Chapter 5
Information Systems for Managing Business Processes

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Learning Objectives
• List how IT enables business change.
• Identify ways in which IT can impede business change.
• Understand the problems that are caused by the functional (silo) perspective of a business.
• Identify how the process perspective keeps the big picture in view and how IT can be used to facilitate this perspective.
• Define TQM and BPR, and explain how they are used to transform a business.
• Explain an enterprise system and how it is used to implement organizational change.

Real World Examples
• Sloan Valve Company, a family-owned global manufacturer of plumbing products, was launching a range of new products every year.
• The new product development (NPD) process was both a _______ process and a _______ asset.
• The process was complex:
  – Over 16 functional units involved.
  – Slow, taking 18-24 months to bring a new product to market.
• The process of initiating and screening new product ideas was broken; over 50% of new ideas didn’t make it through.
• No one was accountable for the process.
  – Difficult to get a handle on process management and improvement.
  – Formation flow was blocked in part because of the organizational structure.

Real World Examples (Cont.)
• Management initially invested in an enterprise system to automate their internal processes.
• Despite successful implementation, the communication and coordination problems continued.
• Management realized that the enterprise system was working fine, but the underlying process was broken.
• Top management decided to redesign the process.
• A team spent nine months assessing the current process and proposing a new end-to-end NPD process.
• The quality, timing, and output of the NPD process greatly improved.
• **Time-to-market** was reduced to less than 12 months.

What are the two Perspectives for Business Processes?

SILO PERSPECTIVE VERSES

BUSINESS PROCESS PERSPECTIVE

Silo (Functional) Perspective
• The silo perspective views the business as discrete functions (accounting, sales, production, etc.). Figure 5.1 shows a traditional org chart which is how a functional business is organized.
• Each functional area determines its core competencies and focuses on what it does best.
• Advantages:
  – Allows optimization of expertise.
  – Group like functions together for learning.
• Disadvantages:
  – Significant sub-optimization.
  – Tend to lose sight of overall organizational objectives.
Process Perspective

- **Process** is defined as an *interrelated*, sequential set of activities and tasks that turns inputs into outputs, and includes the following:
  - A beginning and an end
  - Inputs and outputs
  - A set of tasks (subprocesses) that transform the inputs into outputs
  - A set of metrics for measuring effectiveness
- Keeps the big picture in view.
- Focuses on work being done to create optimal value for the business.

Business Process and Work Flow

- A **workflow** is a sequence of activities that take place in a process.
- Metrics help to focus managers on the critical dimensions of the process.
  - Throughput, outputs, customer satisfaction, revenue per output, profit per output, and quality of the output.
- Examples of *business processes* include customer order fulfillment, manufacturing, planning and execution, payroll, financial reporting, and procurement (Figure 5.2).
- Advantages:
  - Helps avoid or reduce duplicate work.
  - Facilitate cross-functional communication.
  - Optimize business processes.
- Figure 5.3 shows the **cross-functional** view of processes as they cross departments (functions).
The Value Chain

Manufacturing Industry Value Chain
Product and Service Flow

Support Activities

Primary Activities

Value Chain in Order Management
An Existing Product

Support Activities

Primary Activities

Value Chain in Order Management
A New Product

Support Activities

Primary Activities

<table>
<thead>
<tr>
<th>Silo Perspective</th>
<th>Business Process Perspective</th>
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<tbody>
<tr>
<td>Definition</td>
<td>Interrelated, sequential set of activities and tasks that turn inputs into outputs</td>
</tr>
<tr>
<td>Focus</td>
<td>Functional, Cross-functional</td>
</tr>
<tr>
<td>Goal Accomplishment</td>
<td>Optimizes on functional, organizational goals, or &quot;big picture&quot;</td>
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<tr>
<td>Benefits</td>
<td>Highlighting and developing core competencies, Functional efficiencies</td>
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Figure 5.4 Comparison of Silo Perspective and Business Process Perspective
Building Agile and Dynamic Business Processes

- Dynamic business processes (or agile business processes).
  - Processes that iterate through a constant renewal cycle of design, deliver, evaluate, and redesign.
- Agile processes
  - Designed with the intention of simplifying redesign and reconfiguration.
  - Flexible and easily adaptable to changes in the business environment.
  - Can be incrementally changed with little effort.
- Dynamic processes reconfigure themselves as they “learn” and are utilized in the business.
- As more of the process is done with software, the easier it is to change and the more likely it can be designed to be agile or dynamic.

Building Agility - Using the Internet and Social Technologies

- Building agility into business processes is increasingly common.
  - Run entirely on the Internet (e.g., order management, service provisioning, software development, and human resource support).
- Incorporate the latest innovations offered by vendors on the Internet.
- Dynamic IT applications are required for dynamic business processes.
- When the underlying IT is not designed with this goal in mind, the business process cannot adapt to changing requirements in the business environment.
- Agile and dynamic business processes enable operational efficiency through incremental and quick, game-changing, innovative processes.

Business Systems Planning (BSP) Approach (Top-Down)

Business Strategies

- Business Processes
- Applications
- Data Classes
- Organizational databases
- Information architecture

THE TOOLS FOR CHANGE

BUSINESS VALUE & FOCUS – IS Perspective

- IS-BUSINESS
- SCM
- CRM
- BPR
- ERP

Customer Core

- Demands
- Products
- Value

Who are the customers? Where are the customers? Their purchasing habits How to reach them?

What they need/want? How many they need/want? When they need/want? How to reach them?

SCM: Supply Chain Mgt.
CRM: Customer Relationship Mgt.
BPR: Business Process Reengineering
ERP: Enterprise Resources Planning

Business Models & Strategies
Why Do Organizations Need to Manage Business Processes?

• Reasons for change
  – Improve process quality
  – Change in technology
  – Change in business fundamentals
  – Market
  – Product lines
  – Supply chain
  – Company policy
  – Company organization
  – Internationalization
  – Business environment

Changing Business Processes

• Two techniques are used to transform business processes:
  – **Radical process redesign**
    – Also called **business process reengineering (BPR)** or simply reengineering.
    – **Incremental** continuous process improvement.
    – Includes **total quality management** (TQM), also called quality management and Six Sigma.
  – Radical and incremental improvement concepts enable a manager to affect change in the way his or her organization does business.
  – These approaches view the business as a set of **business processes** rather than using a silo perspective.

Incremental Change

• Managers improve business processes through small, **incremental changes**.
  – Choosing a business process to improve.
  – Choosing a metric by which to measure the business process.
  – Enabling personnel to improve the process based on the metric.
• Workers often react favorably to **incremental change**.
  – Gain control and ownership of improvements.
  – Render change less threatening

Six Sigma

• **Six Sigma** is a **business management strategy**, originally developed by Motorola (by Bill Smith), that today enjoys widespread application in many sectors of industry.
  – A data-driven approach and methodology for eliminating defects from a process.
  – Six Sigma seeks to identify and remove the causes of defects and errors in manufacturing and business processes. It uses a set of quality management methods, including statistical methods, and creates a special infrastructure of people within the organization who are experts in these methods.
  – Processes that operate with "six sigma quality" over the short term are assumed to produce long-term defect levels below 3.4 defects per million opportunities (DPMO).

Six Sigma (cont.)

• Six Sigma asserts that –
  – Continuous efforts to achieve stable and predictable process results are of vital importance to business success.
  – Manufacturing and business processes have characteristics that can be measured, analyzed, improved and controlled.
  – Achieving sustained quality improvement requires commitment from the entire organization, particularly from top-level management.
• It seeks to eliminate defects from any process.

Sigma levels – further information

Short-term sigma levels correspond to the following long-term DPMO values (one-sided):

• One Sigma
  – 690,000 DPMO = 31% efficiency
• Two Sigma
  – 308,000 DPMO = 69.2% efficiency
• Three Sigma
  – 66,800 DPMO = 93.32% efficiency
• Four Sigma
  – 6,210 DPMO = 99.379% efficiency
• Five Sigma
  – 230 DPMO = 99.977% efficiency
• Six Sigma
  – 3.4 DPMO = 99.9997% efficiency
Radical Change

- Appropriate for addressing cross-functional processes.
- Helps attain aggressive improvement goals.
- The goal is to make a rapid, breakthrough impact on key metrics (Figure 5.5).
- Radical change typically faces greater internal resistance compared with incremental change.
- Requires careful planning.
- Used only when major change is needed in a short time.

Key Aspects of Radical Change Approaches

- Thinking from a cross-functional process perspective.
- Challenging old assumptions.
- Networked (cross-functional) organizing.
- Empowerment of individuals in the process.
- Measurement of success via metrics tied directly to business goals and the effectiveness of new processes (e.g., production cost, cycle time, scrap and rework rates, customer satisfaction, revenues, and quality).

Risks of Radical Redesign

- Research shows some of the common reasons why companies fail to reach their goals:
  - Lack of senior management support.
  - Lack of coherent communications.
  - Introducing unnecessary complexity.
  - Underestimating the amount of effort needed.
  - Combining reengineering with downsizing.

Source: Managing and Using Information Systems, Pearlson and Saunders, p. 144

Four out of five are related to “Human Elements”

Workflow and Mapping Processes

- Workflow is a way to look at a cross-functional process.
  - A series of connected tasks and activities done by people and computers to form a business process.
  - Workflow includes software products that document and automate processes.
  - Workflow software facilitates the design of business processes and creates a digital workflow diagram.
- When combined with business process management modules, processes can be managed, monitored, and modified.
- Workflow diagrams show a picture, or map, of the sequence and detail of each process step.
Business Process Management - BPM

- Business Process Management (BPM)
  - Well-defined and optimized set of IT processes, tools, and skills
  - In the 1990s, a class of systems emerged to help manage business workflows.
  - They primarily helped track document-based processes where people executed the steps of the workflow.
- Beyond document-management, BPM includes features that (Figure 5.6):
  - manage person-to-person process steps, system-to-system process steps, and those processes that include a combination of both.
  - include process modeling, simulation, code generation, process execution, monitoring, and integration capabilities for both company-based and web-based systems.
- The tools allow an organization to actively manage and improve its processes from beginning to end.

Process Integration vs. Standardization

Processes are the way organizations deliver goods and services to customers. Designing, building and executing processes is one of the roles of management.

Companies make two important choices in the design of their operations: 1) how standardized their BP should be across operational units (business units, region, function, market segment), and 2) how standardized their BP should be across those units.

The level of process integration and standardization defines the necessary IS capabilities and ultimately the investment the firm will need to make in IS.

Business Process Standardization

<table>
<thead>
<tr>
<th>Low</th>
<th>High</th>
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<tbody>
<tr>
<td>The business has a decentralized design where business units make local decisions on processes to meet customer needs.</td>
<td>The business is focused on process standardization where tasks are done the same way with the same systems across business units, but the business units have little need to interact.</td>
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<tr>
<td>The business is focused on process integration, usually creating a single face to customers and suppliers, but doesn’t usually impose process standards (e.g., standardized technology platforms) on operating units.</td>
<td>The business has a centralized design, with high needs for reliability, predictability and sharing data across business units creating a single view of the process.</td>
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BPM Systems

- BPM systems are a way to build, execute, and monitor automated processes that span organizational boundaries.
- Enterprise applications include ERP, CRM, and financial software.
- BPM systems go outside a specific application to help manage across processes (e.g., front office applications).
- Appian’s BPM product includes components to help companies design, manage, and optimize core business processes.
- Figure 5.7 summarizes the components of their system.
Enterprise Systems

- Enterprise systems:
  - Are a set of IS tools used to enable information flow within and between processes across an organization.
  - Ensure integration and coordination across functions such as accounting, production, customer management, and supplier management.
  - Include:
    - Enterprise Resource Planning (ERP),
    - Supply Chain Management (SCM),
    - Customer Relationship Management (CRM), and
    - Product Lifecycle Management (PLM) systems (Figure 5.8).
- Crowdsourcing
  - Enterprise have found ways to use a social IT platform to solicit, discuss, and prioritize new ideas.
  - Anyone in the community can add an idea, then the entire community can discuss, comment, and rate the idea.
  - Managers then have a wealth of ideas along with community input, to use as input into the innovation process.

Enterprise Resource Planning (ERP)

- Two of the largest vendors of enterprise systems are German-based SAP and California-based Oracle.
- Designed to help large companies manage the fragmentation of information stored in hundreds of individual desktop, department, and business unit computers across the organization.
- Change from mainframe systems to client-server environments.
- A Y2K-compliant enterprise solution.
- Makes company information immediately available to all departments throughout the company.

Characteristics of Enterprise Systems

- ERP systems:
  - are designed to seamlessly integrate information flow throughout the company.
  - Modules include: manufacturing, accounting, human resources, and sales.
  - require long-term relationships with software vendors.
  - have complex systems that must typically be modified on a continual basis to meet the organization’s needs.
  - reflect industry best practices.
  - need to be integrated with the existing hardware, OSs, databases, and telecommunications.
  - are evolving as the systems continue to change to fit the needs of the diverse marketplace.

ERP II

- ERP II:
  - makes company information immediately available to external stakeholders (e.g., customers and partners).
  - enables e-business by integrating business processes with the enterprise and its trading partners.
  - Integrating the cloud calls into question the design of some business processes.
  - ERP systems include all of the ERP II functionality plus social and collaboration features.
  - SAP’s ERP solution includes SAP ERP Financials, SAP ERP Human Capital Management, and SAP ERP Operations.
  - Oracle’s ERP solution, EnterpriseOne, offers these same functions.

Customer Relationship Management (CRM)

- CRM
  - Suite of applications, a database, and a set of inherent processes
  - Intended to support customer-centric organization
  - Integrates all primary activities of value chain
  - Manage all interactions with customer though four phases of customer life cycle: (Fig. 7-11)
    1. Marketing—marketing sends messages to target market
    2. Customer Acquisition—customer prospects order and need to be supported
    3. Relationship Management—support and resale processes increase value to existing customers
    4. Loss/churn—win-back processes categorize customers according to value and attempt to win back high-value customers
Managing Customer Relationships

- Customer relationship management (CRM) is a set of software programs that support management activities performed to obtain, enhance relationships with, and retain customers.
  - Includes: sales, support, and service processes.
  - Consists of technological components as well as many pieces of information about customers, sales, marketing effectiveness, responsiveness, and market trends.
- Optimized CRM processes and systems can lead to better customer service, more efficient call centers, product cross-selling, simplified sales and marketing efforts, more efficient sales transactions, and increased customer revenues.

Common CRM Systems

- Three common CRM systems are Oracle, SAP, and Salesforce.com.
- Oracle and SAP have CRM systems that integrate nicely with their other enterprise systems.
- Modules include pricing, sales force automation, sales order management, support activities, customer self-service, and service management.
- SAP’s CRM also has marketing support modules such as resource and brand management, campaign management, real-time offer management, loyalty management, and e-marketing.
- Oracle and SAP evolved from enterprise systems, whereas Salesforce.com began as a Web-based cloud system.
- Social IT is increasingly integrated into CRM solutions.
- These additional channels of data are useful for building customer relationships.

Summary on the Process for Radical Redesign

- The different approaches for radical redesign all include:
  - Beginning with a vision of which performance metrics best reflect the success of the overall business strategy.
  - Making changes to the existing process.
  - Measuring the results using the predetermined metrics.
- Figure 5.6 illustrates a general view of radical design.
- Figure 5.7 illustrates a method for redesigning a business process.
- A workflow diagram is the tool used to understand a business process.

Deconstruction of the newspaper industry: BPR

Old newspaper industry value chain

- Journalists
- Columnists
- Editors
- Printers
- Distributors
- Readers

New newspaper industry value chain

- Journalists
- Columnists
- Editors
- Internet
- Readers

BPR

Radical Change = New organization + IT

Types of Organizational Strategies

Industry Structure + Competitive Strategies + Cooperative Strategies

INTEGRATED SUPPLY CHAINS
Wal-Mart

- What is the “core/type of company” of the Wal-Mart?
  - Grocery
  - Manufacturing
  - or ??

What is a Supply Chain (network)?

- A supply chain is a network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services delivered to the ultimate consumer.
- A supply chain has three flows:
  - Information,
  - Goods/materials, and
  - Payment (money)
- Today’s supply chain is a complex web of suppliers, assemblers, logistic firms, sales/marketing channels, and other business partners linked primarily through information networks and contractual relationships.

Managing Supply Chains

- Supply chain management (SCM) systems manage the integrated supply chain.
- Processes are linked across companies; a companion process at a company’s customer or supplier creates an integrated supply chain.
- Web-based technology links customers and suppliers through a single network.
- Costs and opportunities are optimized for all companies in the supply chain.
- Globalization of business, ubiquity of communication networks, and IT have enabled businesses to use suppliers from almost anywhere in the world.
- Supply chain integration is the approach of technically linking supply chains of vendors and customers to streamline the process and to increase efficiency and accuracy.

Integrated Supply Chains Challenges

- Challenges may be caused by different degrees of integration and coordination among supply chain members.
- Information integration.
  - Partners must agree on:
    - the type of information to share.
    - the format of that information.
    - the technological standards they will both use to share the information.
    - the security they will use to ensure that only authorized partners access the information.
  - Trust must be established so the partners can solve higher-level issues that may arise.
- Synchronized planning
  - A joint design of planning, forecasting, and replenishment.

Additional Integrated Supply Chains Challenges

- Workflow coordination
  - The coordination, integration, and automation of critical business processes between partners.
- Using a third party to link the procurement process to the preferred vendors or communities of vendors who compete virtually for the business.
- The integration leads to new business models.
- Demand-driven supply networks are the next step for companies with highly-evolved supply chain capabilities.
- Integrated supply chains are global in nature.
• 66. (p.164) What might an integrated supply chain look like for a financial services company such as an insurance provider or a bank? What are the components of the process?

• A bank may use this type of system to link payroll services that it sells to its customers, but is actually purchased by the bank from a 3rd party organization which in turn links directly to its customers through a web site where customers order the particular payroll items they want, which is then forwarded by the bank to the 3rd party organization and then sent to the customer.

• Another example, could be the printing of new checks for a client of a bank. The client orders the checks from the bank which in turn automatically forwards the order to a 3rd party printer, who in turn mails the checks directly to the client. To the client this transaction is transparent. They only know that they need checks, and ordering them online through their bank and getting them as soon as possible is their primary concern.

Product Lifecycle Management (PLM)

• PLM systems automate the PLM steps starting with the idea for a product and ending with the “end-of-life” of a product.
  – Includes the innovation activities, new product development and management, design, and product compliance.

• PLM contains all the information about a product.
  – Design, production, maintenance, components, vendors, customer feedback, and marketing.

Benefits of Enterprise Systems

• All modules easily communicate together with efficiency.
• Useful tools for effectively centralizing operations and decision making.
• Reinforce the use of standard procedures across different locations.
• Redundant data entry and duplicate data may be eliminated.
• Standards for numbering, naming, and coding enforced.
• Data and records can be cleaned up through standardization.

Disadvantages of Enterprise Systems

• Implementation requires an enormous amount of work.
• Requires redesigning business processes to achieve optimal performance of the integrated modules.
• Organizations are expected to conform to the approach used in the enterprise system (e.g., change organization structure, tasks).
• A hefty price tag: additional costs for project management, user training, and IT support.
• Sold as a suite rather than individual modules.
• Enterprise systems are risky.

When the System Drives the Change

• It is appropriate for an organization to let the enterprise system drive business process redesign when:
  – it is just starting out and processes do not yet exist.
  – operational business processes are not a source of competitive advantage.
  – current systems are in crisis and there is not enough time, resources, or knowledge in the firm to fix them (e.g., Y2K).

• It is inappropriate to let the enterprise system drive business process change when:
  – changing processes that are relied upon for strategic advantage.
  – the features of available packages do not fit the needs of the business.
  – there is a lack of top management support.

Challenges for Integrating Enterprise Systems Between Companies

• Deciding what to share, how to share it, and what to do with it when the sharing takes place.
• Agreeing on security and encryption or other measures to protect data integrity and ensure that only authorized parties have access.
• The complexity of the integration can be reduced by insisting on standards—either at the industry level or at the system level.
• The increasing use of cloud-based systems with standard interfaces makes the integration easier.
Summary on Processes

• To improve process quality and organization’s productivity processes should be organized and linked throughout the entire enterprise and integrated with a centralized database.

Summary

• IS can enable or impede business change.
• You must look at business process to understand the rule IS plays in business transformation.
• TQM or BRP are normally used to make changes to business processes.
• ERP systems can be used to affect organizational transformation.
• Information systems are useful tools to both enable and manage business transformation.

THE CONNECTED CORPORATION: THE FUTURE OF ERP

• Data points where SCM, CRM, and ERP integrate.
• Lines between SCM, CRM, and ERP will continue to blur
  – Internet – continue to help organizations integrate data and process across functional departments
  – Interface – customizable employee browsers
  – Wireless technology – support a mobile workforce

End of Chapter 5