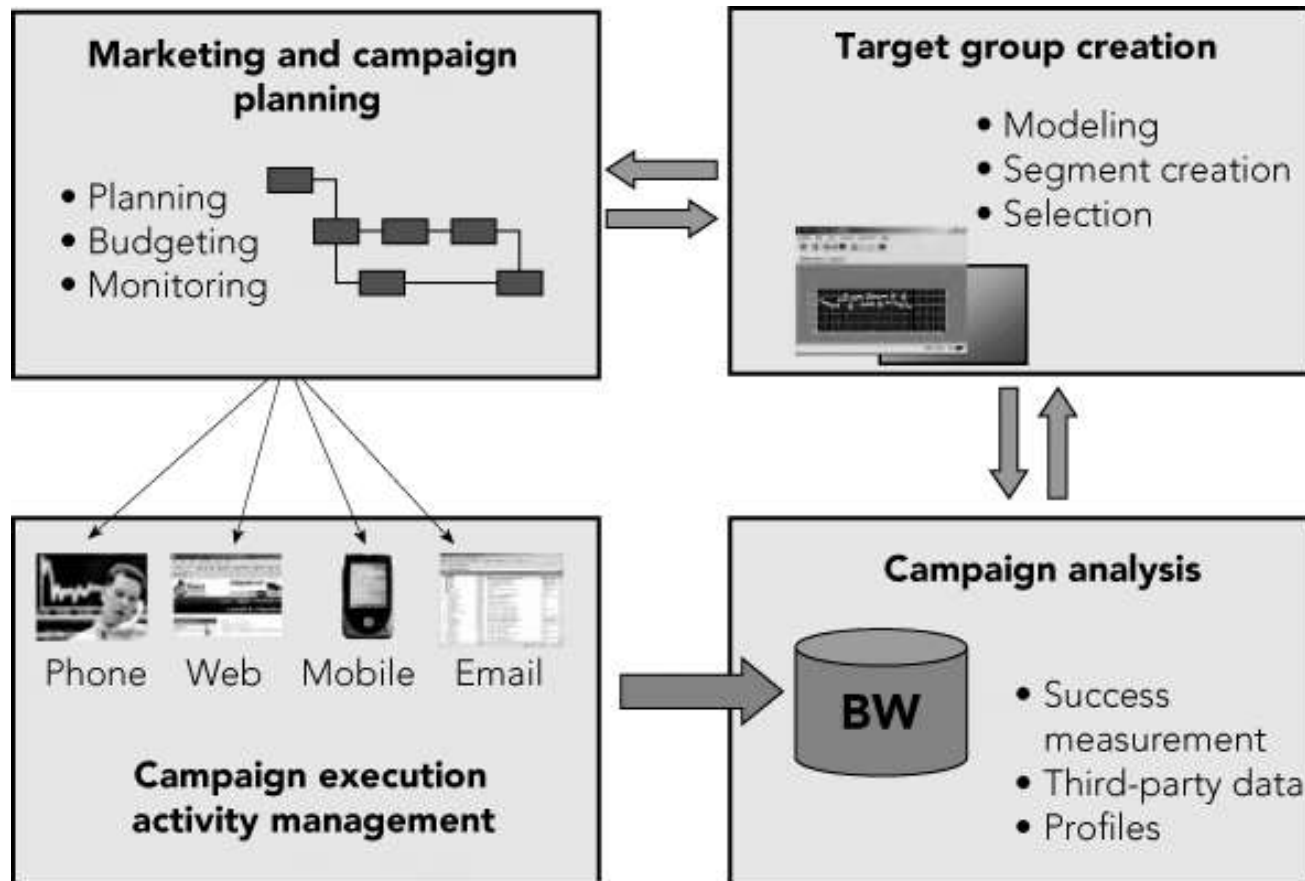


Figure 3-16 Marketing and campaign planning

The Benefits of CRM

- Lower costs
- Higher revenue
- Improved strategy and performance measurement

Summary

- Fitter Snacker's unintegrated information systems are at the root of an inefficient and costly sales order process
- An ERP system such as SAP ERP treats a sale as a sequence of related functions
 - Including: taking orders, setting prices, checking product availability, checking the customer's credit line, arranging for delivery, billing the customer, and collecting payment
 - In SAP ERP, all these transactions, or documents, are electronically linked

Summary (cont'd.)

- Installing an ERP system means making various configuration decisions
 - Configuration decisions reflect management's view of how transactions should be recorded and later used for decision making
- ERP system's central database contains:
 - Tables of master data: relatively permanent data about customers, suppliers, material, and inventory
 - Transaction data tables: store relatively temporary data such as sales orders and invoices

Summary (cont'd.)

- Customer relationship management (CRM) systems
 - Build on the organizational value that ERP provides
 - Specifically increase the flexibility of the company's common database regarding customer service
 - Various kinds of CRM software are available
 - Can be installed in-house or on-demand

Concepts in Enterprise Resource Planning

Fourth Edition

Chapter Four

Production and Supply Chain Management Information Systems

Dr.A. Sasi Kumar

Objectives

After completing this chapter, you will be able to:

- Describe the steps in the production planning process of a high-volume manufacturer such as Fitter Snacker
- Describe Fitter Snacker's production and materials management problems
- Describe how a structured process for Supply Chain Management planning enhances efficiency and decision making
- Describe how production planning data in an ERP system can be shared with suppliers to increase supply chain efficiency

Introduction

- Supply Chain Management (SCM) in an ERP system
- Fitter Snacker is part of a supply chain
- FS's SCM problems and how ERP can help fix them

Production Overview

- To meet customer demand efficiently, Fitter Snacker must:
 - Develop a forecast of customer demand
 - Develop a production schedule to meet the estimated demand
- ERP system is a good tool for developing and executing production plans
- Goal of production planning is to schedule production economically

Production Overview (cont'd.)

- Three general approaches to production
 - *Make-to-stock* items: made for inventory (the “stock”) in anticipation of sales orders
 - *Make-to-order* items: produced to fill specific customer orders
 - *Assemble-to-order* items: produced using a combination of make-to-stock and make-to-order processes

Fitter Snacker's Manufacturing Process

- Fitter Snacker uses make-to-stock production

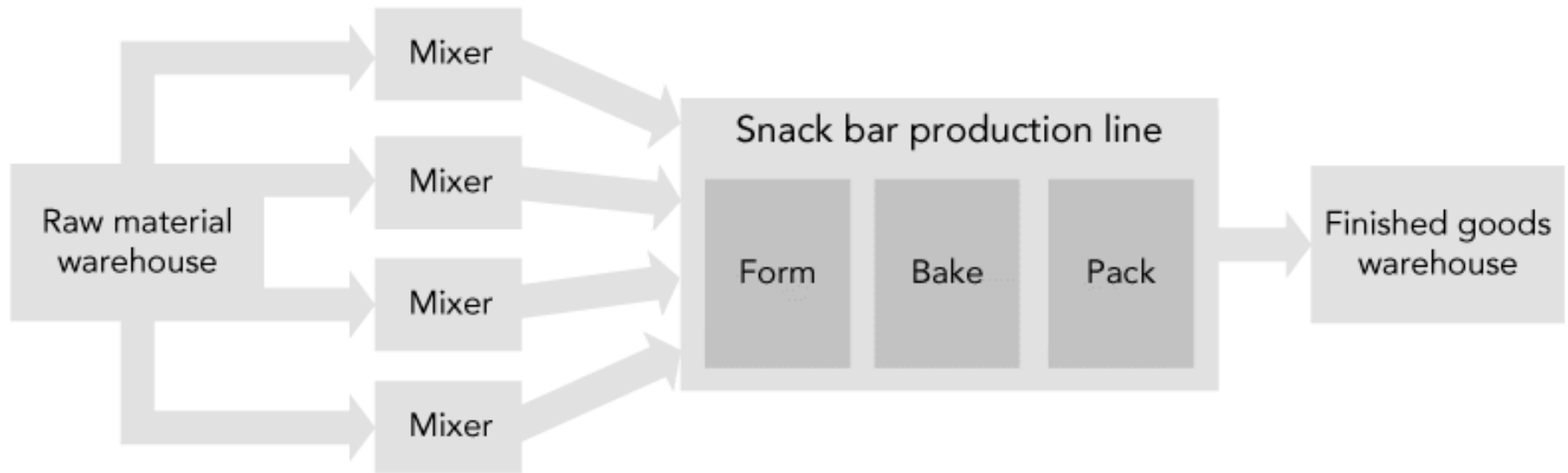


Figure 4-1 Fitter Snacker's manufacturing process

Fitter Snacker's Manufacturing Process (cont'd.)

- Snack bar line can produce 200 bars a minute, or 12,000 bars per hour
- Each bar weighs four ounces
- Product 48,000 ounces/hour, or 3,000 lbs/hour
- Entire production line operates on one shift a day
- Fitter Snacker's production sequence
 - **Capacity:** number of bars that can be produced

Fitter Snacker's Production Problems

- Fitter Snacker has problems deciding *how many* bars to make and *when* to make them
- Communication problems
 - FS's Marketing and Sales personnel do not share information with Production personnel
 - Production personnel find it hard to deal with sudden increases in demand
 - Might cause shortages or stockout

Fitter Snacker's Production Problems (cont'd.)

- Inventory problems
 - Production manager lacks systematic method for:
 - Meeting anticipated sales demand
 - Adjusting production to reflect actual sales
- Accounting and purchasing problems
 - **Standard costs:** normal costs of manufacturing a product
 - Production and Accounting must periodically compare standard costs with actual costs and then adjust the accounts for the inevitable differences

The Production Planning Process

- Three important principles for production planning:
 - Work from sales forecast and current inventory levels to create an “aggregate” (“combined”) production plan for all products
 - Break down aggregate plan into more specific production plans for individual products and smaller time intervals
 - Use production plan to determine raw material requirements

The SAP ERP Approach to Production Planning

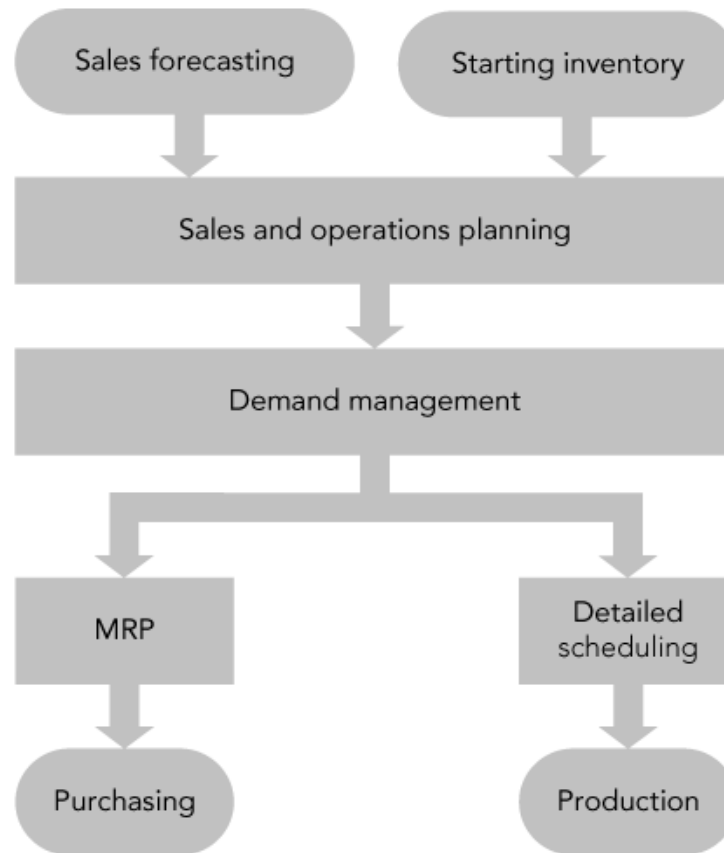


Figure 4-2 The production planning process

Sales Forecasting

- SAP's ERP system takes an integrated approach
 - Whenever a sale is recorded in Sales and Distribution (SD) module, quantity sold is recorded as a consumption value for that material
- Simple forecasting technique
 - Use a prior period's sales and then adjust those figures for current conditions
- To make a forecast for Fitter Snacker:
 - Use previous year's sales data in combination with marketing initiatives to increase sales

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 |

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

Sales and Operations Planning

- Sales and operations planning (SOP)
 - Input: sales forecast provided by Marketing
 - Output: production plan designed to balance market demand with production capacity
 - Production plan is the input to the next step, demand management

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 | 6650 | 6950 |
| 3) Inventory | | 100 | 100 | 100 | 100 | 100 | 274 | 96 |
| 4) Working days | | | 21 | 20 | 23 | 21 | 21 | 22 |
| 5) Capacity (shipping cases) | | | 6999 | 6666 | 7666 | 6999 | 6999 | 7333 |
| 6) Utilization | | | 84% | 90% | 79% | 90% | 95% | 95% |
| 7) NRG-A (cases) | 70.0% | | 4134 | 4199 | 4243 | 4423 | 4655 | 4865 |
| 8) NRG-B (cases) | 30.0% | | 1772 | 1799 | 1818 | 1895 | 1995 | 2085 |

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

Sales and Operations Planning (cont'd.)

- In SAP ERP, sales forecast can be made using:
 - Historical sales data from the Sales and Distribution (SD) module
 - Input from plans developed in Controlling (CO) module
- CO module
 - Profit goals for company can be set
 - Sales levels needed to meet the profit goals can be estimated

Sales and Operations Planning (cont'd.)

- **Rough-cut planning:** common term in manufacturing for aggregate planning
 - Disaggregated to generate detailed production schedules
- Once SAP ERP system generates a forecast, the planner can view the results graphically
- Rough-cut capacity planning applies simple capacity-estimating techniques to the production plan to see if the techniques are feasible

Sales and Operations Planning (cont'd.)

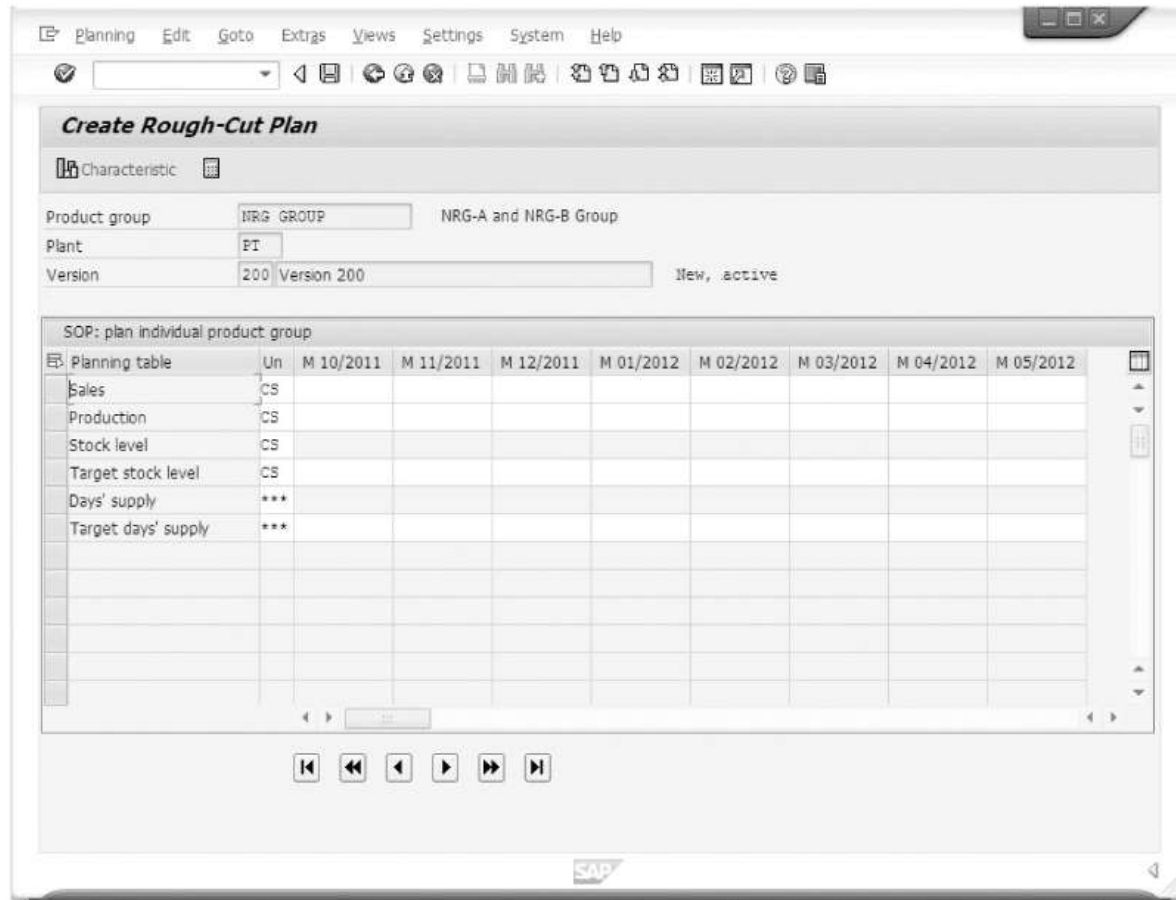


Figure 4-6 Sales and operations planning screen in SAP ERP

Forecast: Historical Values

Historical values

| Period | Val. fld | Corr.value | F | C |
|-----------|----------|------------|--------------------------|--------------------------|
| M 09/2011 | 6214 | 6214 | <input type="checkbox"/> | <input type="checkbox"/> |
| M 08/2011 | 6326 | 6326 | <input type="checkbox"/> | <input type="checkbox"/> |
| M 07/2011 | 6501 | 6501 | <input type="checkbox"/> | <input type="checkbox"/> |
| M 06/2011 | 6434 | 6434 | <input type="checkbox"/> | <input type="checkbox"/> |
| M 05/2011 | 6286 | 6286 | <input type="checkbox"/> | <input type="checkbox"/> |
| M 04/2011 | 6133 | 6133 | <input type="checkbox"/> | <input type="checkbox"/> |
| M 03/2011 | 5883 | 5883 | <input type="checkbox"/> | <input type="checkbox"/> |
| M 02/2011 | 5822 | 5822 | <input type="checkbox"/> | <input type="checkbox"/> |

Forecasting Correct

Sales provided from SD module

Field where planner can "correct" the sales value

Figure 4-7 Historical sales figures in SAP

Sales and Operations Planning (cont'd.)

- Historical sales screen allow planner to correct sales values
- Do not account for external factors, such as unusual weather
- Sales figures forecasting represent best estimate of demand

Forecast: Model Selection

Periods

☒ Period intervals

Forecast From 10/2011 To 10/2012

Historical data From 10/2006 To 09/2011

☐ No. of periods

No. of forecast periods 0

No. of historical values 60

Forecast execution

☐ Constant models ☐ Seasonal models

☐ Trend models ☐ Season. trend models

☒ Aut. model selection ☐ Historical

Forecast parameters

Profile SAP

Forecasting Historical... Forecast profile... Version...

Figure 4-8 Forecasting model options in SAP ERP

Sales and Operations Planning (cont'd.)

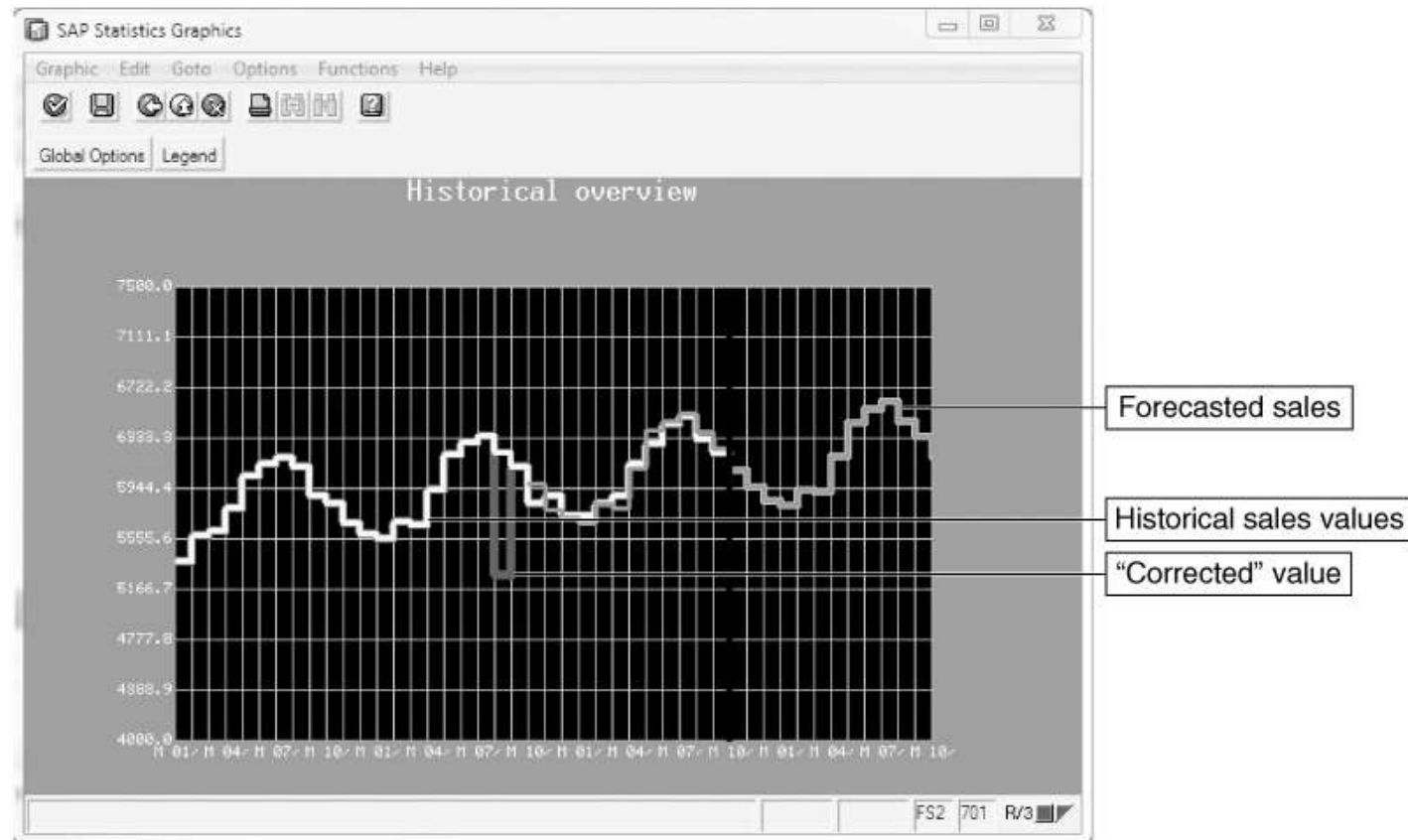


Figure 4-9 Forecasting results presented graphically in SAP ERP

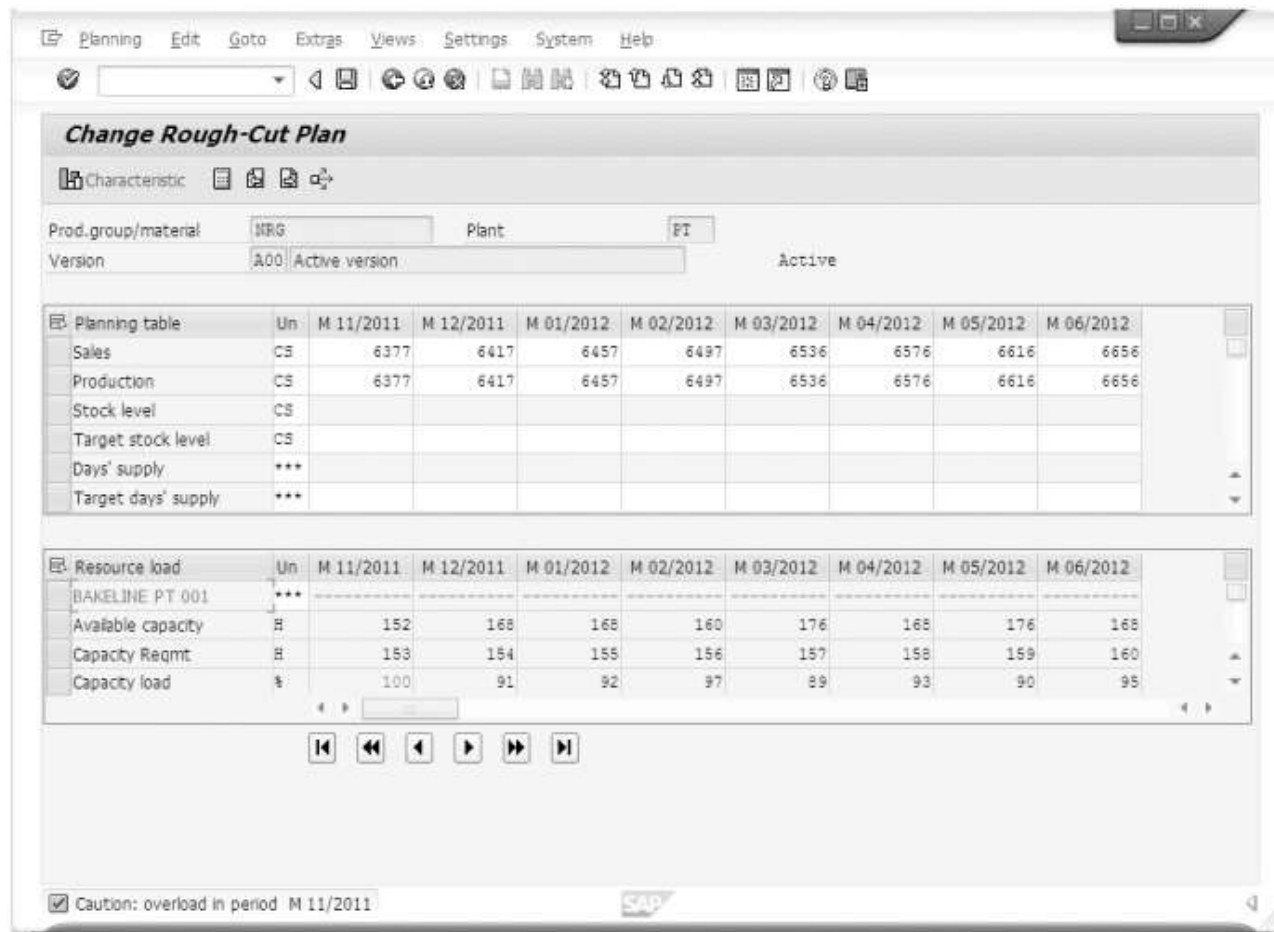


Figure 4.10 Sales and operation plan with rough-cut capacity calculation in SAP ERP

Sales and Operations Planning (cont'd.)

- Disaggregating the sales and operations plan
 - Companies typically develop sales and operations plans for product groups
 - SAP ERP system allows any number of products to be assigned to a product group
 - Sales and operation plan disaggregated
 - Production plan quantities specified for the group are transferred to the individual products that make up the group

Sales and Operations Planning (cont'd.)

Display Product Group: Members (Materials)

Hierarchy graphic Versions... Master data... Product grp. graphic

Product group: NRG GROUP NRG-A and NRG-B Group

Plant: PT Fitter Snacker Plant

Base Unit: CS

| Member number | Plant | Unit conv. Short Text | Aggr. fact. | Proportion | UoM MTyp | V | M | Fx |
|---------------|-------|--------------------------|-------------|------------|-------------|---|---|--------------------------|
| F100 | PT | 1 | 1 | 70 | CS | | | <input type="checkbox"/> |
| | | NRG-A | | | FERT | | | |
| F110 | PT | 1 | 1 | 30 | CS | | | <input type="checkbox"/> |
| | | NRG-B | | | FERT | | | |

NRG group consists of 70% NRG-A bars and 30% NRG-B bars

Figure 4-11 Product group structure in SAP ERP

Sales and Operations Planning (cont'd.)

Stock/Requirements List as of 22:28 hrs

Show Overview Tree

Material: F100 NRG-A
Plant: FT MRP type: SD Material Type: FEAT Unit: CS

| A. Date | MRP ... | MRP element data | Reschedul... | E. Receipt/Reqmt | Available Qty |
|------------|---------|------------------|--------------|------------------|---------------|
| 10/25/2011 | Stock | | | | 389 |
| 11/01/2011 | IndReq | VSF | | 4,464 | 4,075 |
| 12/01/2011 | IndReq | VSF | | 4,492 | 8,567 |
| 01/02/2012 | IndReq | VSF | | 4,520 | 13,087 |
| 02/01/2012 | IndReq | VSF | | 4,548 | 17,635 |
| 03/01/2012 | IndReq | VSF | | 4,575 | 22,210 |
| 04/02/2012 | IndReq | VSF | | 4,603 | 26,813 |
| 05/01/2012 | IndReq | VSF | | 4,631 | 31,444 |
| 06/01/2012 | IndReq | VSF | | 4,659 | 36,103 |
| 07/02/2012 | IndReq | VSF | | 4,687 | 40,790 |
| 08/01/2012 | IndReq | VSF | | 4,715 | 45,505 |
| 09/04/2012 | IndReq | VSF | | 4,743 | 50,248 |
| 10/01/2012 | IndReq | VSF | | 4,771 | 55,019 |

Page 1 / 1

Anticipated demand for NRG-A bars from sales and operations plan

Figure 4-12 Stock/Requirements List for NRG-A bars after disaggregation

Demand Management

- Links the sales and operations planning process with detailed scheduling and materials requirements planning processes
- Output: **master production schedule (MPS)**
 - Production plan for all finished goods
- For Fitter Snacker, MPS is an input to detailed scheduling, which determines what bars to make and when to make them

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

Materials Requirements Planning (MRP)

- Determines required quantity and timing of the production or purchase of subassemblies and raw materials needed to support MPS
- **Bill of material (BOM)**: list of the materials (including quantities) needed to make a product

| Ingredient | Quantity | |
|------------------------|----------|-------|
| | NRG-A | NRG-B |
| Oats (lb.) | 300 | 250 |
| Wheat germ (lb.) | 50 | 50 |
| Cinnamon (lb.) | 5 | 5 |
| Nutmeg (lb.) | 2 | 2 |
| Cloves (lb.) | 1 | 1 |
| Honey (gal.) | 10 | 10 |
| Canola oil (gal.) | 7 | 7 |
| Vit./min. powder (lb.) | 5 | 5 |
| Carob chips (lb.) | 50 | |
| Raisins (lb.) | 50 | |
| Protein powder (lb.) | | 50 |
| Hazelnuts (lb.) | | 30 |
| Dates (lb.) | | 70 |

Figure 4-15 Fitter's factory calendar for August

Materials Requirements Planning (MRP) (cont'd.)

| | Quantity | |
|------------------------|----------|-------|
| Ingredient | NRG-A | NRG-B |
| Oats (lb.) | 300 | 250 |
| Wheat germ (lb.) | 50 | 50 |
| Cinnamon (lb.) | 5 | 5 |
| Nutmeg (lb.) | 2 | 2 |
| Cloves (lb.) | 1 | 1 |
| Honey (gal.) | 10 | 10 |
| Canola oil (gal.) | 7 | 7 |
| Vit./min. powder (lb.) | 5 | 5 |
| Carob chips (lb.) | 50 | |
| Raisins (lb.) | 50 | |
| Protein powder (lb.) | | 50 |
| Hazelnuts (lb.) | | 30 |
| Dates (lb.) | | 70 |

Figure 4-16 The bill of material (BOM) for Fitter Snacker's NRG bars

Materials Requirements Planning (MRP) (cont'd.)

- Lead times and lot sizing
 - **Lead time:** 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
 - **Lot sizing:** determining production quantities and order quantities
- **MRP record:** standard way of viewing the MRP process on paper

Materials Requirements Planning (MRP) (cont'd.)

| Oats | Lead time = 2 weeks | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 |
|--------------------------|---------------------|--------|--------|--------|--------|--------|
| MPS (cases) | NRG-A | 984 | 984 | 984 | 984 | 1037 |
| | NRG-B | 422 | 422 | 422 | 422 | 444 |
| MPS (500 lb. batches) | NRG-A | 142 | 142 | 142 | 142 | 149 |
| | NRG-B | 61 | 61 | 61 | 61 | 64 |
| Gross requirements (lb) | | 57,850 | 57,850 | 57,850 | 57,850 | 60,700 |
| Scheduled receipts | | 44,000 | 44,000 | | | |
| Planned receipts | | | | 88,000 | 44,000 | 44,000 |
| On hand | 29,650 | 15,800 | 1,950 | 32,100 | 18,250 | 1,550 |
| Planned orders | | 88,000 | 44,000 | 44,000 | | |

Figure 4-17 The MRP record for oats in NRG bars, weeks 1 through 5

Materials Requirements Planning in SAP ERP

- MRP list shows results of MRP calculations
- MRP process creates planned orders to meet dependent requirements
- Stock/Requirements List shows:
 - Planned orders
 - Purchase requisitions (PurRqs)
 - Purchase orders (POitem)
- Planner can convert a planned order to a purchase order from Stock/Requirements List by double-clicking the planned order line

Materials Requirements Planning in SAP ERP (cont'd.)

MRP List as of 01/03/2011, 21:31 hrs

Show Overview Tree | | | | On

Material: R380 Oats
Plant: PT MRP type: PD Material Type: ROH Unit: LB

| A. | Date | MRP ... | MRP element data | Reschedul... | E.. Receipt/Reqmt | Available Qty |
|----|------------|---------|------------------|--------------|-------------------|---------------|
| | 01/03/2011 | Stock | | | | 29,650 |
| | 01/07/2011 | POitem | 4500000002/00010 | | 44,000 | 73,650 |
| | 01/07/2011 | DepReq | S200 | | 57,850- | 15,800 |
| | 01/14/2011 | POitem | 4500000003/00010 | | 44,000 | 59,800 |
| | 01/14/2011 | DepReq | S200 | | 57,850- | 1,950 |
| | 01/21/2011 | PldOrd | 0000005269/STPO | | 88,000 | 89,950 |
| | 01/21/2011 | DepReq | S200 | | 57,850- | 32,100 |
| | 01/28/2011 | PldOrd | 0000005270/STPO | | 44,000 | 76,100 |
| | 01/28/2011 | DepReq | S200 | | 57,850- | 18,250 |
| | 02/04/2011 | PldOrd | 0000005271/STPO | | 44,000 | 62,250 |
| | 02/04/2011 | DepReq | S200 | | 60,700- | 1,550 |

Page 1 /

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Figure 4-18 The MRP list in SAP ERP

Materials Requirements Planning in SAP ERP (cont'd.)

Stock/Requirements List as of 21:33 hrs

Show Overview Tree

Material: R380 Oats
Plant: PT MRP type: PD Material Type: ROH Unit: LB

| A. Date | MRP ... | MRP element data | Reschedul... | E... Receipt/Reqmt | Available Qty |
|------------|---------|--------------------|--------------|--------------------|---------------|
| 01/03/2011 | Stock | | | | 29,650 |
| 01/07/2011 | POItem | 4500000002/00010 | | 44,000 | 73,650 |
| 01/07/2011 | DepReq | S200 | | 57,850- | 15,800 |
| 01/14/2011 | POItem | 4500000003/00010 | | 44,000 | 59,800 |
| 01/14/2011 | DepReq | S200 | | 57,850- | 1,950 |
| 01/21/2011 | PurRqs | 0010000013/00010 * | | 88,000 | 89,950 |
| 01/21/2011 | DepReq | S200 | | 57,850- | 32,100 |
| 01/28/2011 | PldOrd | 0000005270/SIPO | | 44,000 | 76,100 |
| 01/28/2011 | DepReq | S200 | | 57,850- | 18,250 |
| 02/04/2011 | PldOrd | 0000005271/SIPO | | 44,000 | 62,250 |
| 02/04/2011 | DepReq | S200 | | 60,700- | 1,550 |

Page 1

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Figure 4-19 The Stock/Requirements List in SAP ERP

Additional Data for MRP Element

| | | | | | | |
|------------|------------|----------------|-----------------|------------|------------|----|
| Plnd order | 0000005270 | External proc. | Order finish | 01/28/2011 | GR ProcTme | 0 |
| Order qty | 44,000 | LB | Order start | 01/22/2011 | Proc. type | F |
| Scrap | 0 | | Planned opening | 01/20/2011 | Order type | NB |

☒ ☐ ☐ ☐ ☐ -> Pur.req. ☐ ☐

Planned order release and receipt dates

Option to convert planned order to purchase requisition

Figure 4-20 Conversion of a planned order to a requisition

Materials Requirements Planning in SAP ERP (cont'd.)

- Integrated information system allows Purchasing to make the best decision on a vendor based on relevant, up-to-date information
- Once Purchasing employee decides which vendor to use, the purchase order is transmitted to vendor
 - System can be configured to fax order to vendor, transmit it electronically through EDI (electronic data interchange), or send it over the Internet

Source Overview for Item 00010

Material: R380 Oats

Quantity: 44,000 LB

| Vendor | Name | Info/agmt. | Item | Net price | Crcy | Realistic D... | POrg | Pln |
|--------|----------------|------------|------|-----------|------|----------------|------|-----|
| 100000 | Climax Cereals | 5300002200 | | 0.20 USD | | 11/04/2011 | 00PR | 00: |
| 100100 | Grand Rapids | 5300002300 | | 0.20 USD | | 11/04/2011 | 00PR | 00: |
| 100200 | Oshtemo Oats | 5300002400 | | 0.20 USD | | 11/04/2011 | 00PR | 00: |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Options to evaluate vendors

☒ Source of supply
 ☒ Vendor
 ☐ Price simulation
 ☐ Price simulation/all
 ☒ Vendor eval.

Figure 4-21 Source Overview screen for supplier selection

Detailed Scheduling

- Detailed plan of what is to be produced, considering machine capacity and available labor
- One key decision in detailed production scheduling
 - How long to make the production runs for each product
 - Production run length requires a balance between setup costs and holding costs to minimize total costs to the company

Detailed Scheduling (cont'd.)

- Fitter Snacker uses repetitive manufacturing
- **Repetitive manufacturing** environments usually involve production lines that are switched from one product to another similar product
 - Production lines are scheduled for a period of time, rather than for a specific number of items

Detailed Scheduling (cont'd.)

Planning Table for Repetitive Manufacturing: Change Mode

| Total Capacity Data | | Un | Due | TU 11/01... | WE 11/0... | TH 11/03... | FR 11/04... | SA 11/05... | SU 11/06... | MO 11/0... | TU 11/08... | WE 11/0... |
|------------------------------|---|----|-----|-------------|------------|-------------|-------------|-------------|-------------|------------|-------------|------------|
| REPBKAE /001 Repetitiv.. | % | | | 90.090 | 90.090 | 90.090 | 96.153 | 90.090 | 90.090 | 90.090 | 90.090 | |
| Required - Repetitive Ba.. | % | | | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | |
| Available - Repetitive Bak.. | % | | | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |

| Material Data | | Un | Due | TU 11/01... | WE 11/0... | TH 11/03... | FR 11/04... | SA 11/05... | SU 11/06... | MO 11/0... | TU 11/08... | WE 11/0... |
|--------------------|-----|----|-----|-------------|------------|-------------|-------------|-------------|-------------|------------|-------------|------------|
| F100 NRG-A | *** | | | | | | | | | | | |
| Available Quantity | CS | | 37 | 37 | 337 | 637 | 937 | 1087 | 1087 | 1087 | 1087 | 1087 |
| Tot. Requirements | CS | | | | | | | | | | | |
| 0001 REPBKAE | CS | | | 300 | 300 | 300 | 150 | | | | | |
| Not Assigned | CS | | | | | | | | | | | |
| F110 NRG-B | *** | | | | | | | | | | | |
| Available Quantity | CS | | 153 | 153 | 153 | 153 | 153 | 303 | 603 | 903 | 1203 | 1503 |
| Tot. Requirements | CS | | | | | | | | | | | |
| 0001 REPBKAE | CS | | | | | | 150 | 300 | 300 | 300 | 300 | |
| Not Assigned | CS | | | | | | | | | | | |

Figure 4-22 Repetitive manufacturing planning table in SAP ERP

Detailed Scheduling (cont'd.)

- Production runs should be decided by evaluating the cost of equipment setup and holding inventory
- Integrated information system simplifies this analysis
 - Automatically collects accounting information that allows managers to better evaluate schedule trade-offs in terms of costs to company

Providing Production Data to Accounting

- In the manufacturing plant, ERP packages do not directly connect with production machines
- Data can be entered into SAP ERP through a PC on the shop floor, scanned by a barcode reader or radio frequency identification (RFID) technology, or a mobile device
- In an integrated ERP system, the accounting impact of a material transaction can be recorded automatically

Providing Production Data to Accounting (cont'd.)

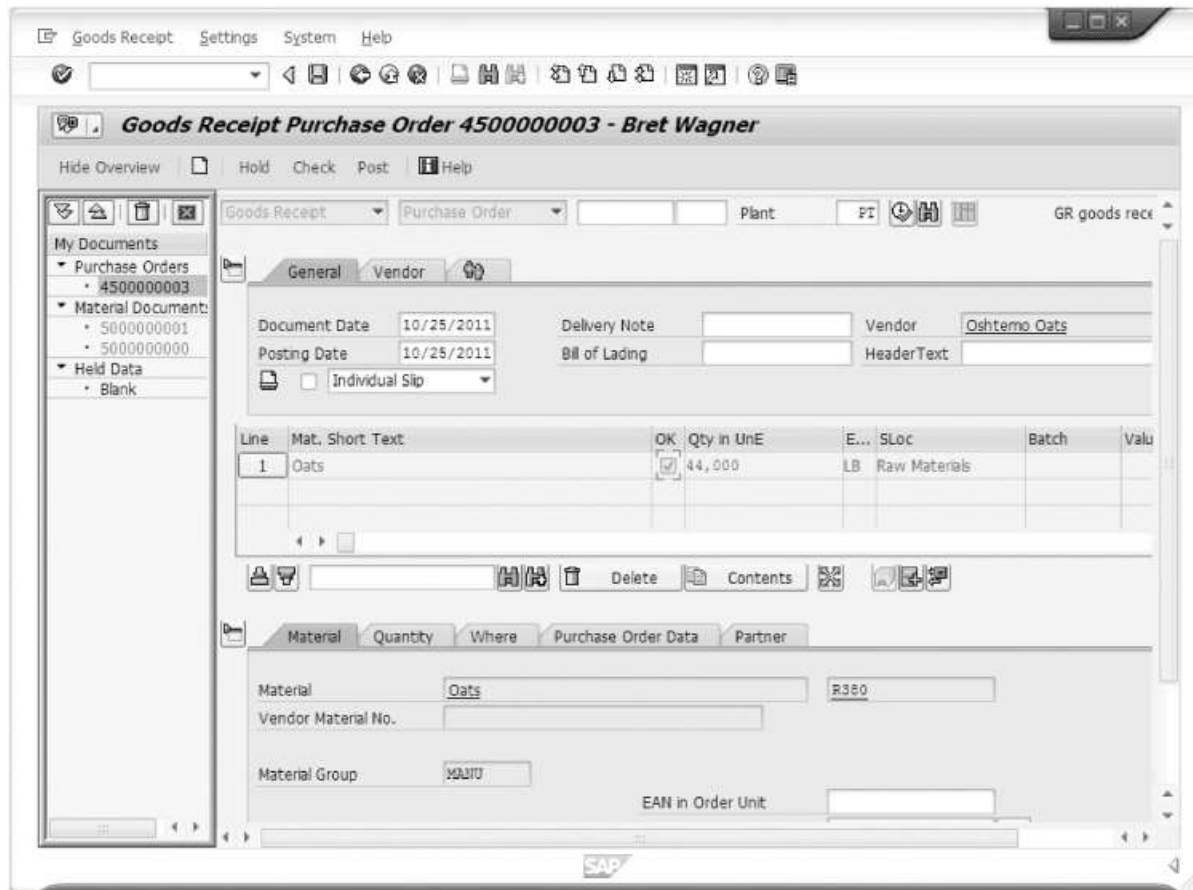


Figure 4-23 Goods receipt screen in SAP ERP

Providing Production Data to Accounting (cont'd.)

- Once FS accepts shipment, Receiving must notify SAP ERP system of the arrival and acceptance of the material
 - Goods receipt transaction
- Receiving department must match goods receipt with purchase order that initiated it
- When receipt is successfully recorded, SAP ERP system immediately records the increase in inventory levels for the material

ERP and Suppliers

- Fitter Snacker is part of a supply chain
 - Starts with farmers growing oats and wheat
 - Ends with a customer buying an NRG bar from a retail store
- ERP systems can play a key role in collaborative planning

ERP and Suppliers (cont'd.)

- Working with suppliers in a collaborative fashion requires trust among all parties
 - Company opens its records to its suppliers
 - Suppliers can read company's data because of common data formats
- Advantages
 - Reductions in paperwork
 - Savings in time
 - Other efficiency improvements

The Traditional Supply Chain

- **Supply chain:** all activities that occur between the growing or mining of raw materials and the appearance of finished products on the store shelf
- Traditional supply chain
 - Information is passed through the supply chain reactively as participants increase their product orders
 - Inherent time lags cause problems

The Traditional Supply Chain (cont'd.)

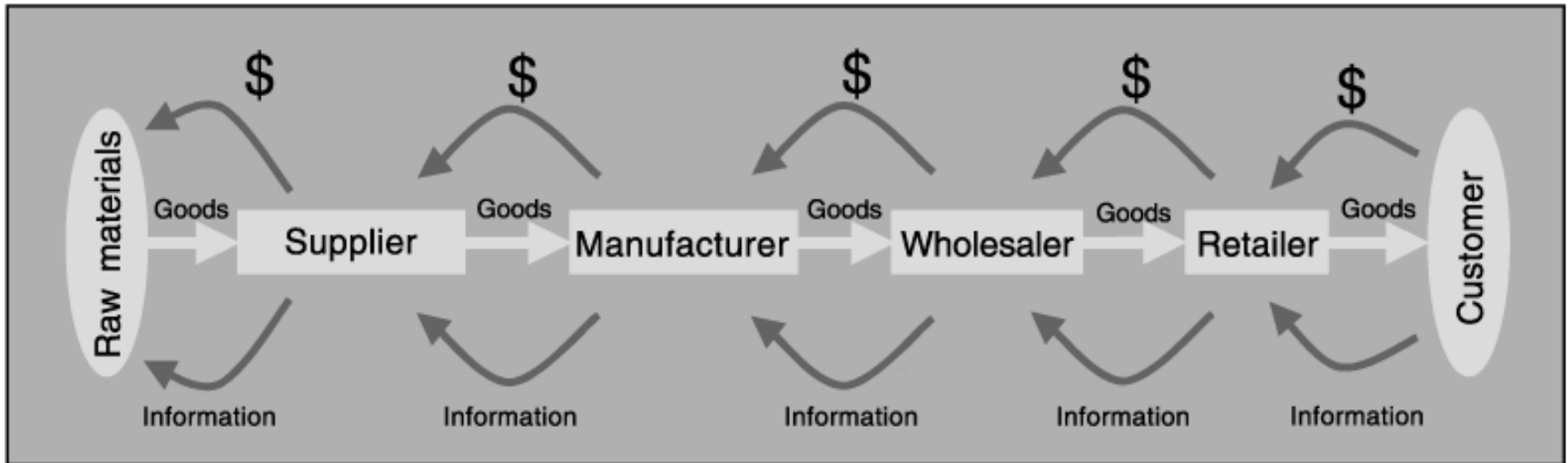


Figure 4-24 Supply chain management (SCM) from raw materials to consumer

The Traditional Supply Chain (cont'd.)

- EDI and ERP
 - Before ERP systems were available, companies could be linked with customers and suppliers through electronic data interchange (EDI) systems
 - Well-developed ERP system can facilitate SCM
 - Needed production planning and purchasing systems already in place
 - With ERP system, sharing production plans along the supply chain can occur in real time

The Measures of Success

- Performance measurements
 - **Metrics**
 - Show the effects of better supply chain management
- **Cash-to-cash cycle time**
 - Time between paying for raw materials and collecting cash from customer
- SCM costs
 - Include cost of buying and handling inventory, processing orders, and information systems support

The Measures of Success (cont'd.)

- **Initial fill rate**
 - Percentage of the order that the supplier provided in the first shipment
- **Initial order lead time**
 - Time needed for the supplier to fill the order
- **On-time performance**
 - If supplier agreed to requested delivery dates, tracks how often supplier actually met those dates

Summary

- ERP system can improve the efficiency of production and purchasing processes
 - Efficiency begins with Marketing sharing a sales forecast
 - Production plan is created based on sales forecast and shared with Purchasing so raw materials can be ordered properly

Summary (cont'd.)

- Companies can do production planning without an ERP system, but an ERP system increases company's efficiency
 - ERP system that contains materials requirements planning allows Production to be linked to Purchasing and Accounting
 - This data sharing increases a company's overall efficiency

Summary (cont'd.)

- Companies are building on their ERP systems and integrated systems philosophy to practice supply chain management (SCM)
 - SCM: company looks at itself as part of a larger process that includes customers and suppliers
 - Using information more efficiently along the entire chain can result in significant cost savings
 - Complexity of the global supply chain
 - Developing a planning system that effectively coordinates information technology and people is a considerable challenge

Concepts in Enterprise Resource Planning

Fourth Edition

Chapter Five

Accounting in ERP Systems

Dr.A.Sasi Kumar

Objectives

After completing this chapter, you will be able to:

- Describe the differences between financial and managerial accounting
- Identify and describe problems associated with accounting and financial reporting in unintegrated information systems
- Describe how ERP systems can help solve accounting and financial reporting problems in an unintegrated system

Objectives (cont'd.)

- Describe how the Enron scandal and the Sarbanes-Oxley Act have affected accounting information systems
- Explain accounting and management-reporting benefits that accrue from having an ERP system
- Explain the importance of Extensible Business Reporting Language (XBRL) in financial reporting

Introduction

- In this chapter, you will learn about the activities in the Accounting functional area
- Accounting is tightly integrated with all other functional areas
- Accounting activities are necessary for decision making

Accounting Activities

- Areas of accounting:
 - Financial accounting
 - Managerial accounting
- **Financial accounting**
 - Documenting all transactions of a company that have an impact on the financial state of the firm
 - Using documented transactions to create reports for external parties and agencies
 - Reports, or financial statements, must follow prescribed rules and guidelines of various agencies

Accounting Activities (cont'd.)

- Common financial statements: balance sheets and income statements
- **Balance sheet**
 - Statement that shows account balances such as:
 - Cash held
 - Amounts owed to company by customers
 - Cost of raw materials and finished-goods inventory
 - Long-term assets such as buildings
 - Amounts owed to vendors, banks, and other creditors
 - Amounts owners have invested in company

| Fitter Snacker Balance Sheet December 31, 2011 (in thousands of dollars) | | |
|---|----------|----------|
| <u>Assets</u> | | |
| Cash | | \$5,003 |
| Accounts receivable | | \$4,715 |
| Inventories | | \$9,025 |
| Plant and equipment | | \$6,231 |
| Land | | \$1,142 |
| Total assets | | \$26,116 |
| <u>Liabilities</u> | | |
| Accounts payable | \$6,400 | |
| Notes payable | \$10,000 | |
| Total liabilities | | \$16,400 |
| <u>Stockholders' Equity</u> | | |
| Contributed capital | \$2,000 | |
| Retained earnings | \$7,716 | |
| Total stockholders' equity | | \$9,716 |
| Total liabilities and stockholders' equity | | \$26,116 |

Figure 5-1 Fitter Snacker sample balance sheet

Accounting Activities (cont'd.)

- **Income statement**
 - **Profit and loss (P&L) statement**
 - Shows company's sales, cost of sales, and profit or loss for a period of time (typically a quarter or year)
- Integrated information system simplifies the process of closing the books and preparing financial statements
- **Managerial accounting:** determining costs and profitability of company's activities

| Fitter Snacker Balance Sheet December 31, 2011 (in thousands of dollars) | | |
|--|----------|----------|
| <u>Assets</u> | | |
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| Total liabilities and stockholders' equity | | \$26,116 |

Figure 5-2 Fitter Snacker sample income statement

Accounting Activities (cont'd.)

- Quarterly financial statement
 - Close books
 - Closing entries to nominal accounts
 - Nominal accounts – zero balance to start next cycle
 - Ensure accounts accurate and up-to-date
 - “Adjusting” entries
- Integrated information system advantage
 - Simplifies process of closing books and preparing financial statements

System Help

Financial Statements

Fitter Snacker

FS 10 Ledger
 USD Currency type Company code currency
 2011.01 - 2011.16 Reporting periods
 2010.01 - 2010.16 Comparison periods

| F.S. item/account | Tot.rpt.pr | tot.cmp.pr | Abs. diff. |
|-----------------------------|---------------|---------------|--------------|
| Assets | 26,116,815.00 | 25,533,531.00 | 583,284.00 |
| Cash & Cash Equivalents | 5,003,182.00 | 4,982,485.00 | 20,697.00 |
| Inventories | 9,025,081.00 | 8,761,907.00 | 263,174.00 |
| Accounts Receivable | 4,715,394.00 | 4,374,098.00 | 341,296.00 |
| Property, Plant & Equipment | 7,373,158.00 | 7,415,041.00 | 41,883.00 |
| Liabilities/Equity | 26,116,815.00 | 25,533,531.00 | 583,284.00 |
| Current Liabilities | 6,400,158.00 | 5,984,730.00 | 415,428.00 |
| Long-term Liabilities | 10,000,782.00 | 11,289,379.00 | 1,288,597.00 |
| Equity | 9,715,875.00 | 8,259,422.00 | 1,456,453.00 |
| Profit & Loss Statement | 3,433,353.00 | 2,983,945.00 | 449,408.00 |
| Net Income After Taxes | 3,433,353.00 | 2,983,945.00 | 449,408.00 |
| Income Before Taxes | 4,577,589.00 | 4,011,598.00 | 565,991.00 |
| Corporate Tax | 1,144,236.00 | 1,027,653.00 | 116,583.00 |

Balance Sheet

P&L statement

Comparison of current year to previous year

SAP AB1 (2) 905 ab1 INS

Figure 5-3 Balance sheet and income statement for Fitter Snacker in SAP ERP system

Accounting Activities (cont'd.)

- Managerial accounting
 - Determine costs and profitability of company's activities
 - Provide managers with detailed information
 - Informed decisions
 - Create budgets
 - Determine profitability
 - Information that managers use to control day-to-day activities, develop long-term plans

Using ERP for Accounting Information

- Problems associated with unintegrated systems
 - Data sharing usually did not occur in real time
 - Accounting's data were often out of date
 - Accounting personnel had to do significant research
- ERP system, with its centralized database, avoids these problems
- In traditional accounting, company's accounts are kept in a record called a **general ledger**

Using ERP for Accounting Information (cont'd.)

- In the SAP ERP system, input to general ledger occurs simultaneously with business transactions
- Many SAP ERP modules cause transaction data to be entered into general ledger, including:
 - Sales and Distribution (SD)
 - Materials Management (MM)
 - Financial Accounting (FI)
 - Controlling (CO)
 - Human Resources (HR)
 - Asset Management (AM)

Operational Decision-Making Problem: Credit Management

- Unintegrated information system
 - Out-of-date or inaccurate accounting data can cause problems when a company is making operational decisions
- Industrial credit management
- Fitter Snacker's credit management procedures
- Credit management in SAP ERP

Industrial Credit Management

- Credit management requires a good balance between:
 - Granting sufficient credit to support sales *and*
 - Making sure that the company does not lose too much money
- Setting a limit on how much money a customer can owe at any one time
 - Monitoring that limit as orders come in and payments are received

Industrial Credit Management (cont'd.)

- Sales representative needs to be able to review an up-to-date accounts receivable balance when an order comes in
- Problems arise if Marketing and Accounting have unintegrated information systems
 - Less than full cooperation on updates
- Problems should not arise with an integrated information system
 - Accounts receivable is immediately updated

Fitter Snacker's Credit Management Procedures

- FS sales clerk refers to a weekly printout of a customer's current balance and credit limit to see if credit should be granted
- Sales data are transferred to Accounting by disk three times a week
- Accounting clerk can use sales input to prepare a customer invoice
- Accounting must make any adjustments for partial shipments before preparing the invoice
- Accounting clerks process customer payments

Credit Management in SAP ERP

- SAP ERP would allow FS to set a credit limit for each customer
- Company can configure any number of credit-check options in SAP ERP system
- Advantages of using SAP ERP to manage credit
 - Process is automated
 - Data are available in real time

Table View Edit Goto Selection Utilities System Help

Change View "View for Maintenance of Automatic Credit Control": Detail

New Entries

CCA RxC CB Credit control Curr. Update
 FS Z00 01 Standard Credit Check USD 000012

Document controlling Released documents are still unchecked

No credit check ☐ Deviation in % ☐
☐ Item check Number of days ☐

Credit limit seasonal factor Checks in financial accounting/old A/R summary

☐ Minus From To ☐ Payer
 Permitted days ☐ Permitted hours ☐

Checks

| | Reaction | Status/Block | | |
|---|---------------------------------------|-------------------------------------|--------------------------------------|--|
| <input type="checkbox"/> Static | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> Open orders | <input type="checkbox"/> Open deliveries |
| <input checked="" type="checkbox"/> Dynamic | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> | Horizon | 2 M |
| <input type="checkbox"/> Document value | <input type="checkbox"/> | <input type="checkbox"/> | Max.doc.value | |
| <input type="checkbox"/> Critical fields | <input type="checkbox"/> | <input type="checkbox"/> | Number of days | <input type="checkbox"/> |
| <input type="checkbox"/> NextReview date | <input type="checkbox"/> | <input type="checkbox"/> | Max.open.item % | NoDays open <input type="checkbox"/> |
| <input type="checkbox"/> Open items | <input type="checkbox"/> | <input type="checkbox"/> | Days oldestItem | <input type="checkbox"/> |
| <input type="checkbox"/> OldestOpenItem | <input type="checkbox"/> | <input type="checkbox"/> | High.dunn.level | <input type="checkbox"/> |
| <input type="checkbox"/> High.dunn.level | <input type="checkbox"/> | <input type="checkbox"/> | | |
| <input type="checkbox"/> User 1 | <input type="checkbox"/> | <input type="checkbox"/> | | |
| <input type="checkbox"/> User 2 | <input type="checkbox"/> | <input type="checkbox"/> | | |
| <input type="checkbox"/> User 3 | <input type="checkbox"/> | <input type="checkbox"/> | | |

SAP

AB1 (5) 905 ab1 INS

Dynamic credit check with Reaction C selected

Two-month credit check horizon

Figure 5-5 Credit management configuration

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
- Main reasons for inaccurate or incomplete data
 - Inconsistent recordkeeping
 - Inaccurate inventory costing systems
 - Problems consolidating data from subsidiaries

Credit management Edit Goto Extras Environment System Help

Customer Credit Management Change: Overview

Administrative data

Customer: 201 Health Express
 Credit control area: FS FS Credit Control Area
 Currency: USD

| Status | | Dunning data | |
|-----------------|------------|----------------|---|
| Credit limit | 1,000.00 | Dunning Area | |
| Credit exposure | 590.00 | Last dunned | |
| Cred.Used | 59.00 % | Leg.dunn.proc. | |
| Horizon | 03/01/2012 | Dunning level | 0 |

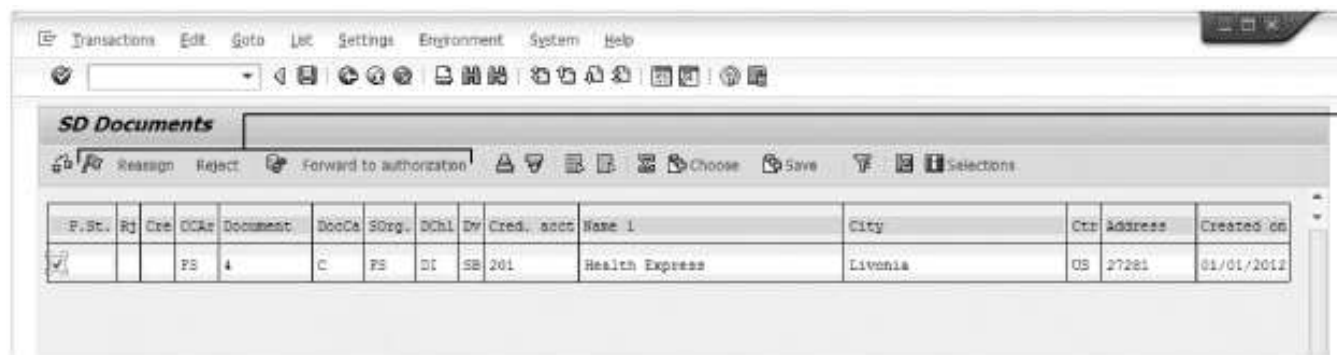
| Payment history/arrears | | Control | |
|-------------------------|----------|----------------------------------|--------------------------|
| With cash disc. | 0.00 0 | Risk category | 200 |
| W/o cash disc. | 0.00 0 | Last int.review | |
| | | <input type="checkbox"/> Blocked | |
| | | Cred.rep.grp | |
| | | Payment index | |
| | | Rating | |
| | | Last ext.review | |
| | | Monitoring | <input type="checkbox"/> |

| Payment data | |
|-----------------|------|
| DSO | 0 |
| Clearing amount | 0.00 |
| Author.deduct. | 0.00 |
| Unauthor.deduc. | 0.00 |

Credit limit

Amount of credit used

Figure 5-6 Credit management for Health Express



Options to release, reassign, reject, or forward a blocked sales order

Figure 5-7 Blocked sales order

Inconsistent Recordkeeping

- Each of FS's marketing divisions maintains its own records and keeps track of sales data differently
- Paper records might be inaccurate or missing, making validity of the final report questionable
- Without integrated information systems, accounting and reporting to management requires:
 - Working around limitations of information systems to produce useful output
- ERP system minimizes or eliminates these problems

Inaccurate Inventory Costing Systems

- Correctly calculating inventory costs
 - One of the most important and challenging accounting tasks in any manufacturing company
- Inventory cost accounting background
 - Manufactured item's cost has three elements:
 - Cost of raw materials
 - Cost of labor employed directly in production of item
 - **Overhead:** all other costs

Inaccurate Inventory Costing Systems (cont'd.)

- Inventory cost accounting background (cont'd.)
 - **Direct costs:** materials and labor
 - Can be estimated fairly accurately
 - **Indirect costs:** overhead items
 - Difficult to associate with specific product(s)
 - **Standard costs** for a product are established by:
 - Studying historical direct and indirect cost patterns
 - Taking into account the effects of current manufacturing changes
 - **Cost variances:** differences between actual costs and standard costs

Inaccurate Inventory Costing Systems (cont'd.)

- ERP and inventory cost accounting
 - Many companies with unintegrated accounting systems analyze their cost variances infrequently
 - Often, they do not know how much it actually costs to produce a unit of a product
 - If FS had an ERP system, employees throughout the company would have recorded costs in a company-wide database as they occurred
 - ERP system configurations allow analysts to track costs using many bases

Inaccurate Inventory Costing Systems (cont'd.)

- Product costing example
 - Suppose Fitter Snacker wishes to update standard costs for NRG-A bars
 - Product cost analysis for NRG-A bar
- Product cost analysis in SAP ERP
 - **Product cost variant:** method for developing a product cost in an ERP system

| NRG-A Bar Product Cost Analysis (7 cases) | | | | |
|---|-----------------|-------|--------------------------|----------------------|
| Ingredient | Unit of measure | NRG-A | Cost per unit of measure | Direct material cost |
| Oats | lb | 300 | \$0.20 | \$60.00 |
| Wheat germ | lb | 50 | \$0.30 | \$15.00 |
| Cinnamon | lb | 5 | \$3.00 | \$15.00 |
| Nutmeg | lb | 2 | \$4.50 | \$9.00 |
| Cloves | lb | 1 | \$5.50 | \$5.50 |
| Honey | gal | 10 | \$6.40 | \$64.00 |
| Canola | gal | 7 | \$1.70 | \$11.90 |
| Vit./min. powder | lb | 5 | \$18.45 | \$92.25 |
| Carob chips | lb | 50 | \$2.10 | \$105.00 |
| Raisins | lb | 50 | \$3.20 | \$160.00 |
| Total direct material cost | | | | \$537.65 |
| Production overhead cost (100% of Total direct material) | | | | \$537.65 |
| Direct labor | | | | 54.50 |
| Cost of goods manufactured (COGM) | | | | 1,129.80 |
| Sales and administrative costs (30% of COGM) | | | | 338.94 |
| Cost of goods sold (COGS) | | | | 1,468.74 |
| | | | | |
| COGM per case | | | | \$161.40 |
| COGS per case | | | | \$209.82 |

Figure 5-8 Product cost analysis for NRG-A bar

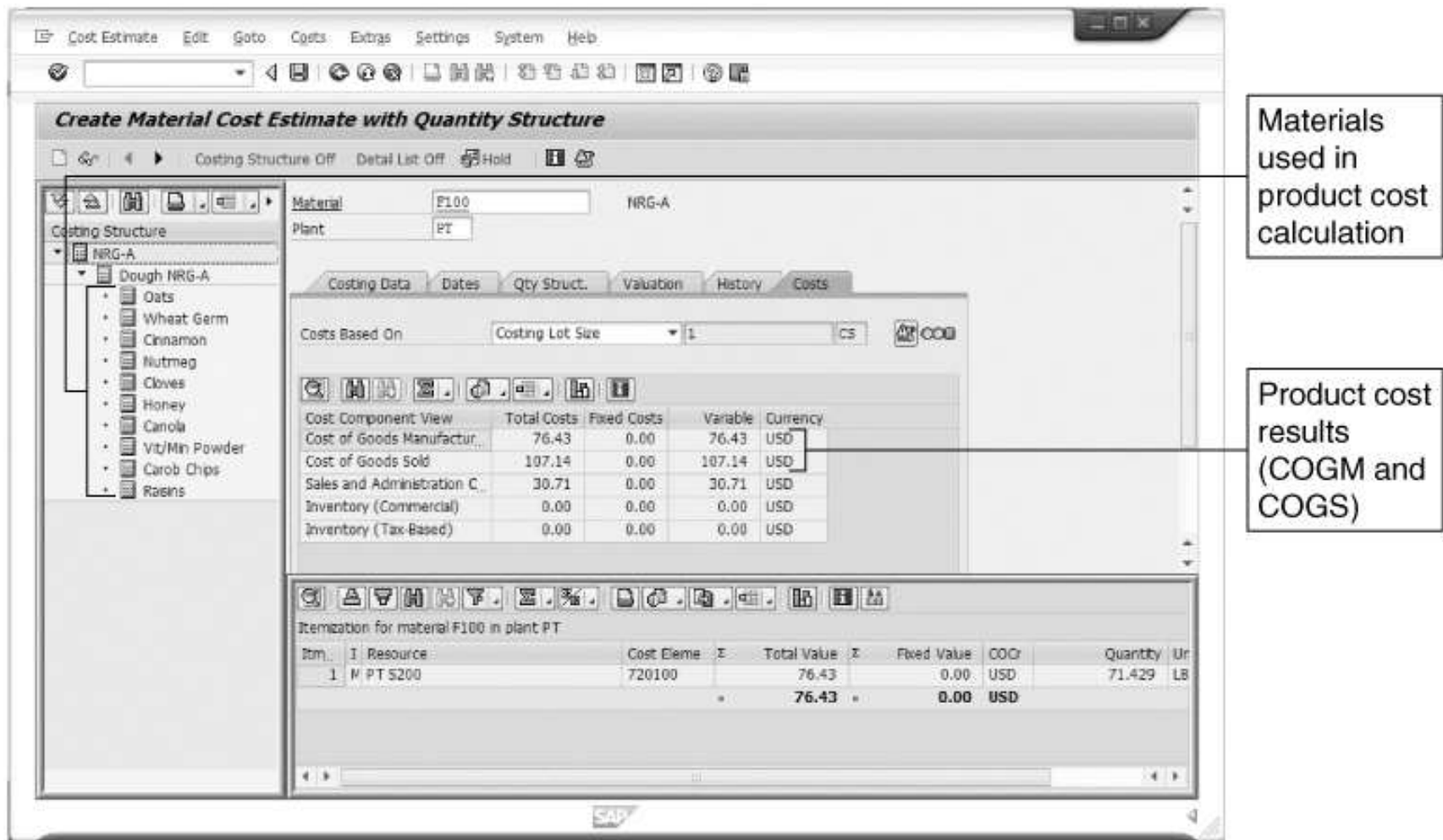


Figure 5-9 Product cost analysis result in SAP ERP

Inaccurate Inventory Costing Systems (cont'd.)

- Activity-based costing and ERP
 - **Activity-based costing (ABC)**
 - Accountants identify activities associated with overhead cost generation and then keep records on costs *and* on activities
 - ABC requires more bookkeeping than traditional costing methods

Companies with Subsidiaries

- Account balances for each entity must be compiled and forwarded to the home office
- Consolidated statement for the company as a whole must be created
- Currency translation
 - Problems when **currency translation** is needed for a subsidiary's accounts
- Intercompany transactions
 - Transactions that occur between companies and their subsidiaries

Management Reporting with ERP Systems

- Generating the right reports for the right situation is often challenging
- Without an ERP system, the job of tracking all the numbers that need to go into a report is a monumental undertaking
- With ERP system, vast amount of information is available for reporting purposes

Document Flow for Customer Service

- With an ERP system, all transactions in all areas of a company get posted in a centralized database
- Each transaction posted in SAP ERP gets its own unique document number
 - Allows quick access to the data
- In SAP ERP, document numbers for related transactions are associated in the database
 - Provides an electronic audit trail

Document Flow for Customer Service (cont'd.)

The screenshot shows the SAP ERP 'Document Flow' (DF) interface. At the top is a menu bar with 'Document flow', 'Edit', 'Goto', 'Environment', 'System', and 'Help'. Below the menu is a toolbar with various icons. The main header area displays 'Document Flow' and navigation options: 'Status overview', 'Display document', 'Service documents', and 'Additional links'. The business partner information is shown as 'Business partner 0000000051 West Hills Athletic Club'. Below this is a table of documents. The table has columns for 'Document', 'On', and 'Status'. The documents are listed in a hierarchical tree structure, starting with 'Standard Order 0000000120' and branching into 'Outbound Delivery 0080000060', which further branches into 'Picking request 20120108', 'GD goods issue:delvy 4900000171', 'Invoice 0090000048', and 'Accounting document 0090000000'. Each document entry includes its date ('01/08/2012') and status ('Completed' or 'Cleared').

| Document | On | Status |
|---------------------------------|------------|-------------------|
| Standard Order 0000000120 | 01/08/2012 | Completed |
| Outbound Delivery 0080000060 | 01/08/2012 | Completed |
| Picking request 20120108 | 01/08/2012 | Completed |
| GD goods issue:delvy 4900000171 | 01/08/2012 | complete |
| Invoice 0090000048 | 01/08/2012 | FI doc. generated |
| Accounting document 0090000000 | 01/08/2012 | Cleared |

Figure 5-10 Document flow of a transaction in SAP ERP

Built-In Management-Reporting and Analysis Tools

- Accounting records maintained in the common database
- Advantage of using a database is the ability to query the records to:
 - Produce standard reports
 - Answer ad hoc questions
- SAP provides a **data warehouse** within each major module
 - Data warehouse: repository for data from various sources

The Enron Collapse

- October 16, 2001: Enron was one of the world's largest electricity and natural gas traders
 - Reported a \$618 million third-quarter loss and disclosed a \$1.2 billion reduction in shareholder equity
- U.S. Securities and Exchange Commission (SEC) inquiry into possible conflict of interest related to company's dealings with partnerships run by CFO Fastow

The Enron Collapse (cont'd.)

- Volume of financial contracts was far greater than volume of contracts to actually deliver commodities
- Some partnerships were faked to mask billions of dollars in debt
- Enron's financial statements had been audited by Arthur Andersen, a highly regarded accounting firm
- Andersen employees on the Enron engagement team were instructed to destroy documentation relating to Enron

Outcome of the Enron Scandal

- Shareholders lost an estimated \$40 billion dollars
- Thousands of workers lost their jobs
- 31 individuals were either charged or pled guilty to criminal charges
- Jurors convicted accounting firm Arthur Andersen for obstructing justice by destroying Enron documents
- U.S. Congress passed Sarbanes-Oxley Act of 2002
 - Act was designed to prevent the kind of fraud and abuse that led to the Enron downfall

Key Features of the Sarbanes-Oxley Act

- Designed to encourage top management accountability in firms that are publicly traded in the United States
- Title IX
 - Financial statements filed with the Securities and Exchange Commission must include a statement signed by the chief executive officer and chief financial officer, certifying that the financial statement complies with SEC rules

Key Features of the Sarbanes-Oxley Act (cont'd.)

- Title II
 - Auditor independence
 - Limits non-audit services that an auditor can provide
- Title IV
 - More stringent requirements for financial reporting

Implications of the Sarbanes-Oxley Act for ERP Systems

- To meet the internal control report requirement, a company must:
 - Document the controls that are in place
 - Verify that the controls are not subject to error or manipulation
- Companies with ERP systems in place will have an easier time complying with the Sarbanes-Oxley Act than will companies without ERP

Archiving

- SAP ERP software offers very few ways to delete items
- Data are removed from SAP ERP system only after they have been recorded to media (tape backup, DVD-R) for permanent storage
- **Archive:** permanent storage
- SAP ERP systems keep track of when data are created or changed
 - Change Record

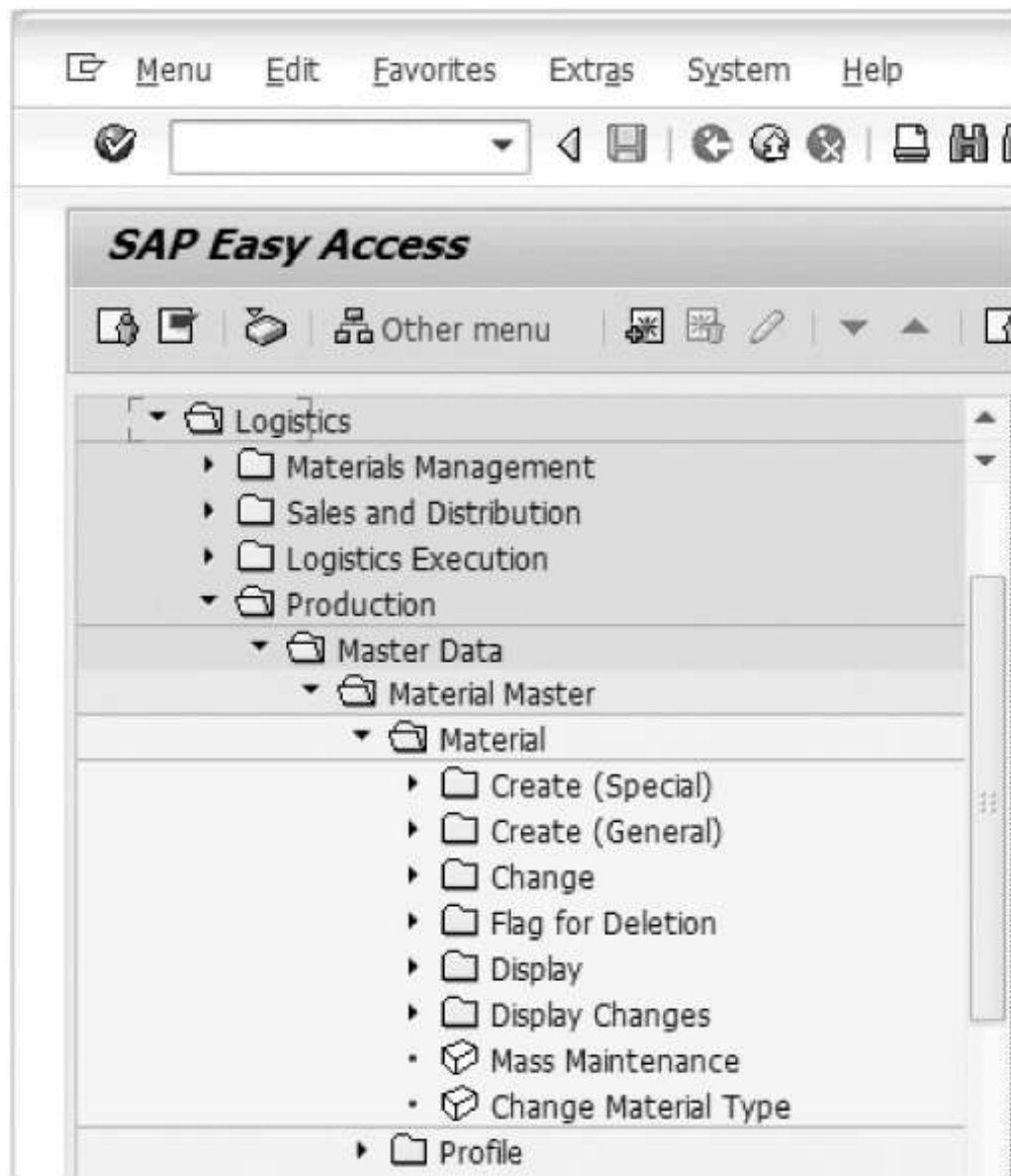


Figure 5-11 Transaction options for material master data

Archiving (cont'd.)

Change Material 00R380 (Basic Data 1, Raw materials)

Material R380 Oats
Industry sector 1 Retail
Material type ROH Raw materials
Low-level code 002
Created by BRET on 07/12/04
Last changed by AUDREY on 02/01/12

Status information:

No deletion flags or locks exist

Client level:

| Status description | Created On | Created by | Last Chg. | Changed by |
|--------------------|------------|------------|------------|------------|
| Purchasing | 07/12/2004 | CHARLES | 01/08/2008 | CHARLES |
| Basic data | 07/14/2004 | CINDY | 04/28/2010 | CINDY |
| Storage | 08/11/2004 | AUDREY | 02/01/2012 | AUDREY |

✓ [icon] [icon] [icon] [icon] [icon]

Figure 5-12 Change Record for material master

User Authorizations

- SAP ERP has sophisticated user administration tools that allow different levels of authorization management
 - Ensure that employees can perform only the transactions required for their jobs
- Profile Generator
 - Provides a simple method for selecting functions that a user should be allowed to perform

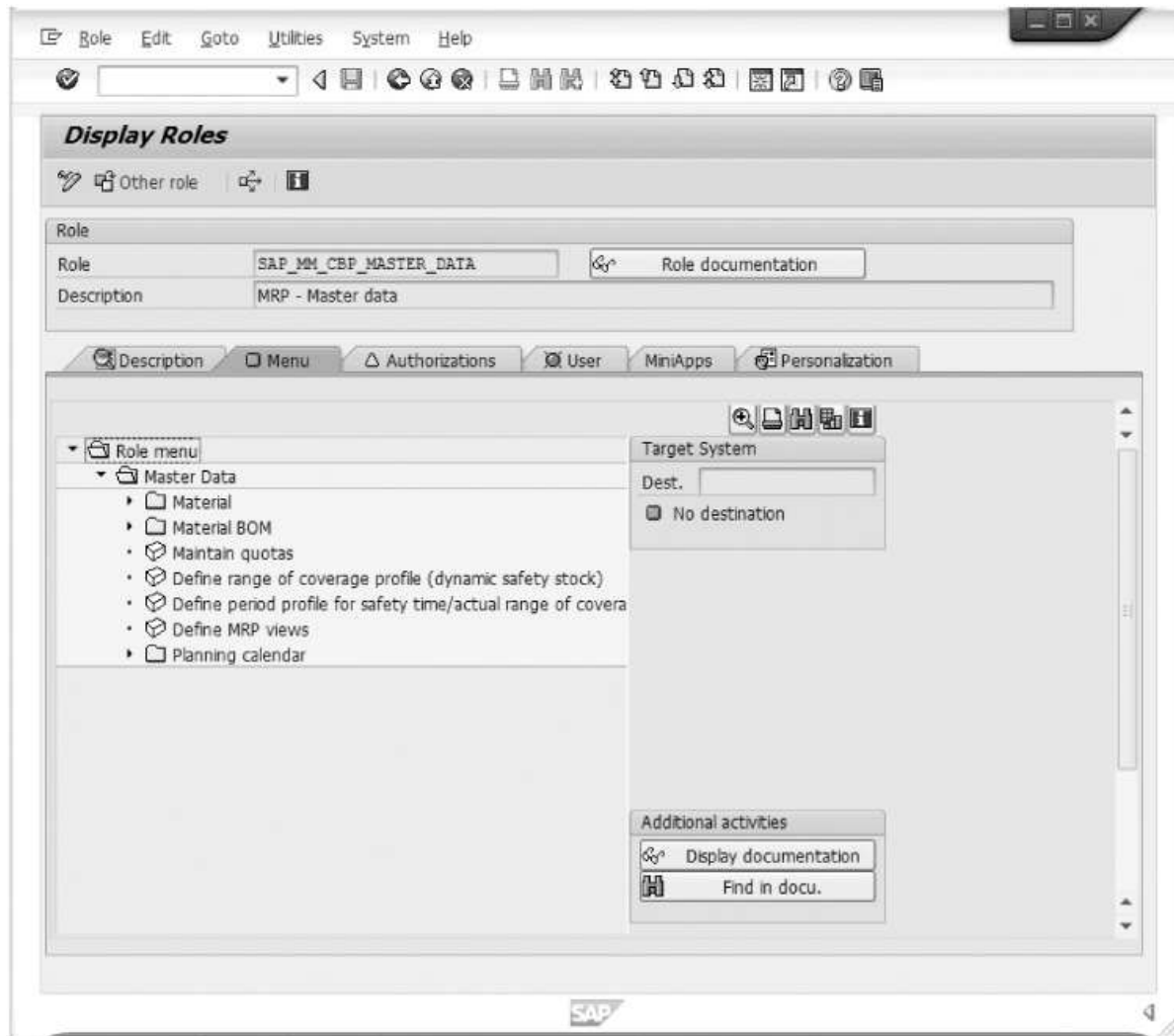


Figure 5-13 Display Roles screen in SAP

Tolerance Groups

- Setting limits on the size of transaction an employee can process
 - In an SAP ERP system, this is done using tolerance groups
- Tolerance groups
 - Preset limits on an employee's ability to post transactions
 - Set limits on the dollar value for a single item in a document as well as the total value of document

Table View Edit Goto Selection Utilities System Help

Change View "FI Tolerance Groups For Users": Details

New Entries

Group

Company code FS Fitter Snacker Kalamazoo

Currency USD

Upper limits for posting procedures

| | |
|-----------------------------------|---------------------------------------|
| Amount per document | <input type="text" value="1,000.00"/> |
| Amount per open item account item | <input type="text" value="1,000.00"/> |
| Cash discount per line item | <input type="text" value="2.000 %"/> |

Permitted payment differences

| | Amount | Percent | Cash discnt adj.to |
|---------|------------------------------------|------------------------------------|------------------------------------|
| Revenue | <input type="text" value="10.00"/> | <input type="text" value="1.0 %"/> | <input type="text" value="10.00"/> |
| Expense | <input type="text" value="10.00"/> | <input type="text" value="1.0 %"/> | <input type="text" value="10.00"/> |

No group specified, so this is the default tolerance

Default setting allows posting of documents for \$1,000 or less

Payments can differ by \$10 or 1%

Figure 5-14 Default tolerance group

Financial Transparency

- ERP systems provide the ability to drill down from a report to the source documents (transactions) that created it
 - Makes it easier for auditors to confirm the integrity of reports
- With a properly configured and managed ERP system, there are direct links between the company's financial statements and individual transactions that make up the statements
 - Fraud and abuse can be detected more easily

Report Edit Goto Navigate Extras Settings System Help

Execute G/L Account - Balances: Overview

Navigation

Segment

Profit Center

Business Area

Functional Area

Currency Type Document currency

Currency US Dollar

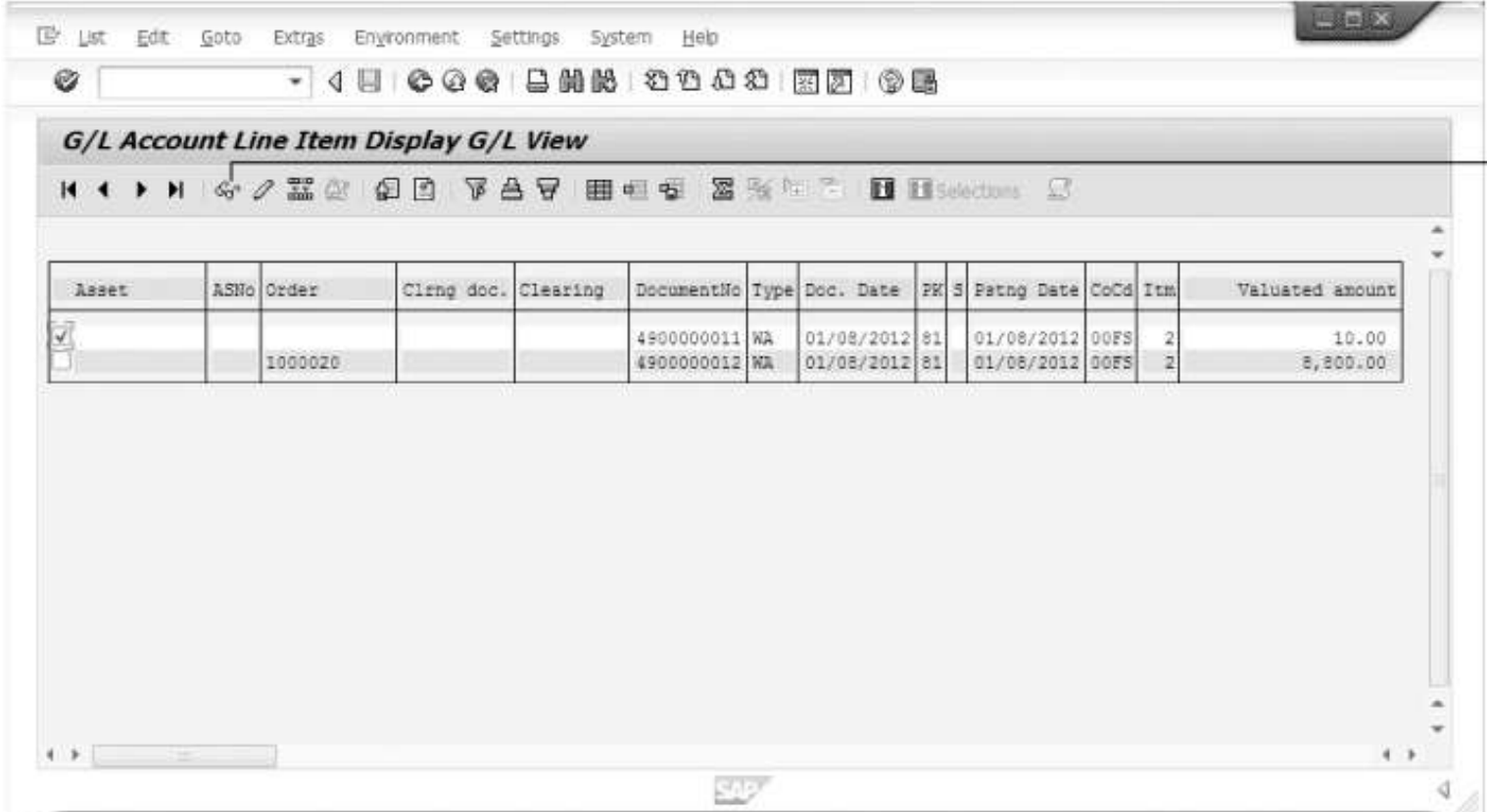
Current data (01/05/2012 16:38:10)

| Account | Balance Car | Balance previous pe | Cumulated B Previous Pe | Debit Total Per. 1- 12 | Credit Total Per. 1- | Cumulated Debit Bal | Cumulated Credit Bal | Accumulated Balance |
|----------------------------------|-------------|---------------------|-------------------------|------------------------|----------------------|---------------------|----------------------|---------------------|
| Raw Material Consumption Expense | 0.00 | 0.00 | 0.00 | 8,810.00 | 0.00 | 8,810.00 | 0.00 | 8,810.00 |
| Result | 0.00 | 0.00 | 0.00 | 8,810.00 | 0.00 | 8,810.00 | 0.00 | 8,810.00 |

SAP

Figure 5-15 G/L (general ledger) account balance for raw material consumption

Financial Transparency (cont'd.)



G/L Account Line Item Display G/L View

Detail button

| Asset | ASNo | Order | Cleng doc. | Clearing | DocumentNo | Type | Doc. Date | PK | S | Prng Date | CoCd | Itm | Valuated amount |
|-------------------------------------|------|---------|------------|----------|------------|------|------------|----|---|------------|------|-----|-----------------|
| <input checked="" type="checkbox"/> | | | | | 4900000011 | WA | 01/08/2012 | 81 | | 01/08/2012 | 00FS | 2 | 10.00 |
| | | 1000020 | | | 4900000012 | WA | 01/08/2012 | 81 | | 01/08/2012 | 00FS | 2 | 8,800.00 |

Figure 5-16 Documents that make up G/L account balance for raw material consumption

Financial Transparency (cont'd.)

The screenshot displays the SAP 'Display Document: Line Item 002' interface. The window title is 'Display Document: Line Item 002'. Below the title bar, there is a menu bar with options: Document, Edit, Goto, Extras, Environment, System, and Help. A toolbar with various icons is located below the menu bar. The main content area is divided into several sections:

- Header Section:** Contains fields for G/L Account (720000), Raw Material Consumption Expense, Company Code (FS), Fitter Snacker, and Doc. no. (4900000011).
- Line Item Section:** Displays 'Line Item 2 / Costs / 81' with an Amount of 10.00 USD.
- Additional Account Assignments Section:** A table-like structure with fields for Business Area, Cost Center (R010), Sales Order, WBS Element, Cost Object, Purchasing Doc. (0), Quantity (50), Value date, Assignment (20120108), Trdg part.BA, Order, Asset, and Network. A 'More' button is visible next to the Cost Object field.
- Text Field:** A 'Text' field with a 'Long text' button.

The SAP logo is visible in the bottom right corner of the window.

Figure 5-17 Details on \$10.00 line item in G/L account for raw material consumption

Trends in Financial Reporting (XBRL)

- Extensible Business Reporting Language (XBRL)
 - Standards based language
 - Extensible Markup Language (XML) coded data directly from web page into database
 - Reports processed faster and validated easier
 - ERP systems accept data in XML and XBRL

Summary

- Companies need accounting systems to record transactions and generate financial statements
- Unintegrated information systems
 - Accounting data might not be current
 - Can cause problems for sales representatives trying to make operational decisions
 - Data can be inaccurate
 - Can affect decision making and therefore profitability

Summary (cont'd.)

- Closing the books at the end of an accounting period can be difficult with an unintegrated IS, but is relatively easy with an integrated IS
 - Closing the books means zeroing out temporary accounts
- Using an integrated IS and a common database to record accounting data has important inventory cost-accounting benefits
 - Can lead to more accurate product cost calculations
 - Can help managers determine which products are profitable and which are not

Summary (cont'd.)

- Use of an integrated system and a common database to record accounting data has important management-reporting benefits
 - Built-in drill-down and query tools available
- Sarbanes-Oxley Act, 2002 U.S. federal regulation
 - Written and passed in the wake of Enron collapse
 - Promoted management accountability by requiring extra financial approval and reporting
 - ERP systems can help companies meet the requirements of this legislation

Summary (cont'd.)

- Trends in financial reporting
 - XBRL
 - XML
 - ERP systems accept data in XML and XBRL into database

Concepts in Enterprise Resource Planning

Fourth Edition

Chapter Six

Human Resources Processes with ERP

Dr.A.Sasi Kumar

Objectives

After completing this chapter, you will be able to:

- Explain why the Human Resources function is critical to the success of a company
- Describe the key processes managed by a Human Resources department
- Describe how an integrated information system can support effective Human Resources processes

Introduction

- **Human capital management (HCM):** tasks associated with managing a company's workforce
- Human Resources (HR) department responsibilities
 - Attracting, selecting, and hiring new employees
 - Communicating information regarding new positions and hires
 - Ensuring proper education, training, and certification for employees
 - Handling issues related to employee conduct
 - Making sure employees understand job responsibilities

Introduction (cont'd.)

- Human Resources (HR) department responsibilities (cont'd.)
 - Using effective process to review employee performance and determine salary increases and bonuses
 - Managing salary and benefits for each employee
 - Communicating changes in salaries, benefits, or policies to employees
 - Supporting management plans for changes in the organization

Problems with Fitter Snacker's Human Resources Processes

- Personnel management relies on paper records and a manual filing system
 - Creates problems
 - Information is not readily accessible or easy to analyze

Recruiting Process

- Fitter Snacker (FS) has three employees in its HR department
- Problems occur because of:
 - Large number of HR processes (from hiring and firing to managing health benefits)
 - Lack of integration among all departments
 - Number of people with whom HR interacts
 - Inaccurate, out-of-date, and inconsistent information

Recruiting Process (cont'd.)

- Problems that can arise in the recruiting process:
 - Description of qualifications required for the job may be incomplete or inaccurate
 - Job vacancy form may be lost or not routed properly
 - Human Resources department will not know that the position is available
 - Supervisor will assume that paperwork is in process
- Filing and properly keeping track of resumes and applications is a challenge at Fitter Snacker
 - Due to applicant's data being kept on paper form

The Interviewing and Hiring Process

- At FS, requesting department develops a short list of candidates based on data provided by HR
- Human Resources department:
 - Contacts candidates on the short list
 - Schedules interviews
 - Creates a file for each candidate
- If a candidate accepts an interview offer, HR makes arrangements for the interview
 - After the initial interview, HR updates candidate's file to indicate whether he or she is a possibility for hire

The Interviewing and Hiring Process (cont'd.)

- Second interview may be scheduled
- HR representative and supervisor of requesting department decide which candidates are acceptable and rank them
- HR person makes the highest-ranking candidate a job offer
- Acceptance of job offer by candidate

The Interviewing and Hiring Process (cont'd.)

- Many of Fitter Snacker's problems in interviewing and hiring process deal with information flow and communication
- After candidate accepts formal job offer, Fitter Snacker hires an HR consulting firm to perform a background check
- Fitter Snacker frequently has problems enrolling new employees in correct benefits plans and establishing proper payroll deductions

Human Resources Duties after Hiring

- HR department should maintain good, continual communication with employee and supervisor to make sure the employee is performing well
- Fitter Snacker issues performance evaluations to new and current employees
 - Evaluation documents become part of employee's file; maintained by HR department

Human Resources Duties after Hiring (cont'd.)

- Not having an effective information system makes it difficult for Fitter Snacker:
 - To manage all of the performance evaluation data
 - For HR department to identify problems with an employee and take corrective action
 - To maintain proper control of sensitive personal information

Human Resources Duties after Hiring (cont'd.)

- Employee turnover can be a significant problem
 - Costs related to hiring and training new employees
 - Companies lose knowledge and skills that may be crucial to keeping them competitive
 - Employee turnover is strongly related to job satisfaction and compensation

Human Resources with ERP Software

The screenshot displays the SAP Human Resources software interface for displaying personal data. The window title is "Display Personal Data". The menu bar includes "Infotype", "Edit", "Goto", "Extras", "System", and "Help". The toolbar contains various icons for navigation and actions. On the left, a "Find by" sidebar shows options: "Person", "Collective search help", "Search Term", and "Free search". The main data area is divided into sections: "Personnel No." (6), "Name" (Ms Shae...), "Status" (Active), "EE group" (1), "Personnel ar" (FS), "Filter Snacker Personnel", "EE subgroup" (AA Salaried employees), "SSN" (363-18-4021), "Start" (08/13/1998), "To" (12/31/9999), "Changed on" (11/14/2011), and "BRET". Below this, the "Name" section includes fields for "Title" (Ms), "Name Format" (00), "Last name" (Heusinkveld), "Birth name", "First name" (Shaelee), "Middle name", "Initials" (SMH), "Designation", "Suffix", "Nickname", and a combined "Name" field (Ms Shaelee Heusinkveld). The "HR data" section includes "SSN" (363-18-4021), "Date of Birth" (03/18/1968), "Language" (English), "Nationality" (American US), "Marital Status" (Single), and "Gender" (Female, Male, Undeclared).

| Field | Value |
|--------------------------|------------------------|
| Personnel No. | 6 |
| Name | Ms Shae... |
| Status | Active |
| EE group | 1 |
| Personnel ar | FS |
| Filter Snacker Personnel | |
| EE subgroup | AA Salaried employees |
| SSN | 363-18-4021 |
| Start | 08/13/1998 |
| To | 12/31/9999 |
| Changed on | 11/14/2011 |
| BRET | |
| Title | Ms |
| Name Format | 00 |
| Last name | Heusinkveld |
| Birth name | |
| First name | Shaelee |
| Middle name | |
| Initials | SMH |
| Designation | |
| Suffix | |
| Nickname | |
| Name | Ms Shaelee Heusinkveld |
| SSN | 363-18-4021 |
| Date of Birth | 03/18/1968 |
| Language | English |
| Nationality | American US |
| Marital Status | Single |
| Gender | Female |

Figure 6-1 Personal data stored in SAP Human Resources software

Human Resources with ERP Software

- A good information system allows all relevant information for an employee to be retrieved in a matter of seconds
- SAP ERP Human Resources (HR) module provides tools for:
 - Managing an organization's roles and responsibilities
 - Definitions
 - Personal employee information
 - Tasks related to time management, payroll, travel management, and employee training

Human Resources with ERP Software (cont'd.)

- SAP ERP's Organization and Staffing Plan tool used to define:
 - Company's management structure
 - Positions within the organizational structure
- SAP ERP distinguishes between **task**, **job**, **position**, and **person**
- Manager's Desktop tool within SAP HR module
 - Provides access to all Human Resources data and transactions in one location

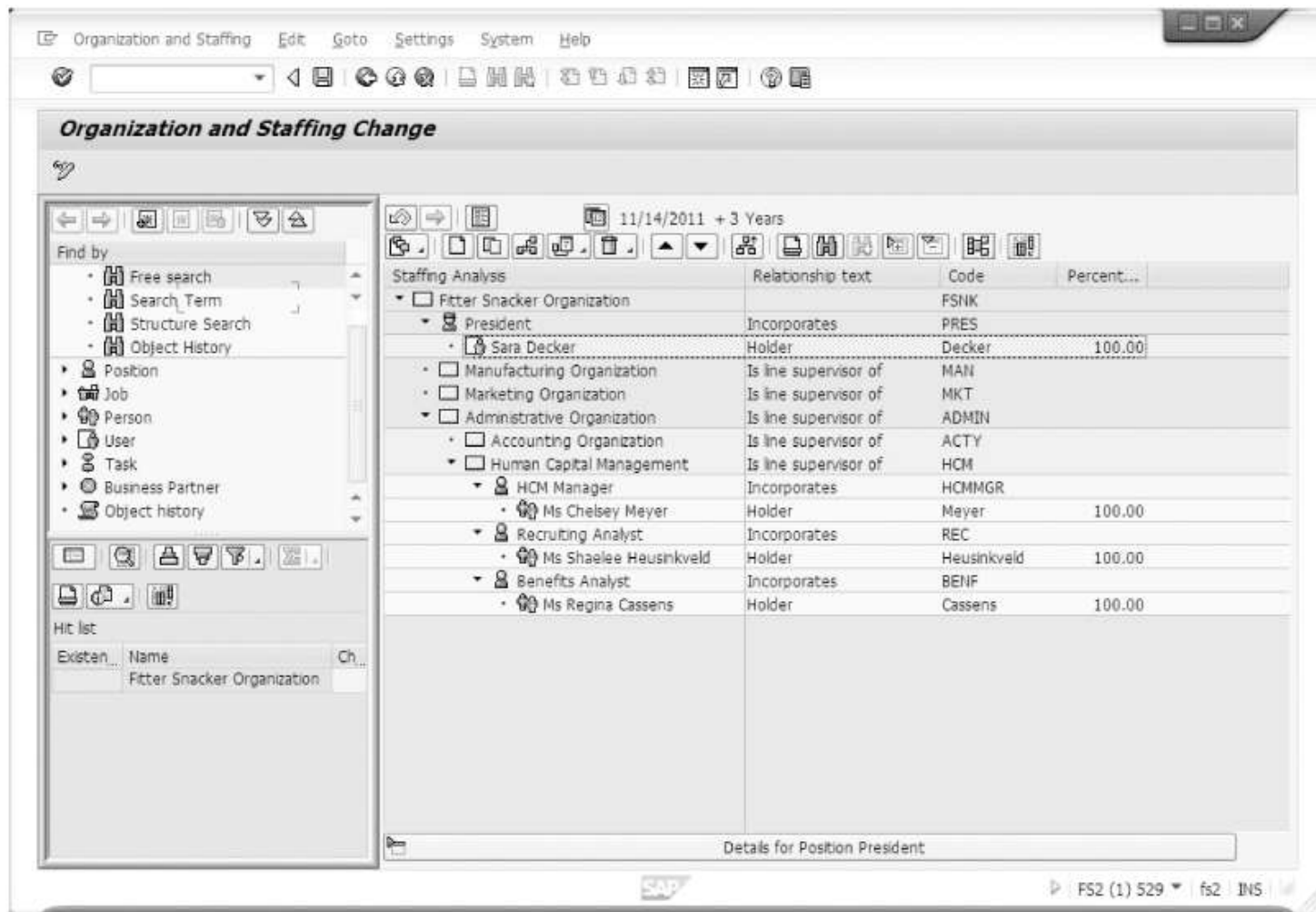


Figure 6-2 Organization and staffing plan in SAP ERP

Human Resources with ERP Software (cont'd.)



Figure 6-3 Relationships among positions, jobs, tasks, and persons who fill positions

Human Resources with ERP Software (cont'd.)

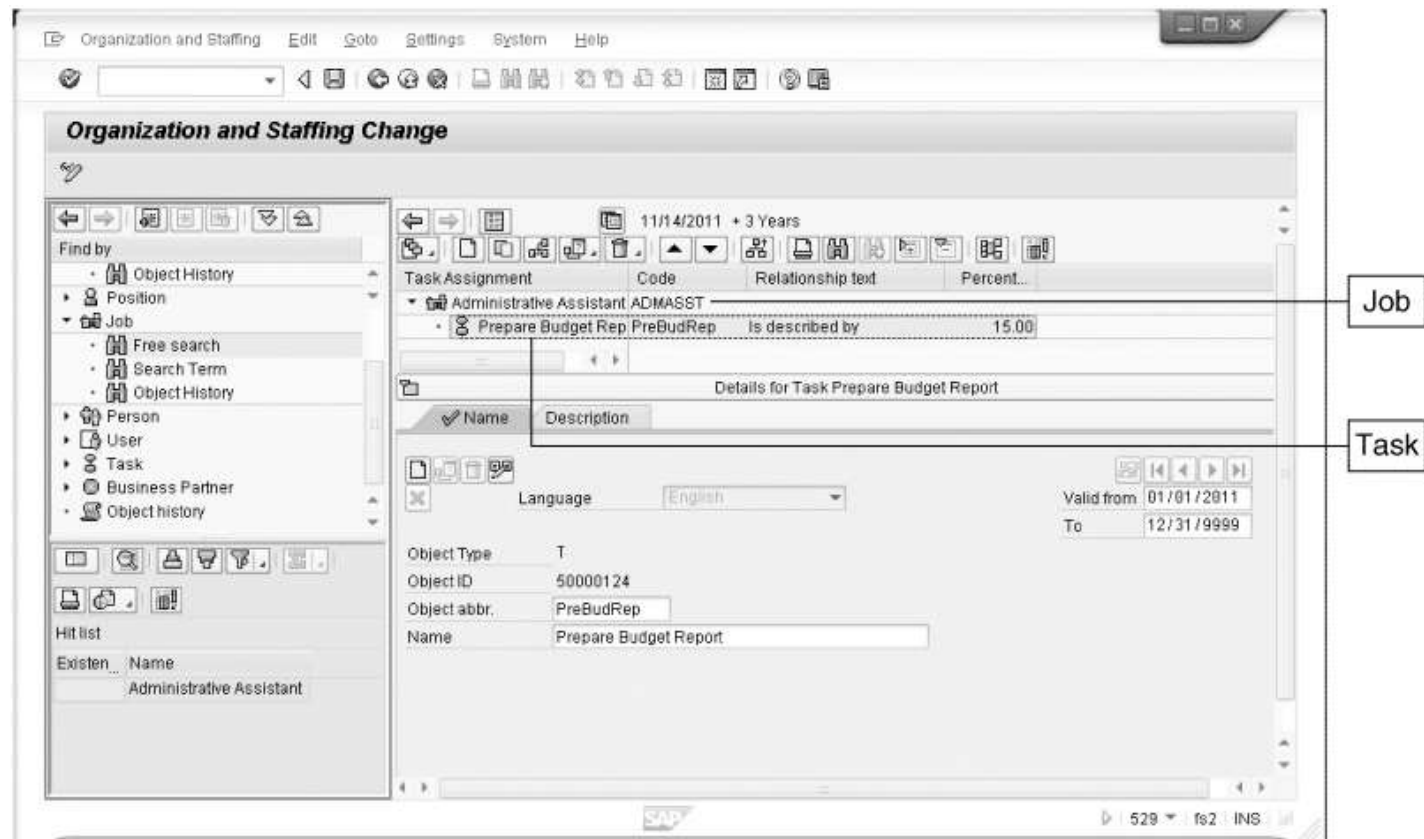


Figure 6-4 Assignment of a task to a job in SAP ERP

Human Resources with ERP Software (cont'd.)

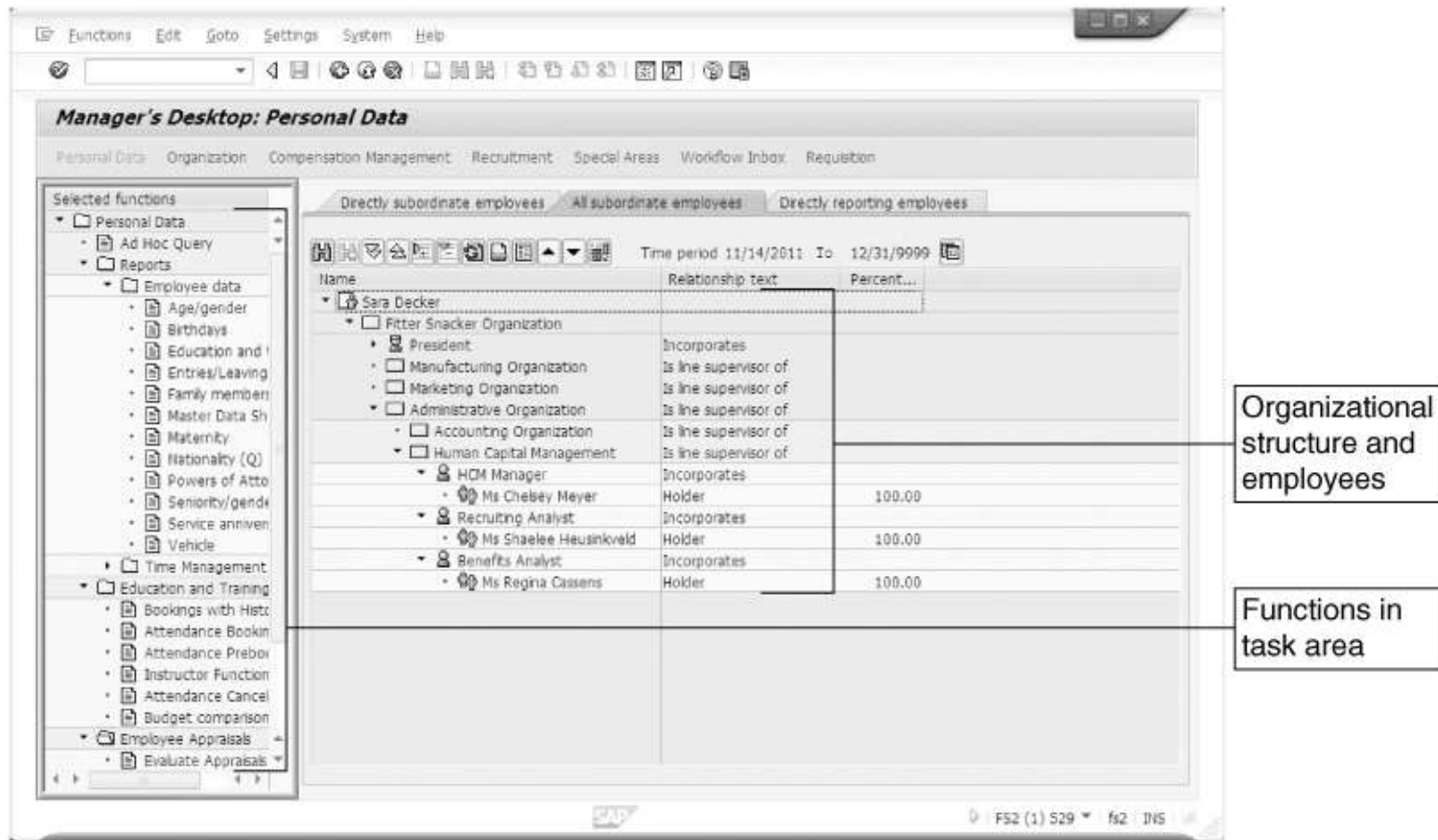


Figure 6-5 Manager's Desktop provides single-point access to HR functions

Advanced SAP ERP Human Resources Features

- Time management
- Payroll processing
- Travel management
- Training and development

Time Management

- Hourly employees
 - Paid for each hour worked
 - Must record time that they work
- Salaried employees
 - Not paid based on hours worked
 - Their time worked usually must be tracked as well

Time Management (cont'd.)

- SAP ERP system uses Cross Application Time Sheets (CATS) to:
 - Record employee working times
 - Provide the data to applications including:
 - SAP Controlling module
 - SAP Payroll module
 - SAP Production Planning module

Payroll

- **Remuneration elements** of an employee's pay
 - Base pay, bonuses, gratuities, overtime, sick pay, and vacation allowances
- **Statutory and voluntary deductions**
 - Taxes (federal, state, local, Social Security, and Medicare), company loans, and benefit contributions
- **Payroll run:** process of determining each employee's pay
 - SAP ERP system evaluates input data and notes any discrepancies in **error log**

Travel Management

- Travel request may originate with employee or employee's manager
- Travel requests usually require management approval
- Once travel request is approved, travel reservations must be made

Travel Management (cont'd.)

- SAP ERP Travel Management system
 - Maintains travel data for each employee, including flight, hotel, and car preferences
 - Integrates travel data with:
 - Payroll module for reimbursements
 - Financial Accounting and Controlling modules to properly record travel expenses

Training and Development

- In SAP ERP system, employee development is driven by qualifications and requirements
 - **Requirements:** skills or abilities associated with a position
 - **Qualifications:** skills or abilities associated with a specific employee
- One of the most important reasons for managing the development and training of employees is **succession planning**

Training and Development (cont'd.)

- Succession plan outlines strategy for replacing key employees when they leave the company
- Career and Succession Planning components of SAP ERP Human Resources module
 - Allow HR professionals to create, implement, and evaluate succession planning scenarios

Additional Human Resources Features of SAP ERP

- Mobile time management
- Management of family and medical leave
- Domestic partner handling
- Administration of long-term incentives
- Personnel cost planning
- Management and payroll for global employees
- Management by objectives

Mobile Time Management

- Many employees may not have regular access to a PC
- Mobile Time Management allows employees to use cellular phones to:
 - Record their working times
 - Record absences
 - Enter a leave request
 - Check their time charge data

Management of Family and Medical Leave

- Human Resources module reduces administrative burden imposed by Family and Medical Leave Act (FMLA) of 1993
- HR system can:
 - Determine whether an employee is eligible to take FMLA absences
 - Automatically deducts those absences from the days the employee takes from allowable leave

Domestic Partner Handling

- Human Resources module now supports the management of benefits for domestic partners and their children
- Provides more flexibility in:
 - Customizing dependent coverage options for health plans
 - Eligibility for enrollment of dependents
 - Designation of beneficiaries

Administration of Long-Term Incentives

- Companies must account for expected costs that occur as a result of long-term incentives such as the exercising of stock options
- Human Resources module now provides more options for processing long-term incentives
 - Integration with SAP Payroll module
 - Can calculate taxes accurately when employees exercise incentives and sell their shares in the company
 - SAP can share incentive data with Accounting

Personnel Cost Planning

- Personnel Cost Planning tool
 - Allows HR personnel to define and evaluate planning scenarios to generate cost estimates
- Performing cost planning and simulation
 - Allows HR to forecast cost estimates by integrating data with other SAP ERP modules

Management and Payroll for Global Employees

- Management of global employees involves many complicated issues
 - Relocation plans, visas and work permits, housing, taxes, bonus pay
- SAP ERP has enhanced features to support the management of these issues
 - Customized functionality for more than 50 countries

Management by Objectives

- Management by objectives (MBO)
 - 1954: first outlined by Peter Drucker in *The Practice of Management*
 - Managers 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

Management by Objectives (cont'd.)

- SAP ERP provides a comprehensive process to support the MBO approach
 - Performance appraisals
 - Appraisal results can affect employee's compensation
 - Managers can include results of achieved objectives in the employee's qualifications profile

Summary

- Employees are among a company's most important assets
 - Without qualified and motivated employees, a company cannot succeed
- Human Resources department responsible for:
 - Ensuring that the company can find, evaluate, hire, develop, evaluate, and compensate the right employees to achieve the company's goals
 - Employee training and development, succession planning, and termination

Summary (cont'd.)

- Managing, sharing, controlling, and evaluating the data required to manage a company's human capital are simplified by an integrated information system
- Additional features of SAP HR systems address today's changing technology and legislation

Concepts in Enterprise Resource Planning

Fourth Edition

Chapter Seven

Process Modeling, Process Improvement, and ERP Implementation

Dr.A.Sasi Kumar

Objectives

After completing this chapter, you will be able to:

- Use basic flowcharting techniques to map a business process
- Develop an event process chain (EPC) diagram of a basic business process
- Evaluate the value added by each step in a business process

Objectives (cont'd.)

- Develop process improvement suggestions
- Discuss the key issues in managing an ERP implementation project
- Describe some of the key tools used in managing an ERP implementation project

Introduction

- Tools that can be used to describe business processes
 - Flowcharts, event process chains
 - Not specific to ERP
 - Can help managers identify process elements that can be improved
- Role of process-modeling tools in ERP implementation projects

Process Modeling

- Business processes can be quite complex
- **Process model:** any abstract representation of a process
- Process-modeling tools provide a way to describe a business process so that all participants can understand the process

Process Modeling (cont'd.)

- Advantages of process models
 - Graphical representations are usually easier to understand than written descriptions
 - Provide a good starting point for analyzing a process
 - Participants can design and implement improvements
 - Document the business process
 - Easier to train employees to support the business process

Flowcharting Process Models

- **Flowchart**
 - Any graphical representation of the movement or flow of concrete or abstract items
 - Clear, graphical representation of a process from beginning to end
 - Uses a standardized set of symbols
- **Process mapping**
 - Often used interchangeably with flowcharting
 - Specifically refers to activities occurring within an *existing* business process

Flowcharting Process Models (cont'd.)

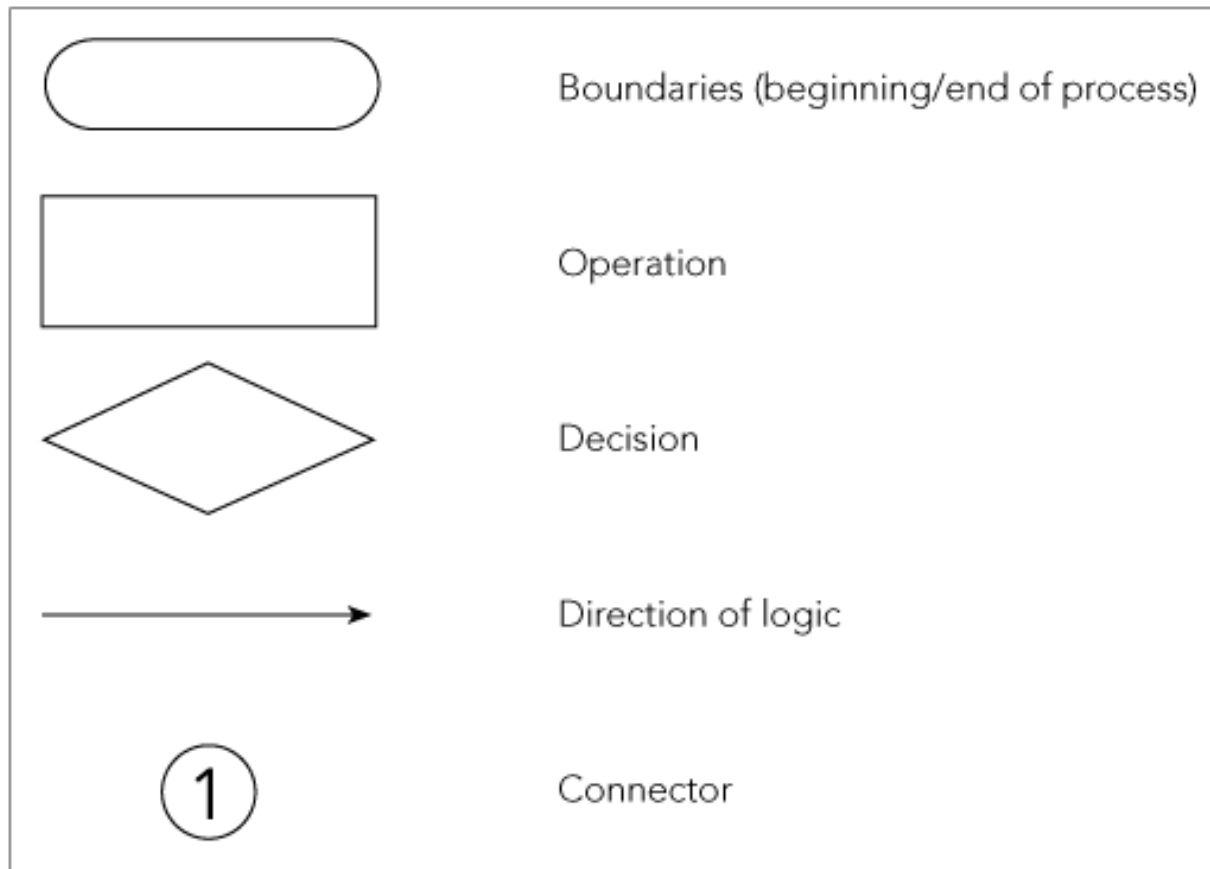
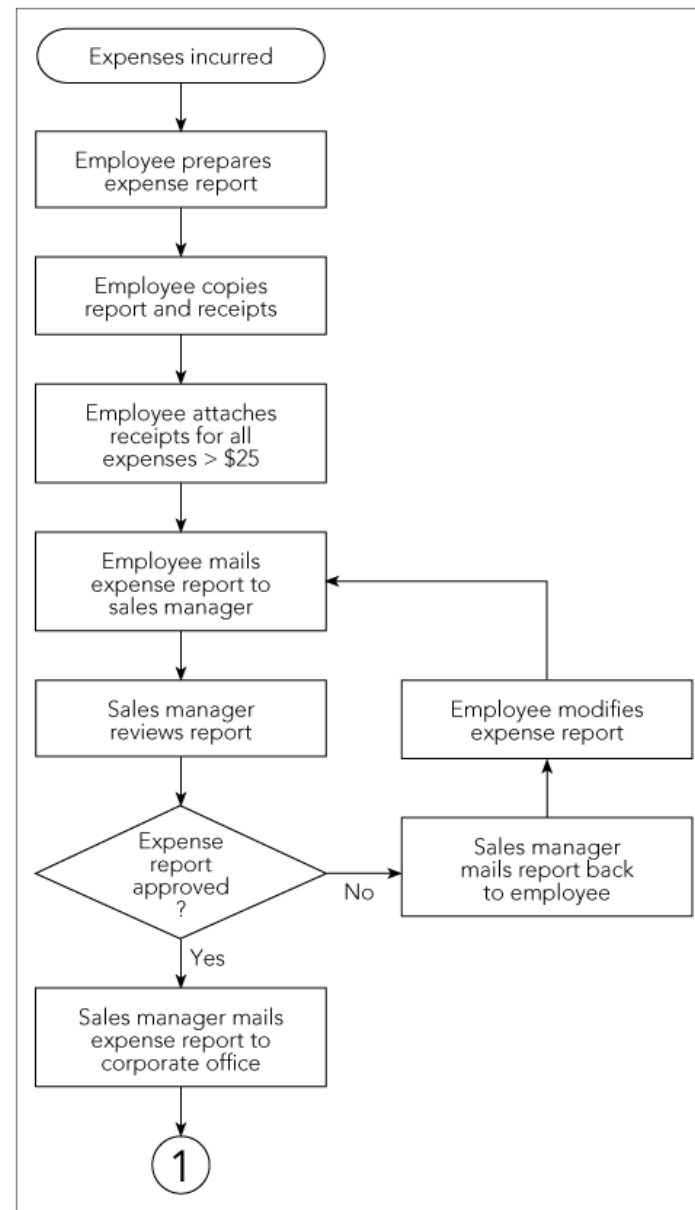


Figure 7-1 Basic flowcharting symbols

Fitter Snacker Expense Report Process

- Maria, Fitter Snacker salesperson
 - Completes a paper expense report after travel
 - Makes a copy for her records
 - Attaches receipts for any expenses over \$25
 - Mails it to her zone manager at the branch office
- Kevin, zone manager
 - Reviews expense report
 - Approves report or mails it back to Maria asking for explanation, verification, or modification
 - After approval, mails it to corporate office

Figure 7-2 Partial process map for Fitter Snacker expense-reporting process



Fitter Snacker Expense Report Process (cont'd.)

- Process at corporate office
 - Accounts payable (A/P) clerk
- **Process boundaries** define:
 - Which activities are to be included in the process
 - Which activities are considered part of environment—external to process
- All processes should have only one beginning point and one ending point
- Decision diamond asks a question that can be answered with “yes” or “no”

Extensions of Process Mapping

- **Hierarchical modeling:** ability to flexibly describe a business process in greater or less detail, depending on the task at hand
- Modeling software that supports hierarchical modeling
 - Provides user the flexibility to move easily from higher-level, less detailed views to the lower-level, more detailed views

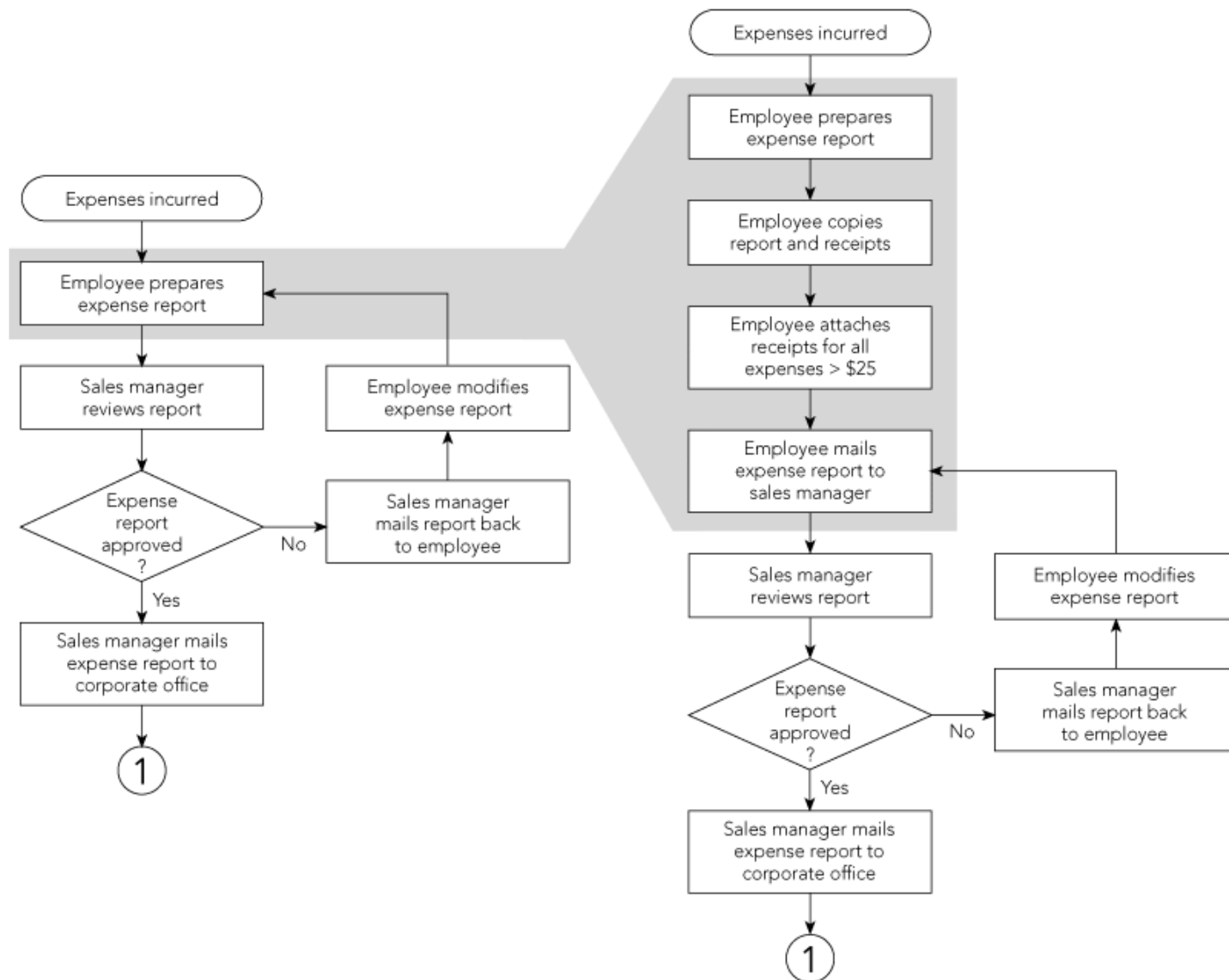


Figure 7-3 Hierarchical modeling of Fitter's expense-reporting process

Extensions of Process Mapping (cont'd.)

- **Deployment flowcharting**
 - **Swimlane flowchart**
 - Depicts team members across the top
 - Each step is aligned vertically under the appropriate employee or team
 - Clearly identifies each person's tasks in the process

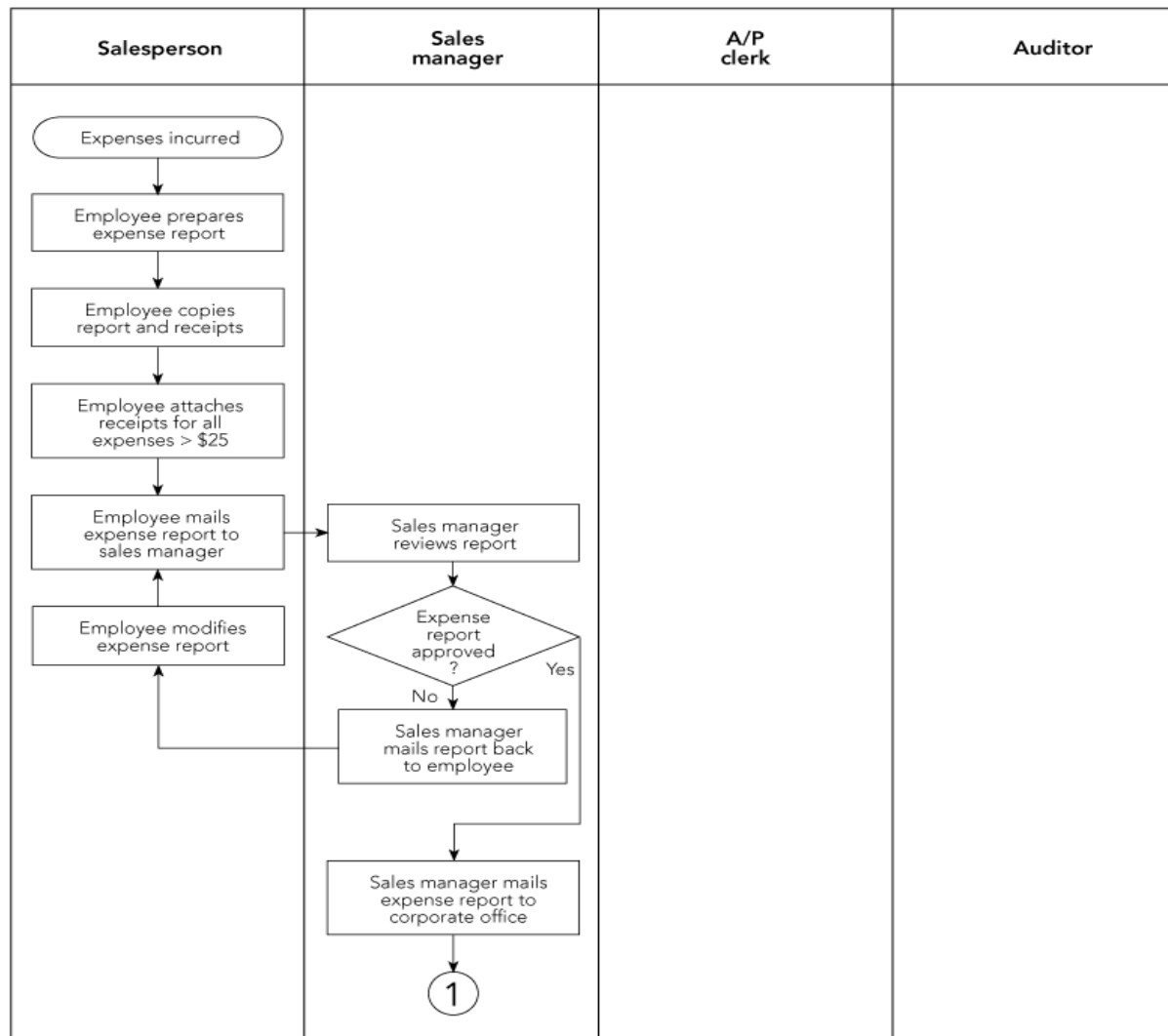


Figure 7-4 Deployment, or swimlane, flowcharting of the Fitter's expense report process

Event Process Chain (EPC) Diagrams

- **Event process chain (EPC) format**
 - Uses only two symbols to represent a business process
 - Matches the logic and structure of SAP's ERP software design
 - Two structures: events and functions
 - Events: a state or status in the process
 - Functions: part of the process where change occurs

Event Process Chain (EPC) Diagrams (cont'd.)

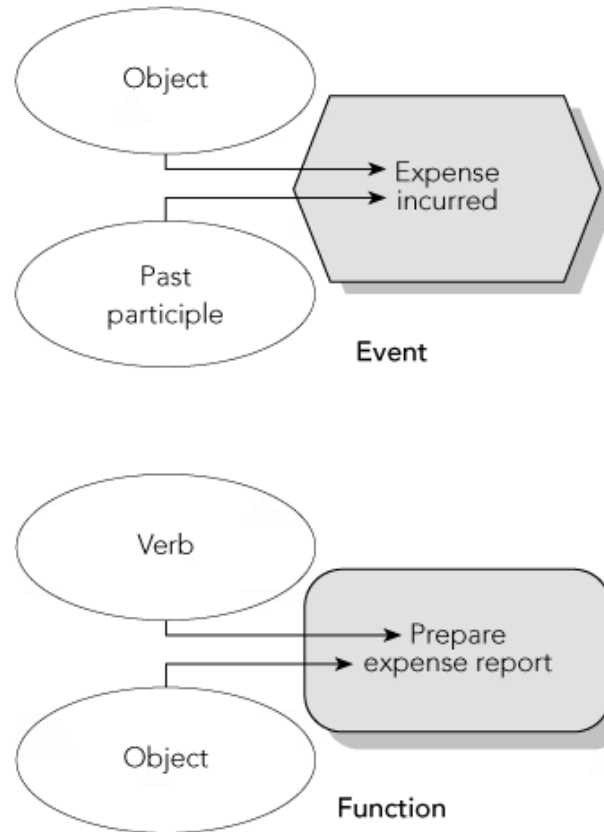


Figure 7-5 EPC components

Event Process Chain (EPC) Diagrams (cont'd.)

- EPC software
 - Enforces an event-function-event structure
 - Standardized naming convention for functions and events
- Three types of branching connectors
 - AND
 - OR
 - Exclusive OR (XOR)
- Basic EPC diagram can be augmented with additional information



Figure 7-6 Basic EPC layout

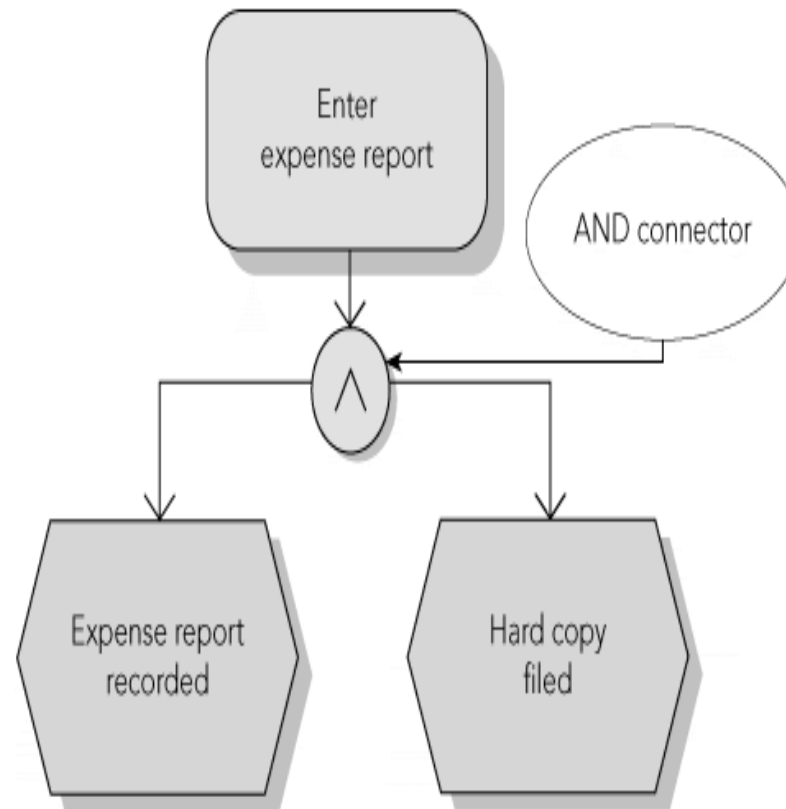


Figure 7-7 AND connector

Event Process Chain (EPC) Diagrams (cont'd.)

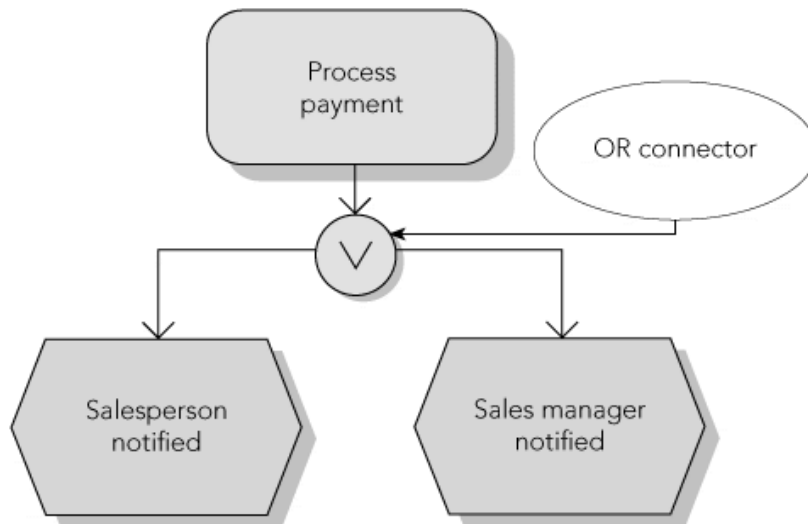


Figure 7-8 OR connector

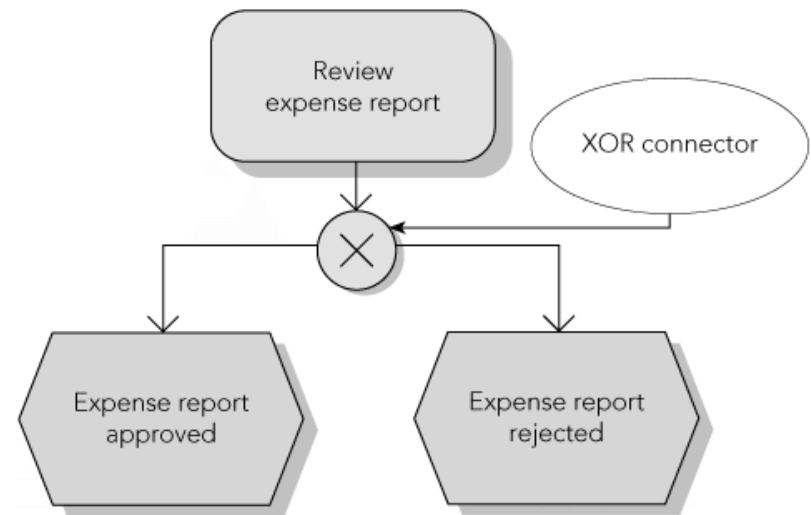


Figure 7-9 XOR connector

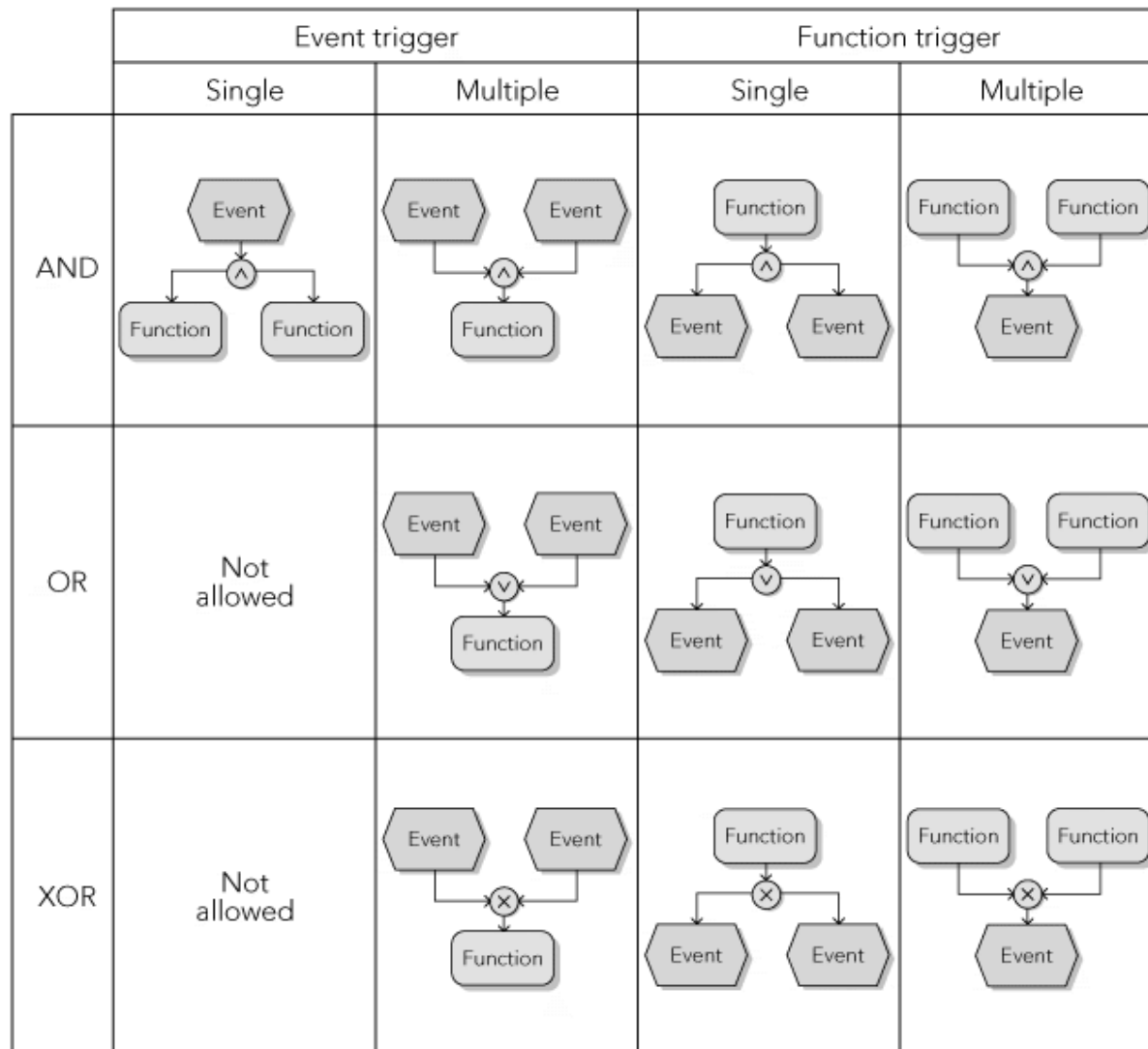


Figure 7-11 Possible connector and triggering combinations

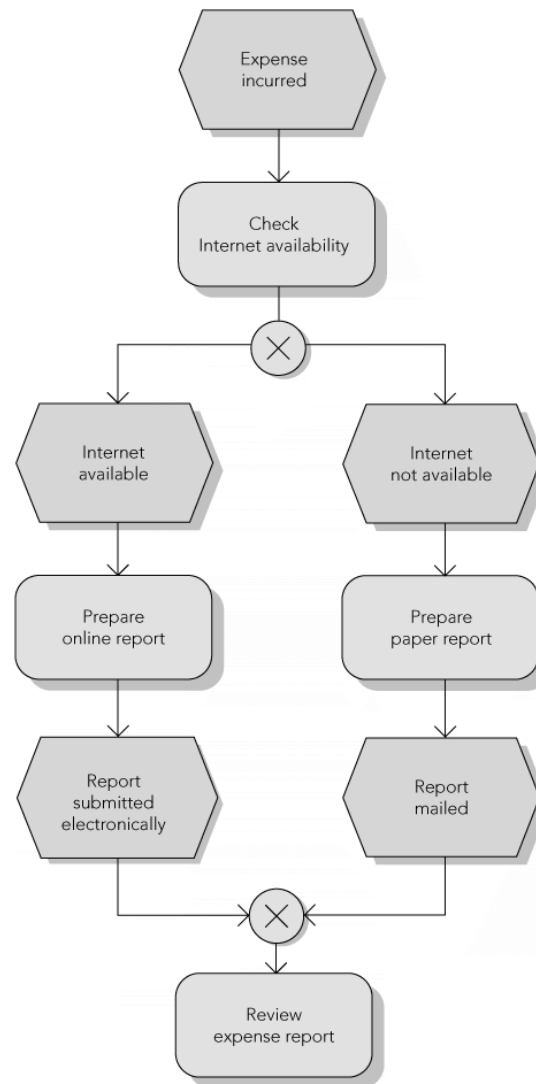


Figure 7-12 Splitting and consolidating paths

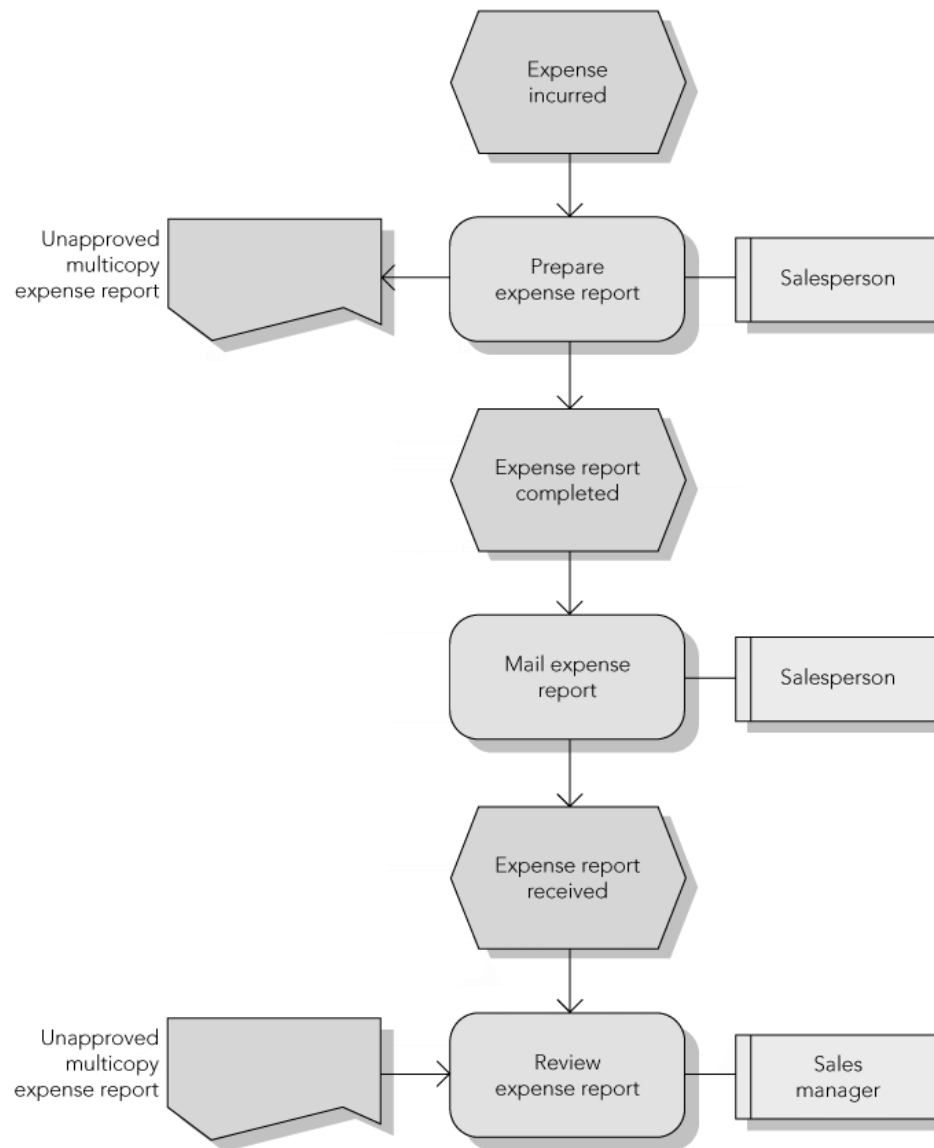


Figure 7-13 EPC diagram with organizational and data elements

Process Improvement

- **Value analysis**
 - Each activity in the process is analyzed for the value it adds to the product or service
 - **Value added** is determined from the perspective of customer
 - *Real value*: value for which the customer is willing to pay
 - *Business value*: value that helps the company run its business
 - *No value*: an activity that should be eliminated

Evaluating Process Improvement

- Disrupting the current process to make changes can be costly and time consuming
- **Dynamic process modeling** takes a basic process flowchart and puts it into motion
 - Uses computer simulation techniques to facilitate the evaluation of proposed process changes
- Computer simulation
 - Uses repeated generation of random variables that interact with a logical model of the process
 - Predict performance of the actual system

ERP Workflow Tools

- **Workflow tools**
 - Software programs that automate the execution of business processes and address all aspects of a process, including:
 - Process flow (logical steps in the business process)
 - People involved (the organization)
 - Effects (the process information)
- ERP software provides a workflow management system
 - Supports and speeds up business processes

ERP Workflow Tools (cont'd.)

- **Workflow tasks:** links that can include basic information, notes, documents, and direct links to business transactions
- SAP system can:
 - Monitor workflow tasks
 - Automatically take various actions if the tasks are not completed on time

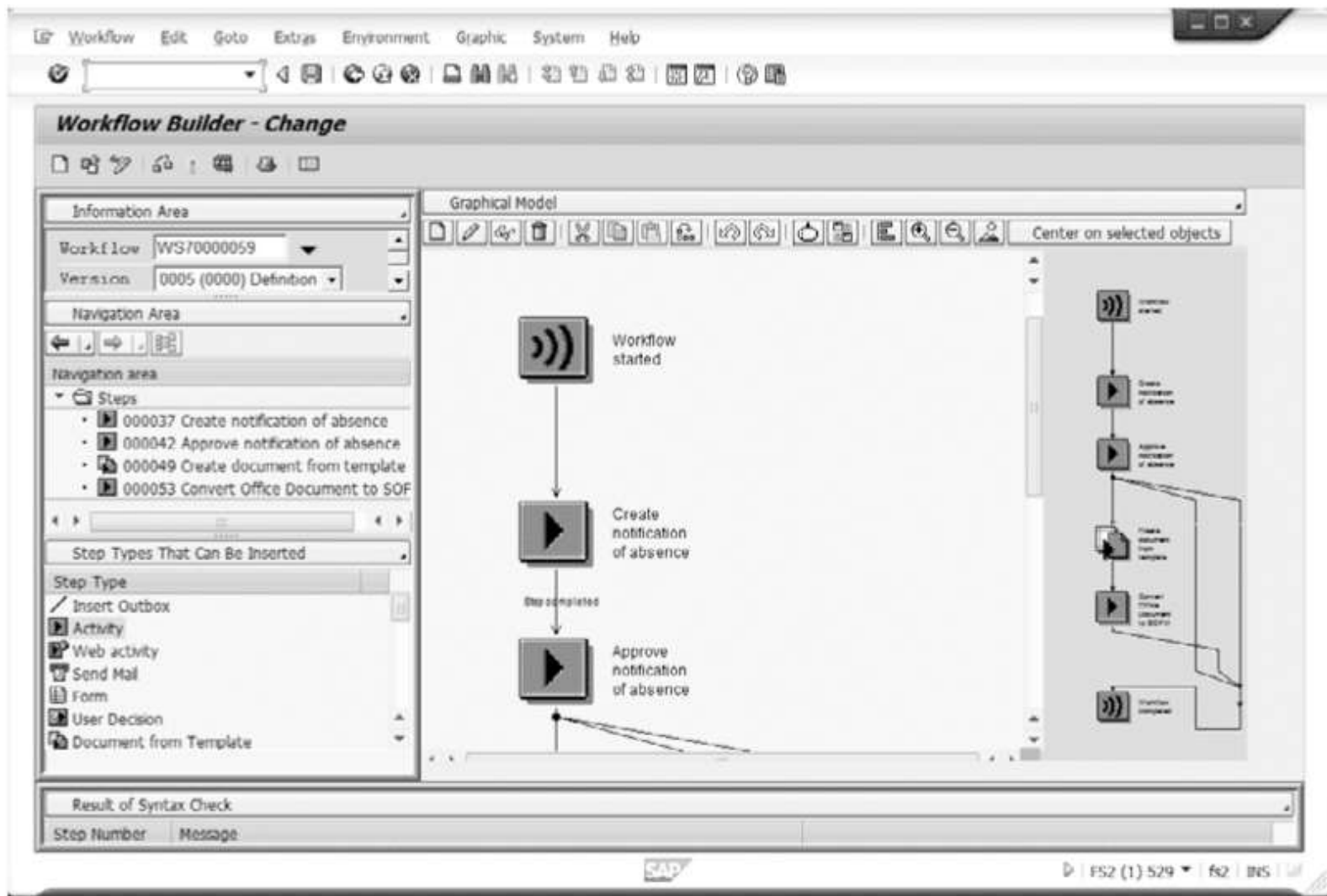


Figure 7-14 SAP ERP Workflow Builder screen

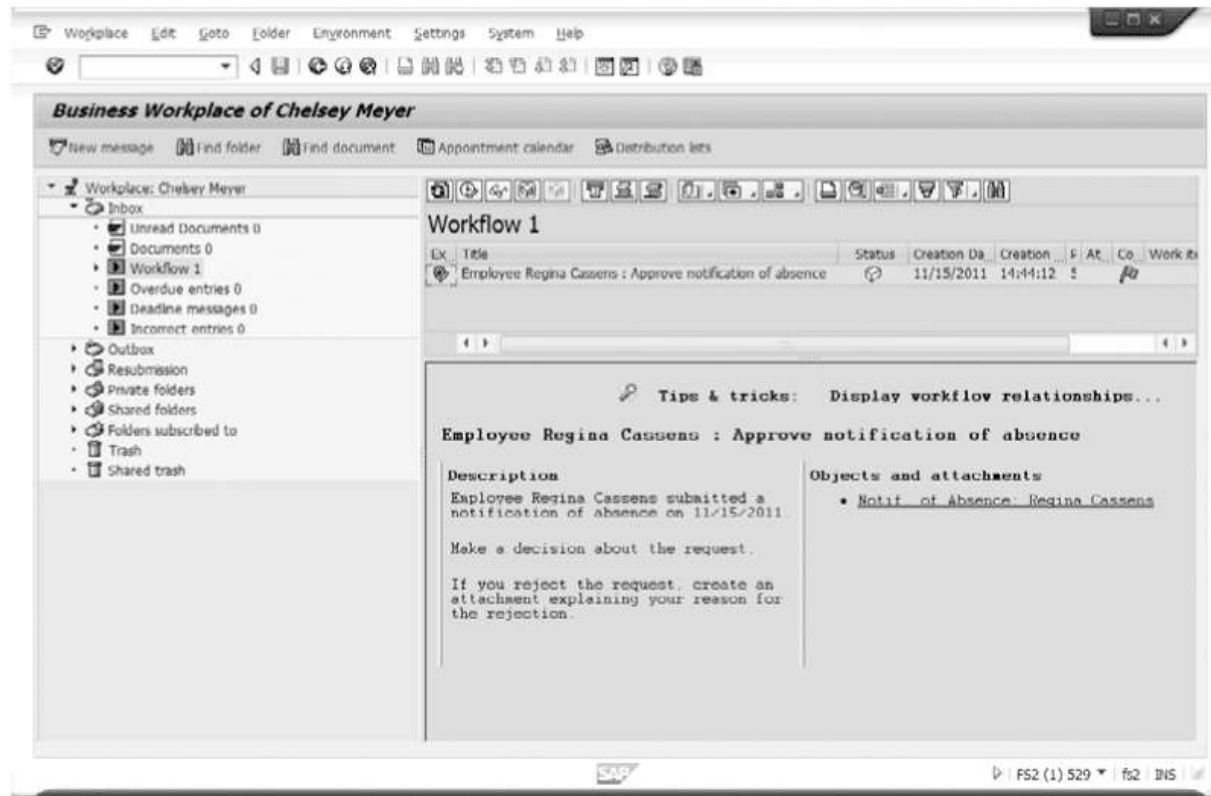


Figure 7-16 Manager's Business Workplace with workflow task

ERP Workflow Tools (cont'd.)

- Workflow provides a number of useful features
 - Employees can track progress of workflow tasks
 - System can be programmed to send reminders to employee(s) responsible for a task
 - For sporadic processes, workflow tools are a powerful way to improve process efficiency and effectiveness

Implementing ERP Systems

- Late 1990s: many firms rushed to implement ERP systems to avoid the Y2K problem
- Since 2000: pace of implementations has slowed considerably
 - Most Fortune 500 firms have implemented an ERP system
 - Current growth is in the small to midsize business market
- Implementation of ERP is an ongoing process

ERP System Costs and Benefits

- ERP implementation is expensive
 - Usually ranging between \$10 million and \$500 million, depending on company size
- Costs of ERP implementation
 - Software licensing fees
 - Consulting fees
 - Project team member time
 - Employee training
 - Productivity losses

ERP System Costs and Benefits (cont'd.)

- Companies must identify a significant financial benefit that will be generated by ERP system
- Only way companies can save money with ERP systems is by using them to support more efficient and effective business processes
- Companies must manage transfer of data from old computer systems to new ERP system

Implementation and Change Management

- Key challenge is not in managing technology, but in managing people
- ERP system changes how people work
 - To be effective, change may have to be dramatic
 - Business processes that are more effective require fewer people
 - Some employees may be eliminated from their current jobs

Implementation and Change Management (cont'd.)

- **Organizational change management (OCM):**
managing the human behavior aspects of organizational change
- People do not mind change, they mind *being* changed
- If ERP implementation is a project that is being forced on employees, they will resist it
- When employees have contributed to a process change, they have a sense of ownership and will likely support the change

Implementation Tools

- Many tools are available to help manage implementation projects
 - Example: process mapping
- SAP provides Solution Manager tool
 - Helps companies manage implementation of SAP ERP

Implementation Tools (cont'd.)

- In Solution Manager, ERP implementation project is presented in a five-phase Implementation Roadmap:
 - Project Preparation (15 to 20 days)
 - Business Blueprint (25 to 40 days)
 - Realization (55 to 80 days)
 - Final Preparation (35 to 55 days)
 - Go Live and Support (20 to 24 days)

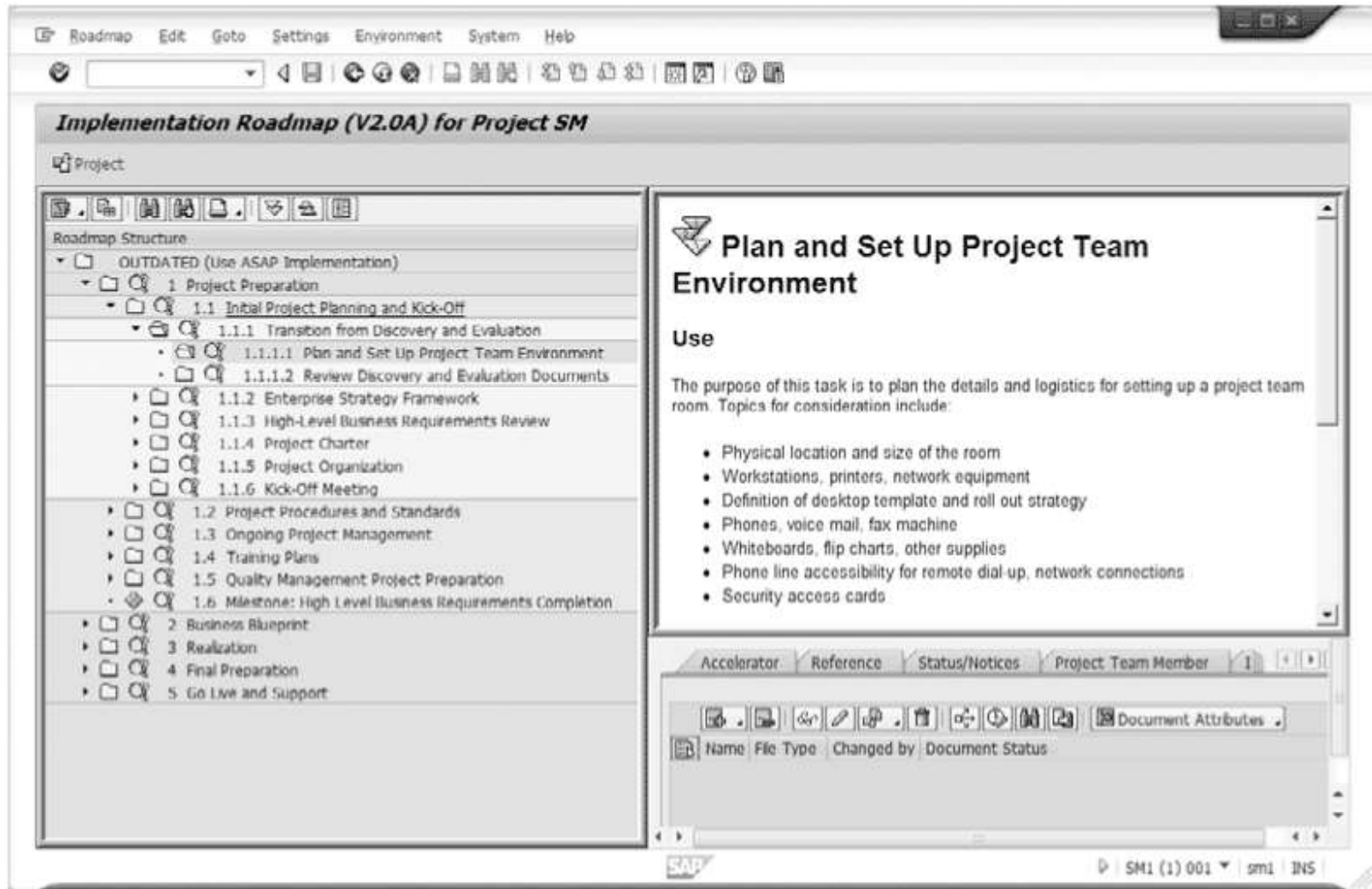


Figure 7-17 Implementation Roadmap in Solution Manager

Implementation Tools (cont'd.)

- Project Preparation
 - Organizing technical team
 - Defining system landscape
 - Selecting hardware and database vendors
 - Defining project's scope
 - Scope creep
- Business Blueprint
 - Produces detailed documentation of business process requirements of the company

Implementation Tools (cont'd.)

- Realization
 - Project team members work with consultants to configure the ERP software in development system
- Final Preparation
 - Testing the system throughput for critical business processes
 - Setting up help desk for end-users
 - Setting up operation of the Production (PROD) system and transferring data from legacy systems
 - Conducting end-user training
 - Setting Go Live date

Implementation Tools (cont'd.)

- Go Live and Support
 - Company begins using new ERP system
 - Monitoring of system is critical so that changes can be made quickly if performance of the system is not satisfactory
 - Important to set a date at which the project will be complete

System Landscape Concept

- SAP recommends a system landscape for implementation
 - Three completely separate SAP systems:
 - Development (DEV)
 - Quality Assurance (QAS)
 - Production (PROD)
 - **Transport directory**: special data file location on DEV server

System Landscape Concept (cont'd.)

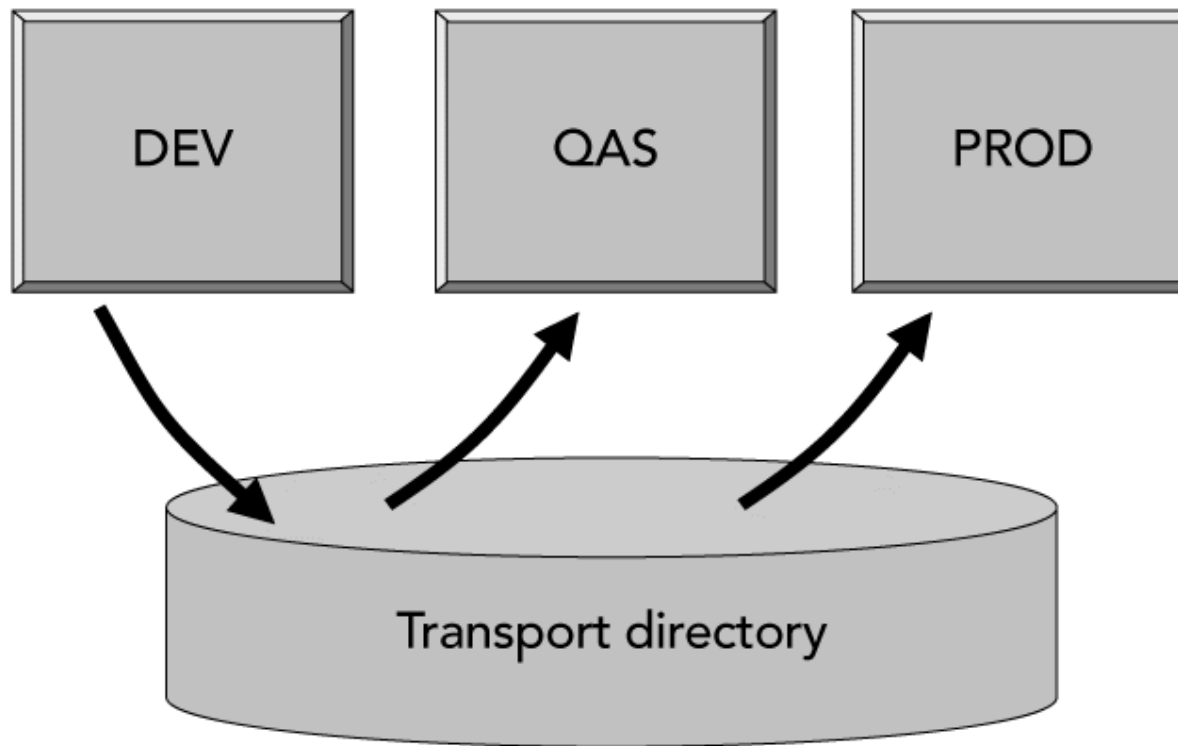


Figure 7-18 System landscape for SAP ERP implementation

System Landscape Concept (cont'd.)

- Development (DEV) system used to develop configuration settings and special enhancements using ABAP code
- Changes recorded in transport directory
- Changes imported into QAS system
- QAS system: changes are tested
- All settings, programs, and changes that pass testing are transported to PROD system
- PROD system: used by company to run its business processes

Summary

- Business processes
 - ERP systems are designed to provide the information, analysis tools, and communication abilities to support efficient and effective business processes
 - Process modeling: fundamental tool in understanding and analyzing business processes

Summary (cont'd.)

- Process mapping: process-modeling tool that uses graphical symbols to document business processes
 - Other methodologies: hierarchical modeling, deployment flowcharting, event process chain diagramming, value analysis, and business process improvement
 - SAP's Solution Manager: set of tools and information that can be used to guide an implementation project
 - Included in SAP ERP to help manage the implementation of ERP software

Summary (cont'd.)

- SAP's system landscape was introduced to show how changes to ERP system during implementation (and beyond) are managed
- Most challenges to ERP implementation involve managing personnel and their reactions to the change, rather than managing technical issues

Concepts in Enterprise Resource Planning

Fourth Edition

Chapter Eight

RFID, Business Intelligence (BI), Mobile Computing, and the Cloud

Dr.A.Sasi Kumar

Objectives

After completing this chapter, you will be able to:

- Define RFID and its role in logistics and sales
- Define business intelligence (BI), and provide examples of its uses
- Explain how in-memory computing will change the use of BI
- Discuss the importance of mobile applications to businesses
- Describe cloud computing and why it is becoming important for ERP providers

Objectives (cont'd.)

- Explain how the service-oriented architecture (SOA) concept has changed ERP development
- Describe Web services, and outline the unique components of NetWeaver
- Define software as a service (SaaS), and identify the advantages and disadvantages of using this software delivery model

Introduction

- An Enterprise Resource Planning (ERP) system allows a company to accomplish tasks that cannot be done well, if at all, without such a system
- Traditionally:
 - ERP systems have been software applications that are run on a company's own computer systems
 - Focus of ERP has been on managing business transactions

Introduction (cont'd.)

- Technologies, such as radio frequency identification (RFID), are increasing the amount of data that is contained in ERP systems
- Business intelligence technologies are turning data in ERP systems into valuable information
- Cloud computing and mobile technologies are changing where ERP data is stored and how it is delivered

Radio Frequency Identification (RFID) Technology

- **Radio frequency identification** technology
 - Known commonly as RFID
 - Becoming an increasingly efficient tool for tracking items through a supply chain
- RFID device
 - Can be attached to products
 - A small package (or tag) made up of a microprocessor and an antenna

Radio Frequency Identification (RFID) Technology (cont'd.)

- RFID reader
 - Can determine location of an item with an RFID tag
 - Emits radio waves and receives signals back from the tag
 - Sometimes called an interrogator
- Advantages of RFID technology:
 - Does not need a line-of-sight connection
 - Can withstand most environmental stresses

Radio Frequency Identification (RFID) Technology (cont'd.)

- Walmart is on the leading edge of the move to integrate RFID technology into the supply chain
- Pharmaceutical firms are evaluating the use of RFID technology
- RFID technology is being employed to track medical devices
 - Spectrum Health's Meijer Heart Center is using RFID technology to track stents

Business Intelligence/Business Analytics

- **Business intelligence (BI)**
 - Also referred to as *business analytics*
 - A range of different applications and technologies used to extract and analyze large amounts of data to aid in decision making
 - Includes data-mining tools and querying tools
 - Often interactive and visual
- There has been significant growth in the BI market in recent years

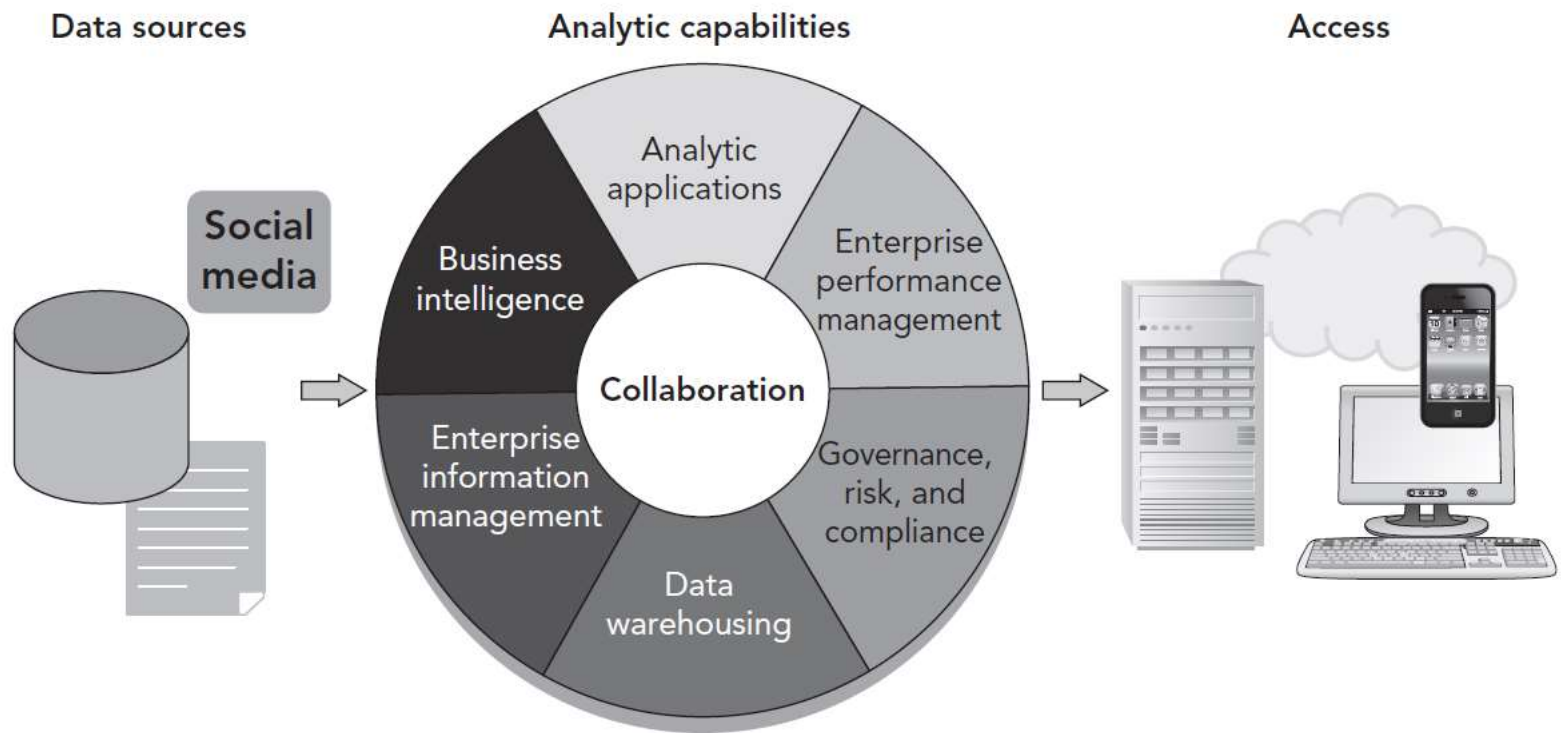


Figure 8-1 SAP Business Intelligence (BI) framework

Business Intelligence/Business Analytics (cont'd.)

- Analytic applications and business intelligence
 - Similar sets of data analysis tools
- Analytic applications
 - Data analysis tools applied to specific industries
- Enterprise performance management
 - Concept of developing strategic goals for the organization
 - Gathering data to evaluate how the organization is performing in relation to those goals

Business Intelligence/Business Analytics (cont'd.)

- Governance, risk, and compliance category
 - A group of activities focused on ensuring an organization is functioning ethically and legally
- Data warehousing
 - Technology used to store the large volumes of data used in the analysis
- **Enterprise information management**
 - Describes the business and technology functions that manage information as a corporate asset

In-Memory Computing

- Data in a data warehouse are structured as **multidimensional data cubes**
 - Allow for relationships in the data to be analyzed quickly
- Two main challenges with using a multidimensional cube structure
 - A significant level of technical expertise is needed to construct a cube
 - A multidimensional cube necessarily restricts how the data can be analyzed

In-Memory Computing (cont'd.)

- Accessing data from memory much faster than accessing data from a hard disk
- Reason why data warehouses use disk memory: storage capacity
 - Hard disks can store one thousand times more data than memory for a comparable cost
- Data compression provided by column storage
 - Makes it possible to store large volumes of data in memory without aggregation
 - Multidimensional cubes are not required

In-Memory Computing (cont'd.)

- Both SAP's and Oracle's in-memory solutions are designed to analyze “big data”
- Big data
 - Enormous amount of data that is now available for BI use from all the available sources, including:
 - ERP systems, Web sites, corporate databases, scientific research, Twitter, and other social networking applications
- BI analytics was the top technology priority for CIOs in 2012

Mobile Computing

- Increasing use of smartphones, tablet computers, and other mobile computing devices
- Mobile applications need to be developed for different kinds of smartphones, with different operating systems
- Companies need to make many decisions about the use of mobile devices by employees
- Mobile devices provide users with information and can also be sources of information

From Internet-Enabled to Cloud Computing

- Cloud computing
 - Delivery of a software product to a user via the Internet
 - The user typically accesses the cloud product through a Web browser or a lightweight (meaning small and simple) application for a computer or mobile device
- Cloud computing is not a completely new concept
 - It represents the latest stage of the development of computing and the Internet

SAP and the Internet

- 1996: SAP introduced its joint Internet strategy with Microsoft
- Internet Transaction Server (ITS)
 - A server-based software system that enabled efficient communication between an SAP ERP system and the Internet
 - Core of SAP's first effort to integrate the Internet with its products

SAP and the Internet (cont'd.)

- May 1999: SAP announced mySAP.com
 - A new strategy designed to completely realign the company and its product portfolio
 - Goal: combine e-commerce solutions with SAP's existing ERP applications, using cutting-edge Web technology
- 2000: SAP began building on the mySAP.com vision
 - Added the capability for electronic marketplaces and corporate portals

NetWeaver

- 2004: SAP introduced its first version of SAP NetWeaver
 - A collection of components that support business transactions over the Internet
 - Provide seamless connectivity of diverse applications
- SAP's enterprise service-oriented architecture (enterprise SOA)
 - Goal of making all of its business applications service based

NetWeaver (cont'd.)

- Web services
 - Combination of software tools that enables an organization's various systems and applications to communicate with other applications
- SAP's NetWeaver
 - A Web services platform that allows various vendor applications to share data over the Internet

NetWeaver (cont'd.)

- One benefit of adopting SOA
 - Ability to quickly add new applications, making the organization more responsive
 - Use of open standards
- Implementing SOA is not easy
- Return on an SOA investment is often difficult to determine

NetWeaver Tools and Capabilities

- SAP's NetWeaver platform is a collection of modules, including:
 - Enterprise Portal
 - Mobile Infrastructure
 - Business Intelligence
 - Master Data Management
 - Exchange Infrastructure

NetWeaver Tools and Capabilities (cont'd.)

- SAP Enterprise Portal gives users complete access to all their work on a single screen
 - All information is available through the Web services provided by NetWeaver
- NetWeaver's Mobile Infrastructure module allows users to access and work with data through mobile devices such as smartphones and pagers

NetWeaver Tools and Capabilities (cont'd.)

- Business Intelligence (BI) works with any database management software and any operating system that is running NetWeaver
- Master Data Management provides data consistency within a company's SAP system
- NetWeaver's Exchange Infrastructure module allows different applications to share data

NetWeaver at Work for Fitter

- Examining how NetWeaver can help Fitter
- Fitter has an SAP ERP system
- Fitter's two top salespeople, Amy Sanchez and Donald Brown, are busy selling NRG bars directly to customers and to distributors

SaaS: Software As A Service

- A software delivery model
- A software product is hosted by a company—such as SAP—on its servers and is accessed by customers via a Web browser
- Sometimes described as a utility
- A subset of cloud computing

SAP Business ByDesign

- An example of SaaS for the ERP market
- First released in 2007
- A full ERP system delivered to customers via the cloud
- For small to medium-sized companies:
 - Lowers the total cost of ownership of the software
 - Enables a rapid and smooth implementation

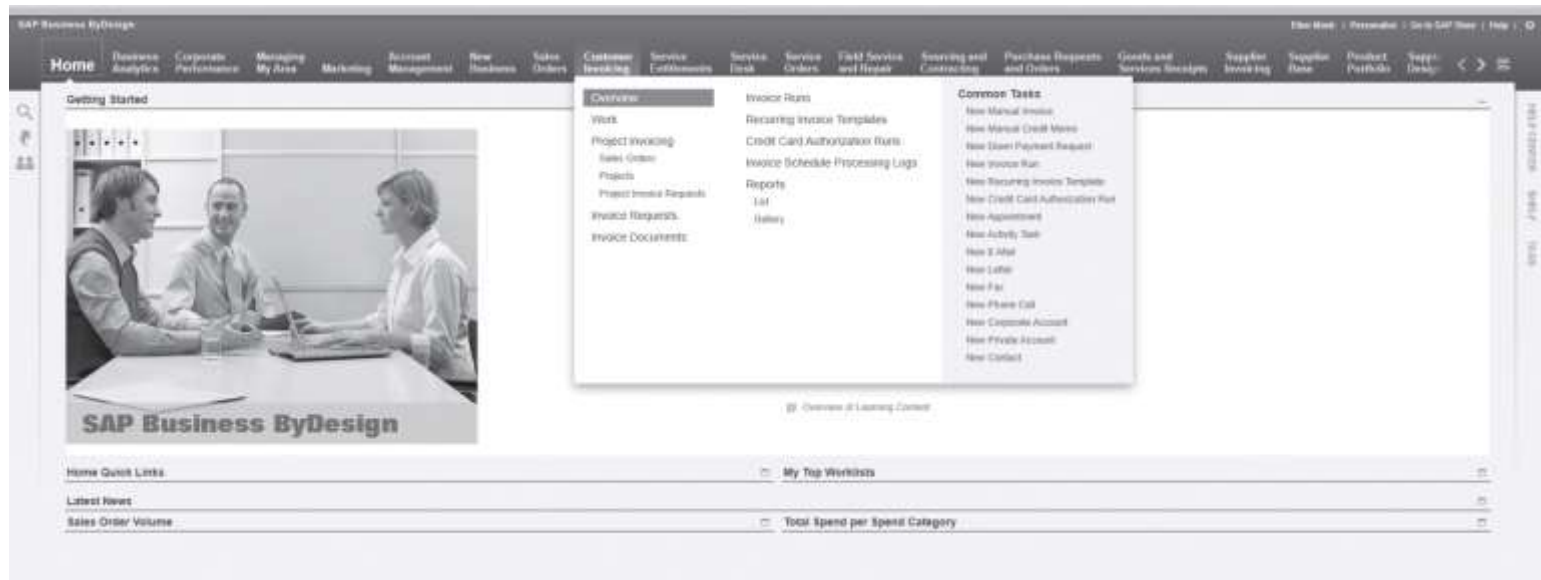


Figure 8-4 SAP Business ByDesign main screen

SAP Business ByDesign (cont'd.)

- PlaNet Finance
 - A small organization that offers microloans to customers in 30 international offices
 - Finds Business ByDesign is a good fit for its needs



FIGURE 8-5 SAP Business ByDesign's key capabilities

Advantages of Using SaaS

- Initial affordability
 - Lower cost to implement software provided through SaaS
- Shorter implementation time
 - Implementation time usually shorter as the user does not have to worry about technical issues
- Lower support costs and complexity
 - Do not need to hire additional IT personnel to implement new systems and applications

Disadvantages of Using SaaS

- Security
- Bandwidth/response time
- Flexibility
- No frills
- Technical, not business focus
- Exercise 8.2
 - Fitter has made the decision to acquire an ERP system

| Advantages of purchasing software and computers for ERP | Advantages of using SaaS to run ERP |
|---|-------------------------------------|
| | |
| | |
| | |
| | |

FIGURE 8-7 Arguments for purchasing ERP system and software versus using SaaS

Option 1: Buying Computers and Software Rights for an ERP System

- Estimated costs to set up its own ERP system:
 - Database server
 - Application server
 - PCs
 - Computer maintenance
 - Licensing rights
 - Installation
 - User training
 - Ongoing consulting
 - Network and database administrator

Option 2: Using an SaaS Provider to Deliver ERP Software

- Estimated costs for using an SaaS provider to deliver ERP software:
 - PCs
 - Computer maintenance
 - Software through the SaaS provider
 - User training

Calculate the NPV and Make a Recommendation

- You will set up a spreadsheet to total all the costs of each option
- In each scenario, you must deal with the net present value (NPV) of money
- NPV
 - A way to figure out whether an investment is profitable
 - In this case, to compare outlay of funds from one method to another
 - Addresses the time value of money

Calculate the NPV and Make a Recommendation (cont'd.)

- When calculating two different investment options, NPV calculation allows:
 - Different future expenses or earnings to be calculated as an equivalent amount in the present time
- NPV can be calculated over a number of years
 - In example: we need a five-year outlay of funds for the ERP project

Calculate the NPV and Make a Recommendation (cont'd.)

- In an Excel spreadsheet, the syntax of NPV calculation:
 $\text{=NPV}(\text{hurdle rate percentage}, \text{range of values})$
 - Values in range can be positive or negative numbers
 - Hurdle rate
 - Rate of discount over the period
 - Minimum acceptable rate of return on a project that a company will accept

| ERP Purchasing Options | | | | | | | |
|--|--|--|--------------------|--------------------|--------------------|--------------------|--------------------|
| | | | | | | | |
| Option 1 - Buying computers and software outright | | | | | | | |
| <u>Items</u> | | | <u>2013</u> | <u>2014</u> | <u>2015</u> | <u>2016</u> | <u>2017</u> |
| Database server | | | 70000 | | | | |
| Application server | | | 40000 | | | | |
| 10 PCs | | | 15000 | | | | |
| Software | | | 500000 | | | | |
| Consultants - initial (6 months) | | | 486000 | | | | |
| Training (2 weeks) | | | 23000 | | | | |
| Consultants - maintenance (1 day per month) | | | | 36000 | 36000 | 36000 | 36000 |
| PC maintenance | | | | 12000 | 12000 | 12000 | 12000 |
| Network administrator | | | 200000 | 200000 | 200000 | 200000 | 200000 |
| | | | | | | | |
| <u>Total</u> | | | 1334000 | 248000 | 248000 | 248000 | 248000 |
| <u>NPV</u> | | | \$1,646,671.81 | | | | |
| | | | | | | | |
| Option 2 - Using SaaS | | | | | | | |
| | | | | | | | |
| PCs | | | 15000 | | | | |
| PC maintenance | | | | 7200 | 7200 | 7200 | 7200 |
| ASP cost | | | 400000 | 400000 | 400000 | 400000 | 400000 |
| | | | | | | | |
| <u>Total</u> | | | 415000 | 407200 | 407200 | 407200 | 407200 |
| <u>NPV</u> | | | \$1,224,277.26 | | | | |
| | | | | | | | |
| | | | | | | | |
| Hurdle rate | | | 20% | | | | |

Figure 8-8 Cost comparisons: buying versus SaaS

Calculate the NPV and Make a Recommendation (cont'd.)

- Perform the following steps:
 - Calculate the cost of the two methods of implementing an ERP system for five years
 - Consider using different hurdle rates for each option
 - Why might varying hurdle rates be applicable for this decision?
 - Write a memo, with your spreadsheet attached, to the CIO
 - Answer this question: Which method should Fitter choose, and why?

Summary

- Technologies such as radio frequency identification (RFID) and smartphones are fueling explosive growth in the amount of data available for businesses to process
- Business intelligence (BI) tools are growing in sophistication and power
 - Technologies such as in-memory computing will provide greater speed and flexibility to BI users
- Mobile computing technology is increasing the use of ERP and BI data

Summary (cont'd.)

- Cloud computing is the delivery of a software product to a user via the Internet
- Web services and service-oriented architecture offer a combination of software tools that enables various programs within an organization to communicate with other applications
- SAP's Web services platform is NetWeaver
 - A collection of components that support business transactions over the Internet by providing seamless connectivity of diverse applications through the Internet

Summary (cont'd.)

- Software as a service (SaaS) is a software delivery model in which a software product is hosted by a company—such as SAP—on its servers and is accessed by customers via a Web browser
 - SaaS model allows companies to use ERP without a large initial investment
 - SaaS solutions allow for more rapid improvements in the software through user communities
 - There are some risks associated with using an SaaS provider