Chapter 5
Information Systems and Business Transformation

Jason C. H. Chen, Ph.D.
Professor of MIS
School of Business Administration
Gonzaga University
Spokane, WA 99258
chen@gonzaga.edu

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.

Opening Case - Sloan Valve
• 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 core process and a strategic 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.
• 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.

Opening Case - Sloan Valve – (Q/A)

1. What is NPD? What did Sloan do?
   – New Product Development
   – Adoption of ERP.
   – Process: team included members across the firm; proposed new process of (1) ideation (2) business case development, (3) project portfolio management, (4) product development, (5) product/process validation, (6) launch

2. What was wrong with their Product Development Process?
   – Complex and slow; 16 units had to coordinate; took 18-24 months to bring new products to market; >50% of ideas didn’t make it; nobody accountable

3. Did it help?
   – Results: Time to market reduced to 12 months, poor ideas filtered out early; better access to info and customer feedback; better accountability

4 Are all enterprise system implementations this successful?
   – Other firms: No, some failed, such as: Overstock.com, Levi Strauss, Avis Europe
Chapter Overview

• This chapter explores the relationship between the transformation of business and information systems.
• There are three key concepts in this chapter:
  – the first is that businesses operate as a set of business processes, rather than as a set of functions, departments, or other organizational forms;
  – second is that business processes are redesigned using both radical (reengineering) and incremental techniques; and
  – third, IS are used to transform a business (by way of changing their business processes).
• Two of the major concepts discussed in the chapter are Integrated Supply Chains and Enterprise Systems.

Discussion Question

• #1. Why was radical design of business processes embraced so quickly and so deeply by senior manager of so many companies? In your opinion, and using hindsight, was this a benefit for businesses? Why or why not? (Why BPR embraced so radically?)

Why was radical design of business processes embraced so quickly and so deeply by senior manager of so many companies? In your opinion, and using hindsight, was this a benefit for businesses? Why or why not? (Why BPR embraced so radically?)

• Ans: This idea was embraced so quickly because managers realized they needed to change the way they did business and reengineering offered them a roadmap to do that. Reengineering was written up as the method to use to achieve very significant (75% or more) increases in productivity, decreases in costs, and increases in efficiency.
• It was a benefit for businesses in part because even if they didn’t achieve the radical objectives they set for themselves, they did realize that changing their operations was not only possible, but also critical if they want to operate at a reasonable cost level. Other managers realized that business processes were the critical unit of business, not function or geographical region. Still other businesses achieved real savings and real productivity gains from the process of reengineering.
• It was not necessarily a benefit to business because the process of reengineering was very disruptive to daily operations. Many people were pulled out of the daily business and put on reengineering teams. Those left in the operations were overloaded, and in many cases, the business was forced to abandon reengineering efforts. This was costly.

Transformation Methodology

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

What are the two Perspectives for Business Processes?

SILO PERSPECTIVE
VERSUS
BUSINESS PROCESS PERSPECTIVE
Silo (Functional) Perspective

- Specialized functions (sales, accounting, production, etc.)

  Executive Officers
  VP Financial
  VP Engineering
  VP Legal
  VP Human Resources
  VP Marketing
  VP Operations
  VP Manufacturing
  VP Sales

- Advantages:
  - Allows optimization of expertise.
  - Group like functions together for transfer of knowledge.

- Disadvantages:
  - Sub-optimization (reinvent wheel; gaps in communication; bureaucracy)
  - Tend to lose sight of overall organizational objectives.

The Process Perspective

- Process is defined as an interrelated, sequential set of activities and tasks that turns inputs into outputs, and includes the following:
  - Beginning and an end
  - Inputs and outputs
  - A process to convert inputs into outputs
  - Metrics to measure effectiveness

- Examples of processes:
  - Fulfill customer orders
  - Manufacturing, planning, execution
  - Procurement (see below)

- They cross functions

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).

How to Manage a Process

- Identify the customers of processes (who receives the output?)
- Identify the customers’ requirements (how do we judge success?)
- Clarify the value each process adds to the organizational goals
- Share this perspective so the organization itself becomes more process focused

<table>
<thead>
<tr>
<th>Silo Perspective</th>
<th>Business Process Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition</td>
<td>Self-contained functional units such as marketing, operations, finance, and so on</td>
</tr>
<tr>
<td>Optimize on organizational goals, or business process</td>
<td>Interrelated, sequential set of activities and tasks that turns inputs into outputs</td>
</tr>
<tr>
<td>Functional</td>
<td>Cross-functional</td>
</tr>
<tr>
<td>Goal</td>
<td>Functional goals, which might be a suboptimal organizational goal</td>
</tr>
<tr>
<td>Optimizes on organizational goals, or &quot;big picture&quot;</td>
<td></td>
</tr>
<tr>
<td>Benefits</td>
<td>Highlighting and developing core competencies; Functional efficiencies</td>
</tr>
<tr>
<td>Averting work duplication and cross-functional communication gaps; organizational effectiveness</td>
<td></td>
</tr>
<tr>
<td>Problems</td>
<td>Redundancy of information throughout the organization; cross-functional inefficiencies; communication problems</td>
</tr>
<tr>
<td>Difficult to find knowledgeable generalists; sophisticated software is needed</td>
<td></td>
</tr>
</tbody>
</table>

Figure 5.3: Cross-Functional Nature of Business Processes

Figure 5.4 Comparison of Silo Perspective and Business Process Perspective
What do you do when things change?

- Dynamic and agile processes
- Examples:
  - Agile: Autos are built with wires and space for options
  - Dynamic: Call centers route incoming or even outgoing calls to available locations and agents
- IT is required to pull this off well

Processes: Using the Internet and Social Technologies

Business Process Transformation

- Organization transformation is a comprehensive organization-wide change initiative that results in change in the “deep structure” of the firm, radically altering strategy, structure, systems, processes, human resource requirements, and core values and beliefs (for the purposes of dynamic and agile processes)
- Two processes:
  - Incremental and radical change consistent with the change process.
  - Business Process Re-structuring
  - Business Process Re-engineering (BPR)

Building Agile and Dynamic Business Processes

Techniques to Transform a Static Process

- Incremental, continuous process improvement
  - 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, HOW?
  - Including total quality management (TQM) and Six Sigma
- Radical process redesign
  - Also known as business process reengineering (BPR)
  - Radical changes

Incremental Change

- Total Quality Management
  - Total Quality Management (TQM) is a tool for change that uses small incremental changes.
- Often results in favorable reactions from personnel
  - Improvements are owned and controlled
  - Less threatening change
- Six-Sigma is one popular approach to TQM
  - Developed at Motorola
  - Institutionalized at GE for “near-perfect products”
  - Generally regarded as 3.4 defects per million opportunities for defect (6 std dev from mean)
Radical Change

- Business Process Reengineering (BPR)
- Sets aggressive improvement goals.
- Goal is to make a rapid, breakthrough impact on key metrics in a short amount of time.
- Greater resistance by personnel.
- Use only when radical change is needed.

Key Aspects of Radical Change Approaches

- Need for quick, major change
- 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).

Deconstruction of the newspaper industry: BPR

Old newspaper industry value chain

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

New newspaper industry value chain

- Journalists
- Columnists
- Internet
- Readers

BPR

Radical Change = New organization + IT

Types of Organizational Strategies = Industry Structure + Competitive Strategies + Cooperative Strategies + Co-opetition

Risks of Radical Redesign

- Research shows some of the common reasons why companies fail to reach their goals:
  - Lack of senior management support at the right time and at the right place.
  - Lack of coherent communications program.
  - Introducing unnecessary complexity into the new process design.
  - Underestimating the amount of effort needed to redesign and implement the new processes.
  - Combining reengineering with downsizing.

FOUR out of FIVE are related to "Human Elements"
THE TOOLS FOR CHANGE

Six Sigma (6σ)

- **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) or Six standard deviations.

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

Workflow and Mapping Processes

- Workflow is a way to look at a cross-functional process.
- Workflow diagrams show a picture of the sequence and detail of each process step.
- Objective is to understand and communicate the dimensions of the process.
- Over 200 (software) products are available to do this.
- High-level overview chart plus detailed flow diagram of the process.
Business Process Management - BPM

- Information systems tools used to enable information flow within and between processes.
- Comprehensive, enterprise software packages.
- Most frequently discussed:
  - ERP (Enterprise Resource Planning),
  - CRM (Customer Relationship Management),
  - SCM (Supply Chain Management)
- Designed to manage the potentially hundreds of systems throughout a large organization.
- SAP, Oracle, Peoplesoft are the most widely used ERP software packages in large organizations.

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>Process Integration</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>The business is focused on process integration, usually creating a single face to customers and suppliers but does not usually impose process standards on operating units.</td>
<td>Decentralized design; business units decide how to meet customer needs</td>
<td>Centralized design; high needs for reliability, predictability, and sharing; single view of process</td>
</tr>
<tr>
<td>The business is focused on process standardization, in which tasks are done the same way across units, but there is little need for business units to interact.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Process Integration Architecture

ERP and ERP II

- Two of the largest vendors of enterprise systems are German-based SAP and California-based Oracle (EnterpriseOne).
- Designed to help large companies manage the fragmentation of information stored in hundreds of individual desktop, department, and business unit computers across the organization.
  - require long-term relationships with software vendors.
  - are evolving as the systems continue to change to fit the needs of the diverse marketplace.
  - ERP should not be implemented if the system is based on a cultural model that conflicts with the local customs and that can not easily be accommodated by the ERP.
- 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
  - Include ERP plus other functions (e.g., social and collaboration features) (see Figure 5.8)
Customer Relationship Management

- Customer Relationship Management (CRM) is a natural extension of applying the value chain model to customers.
- CRM includes many management activities performed to
  - obtain,
  - enhance relationships with, and
  - retain customers
- CRM can lead to better customer service, which leads to competitive advantage for the business.
- Common systems are:
  - Oracle
  - SAP
  - Salesforce.com (web-based cloud system)
- IT is increasingly integrated into CRM solutions.

Wal-Mart

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

What is a Supply Chain Management (Network)

- A supply chain is a network of enterprise systems 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)
- Difficulties in Integrated Supply Chains
  - Trust must be established so the partners can solve higher-level issues that may arise
### The Adoption Decision

- The enterprise system sometimes should drive business process **redesign** when:
  - Just starting out.
  - Organizational processes are not relied upon for strategic advantage.
  - Current systems are in crisis.
- It is **inappropriate** for the enterprise system to drive business process redesign when:
  - Changing an organization’s processes that are relied upon for strategic advantage.
  - The package does not fit the organization.
  - 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 role 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.
Tesco, the U.K. retail grocery chain, used their CRM system to generate annual incremental sales of £100 million. Using a frequent-shopper card, a customer got discounts at the time of purchase and the company got information about their purchases, creating a detailed database of customer preferences.

Tesco then categorized customers and customized discounts and mailings, generating increased sales and identifying new products to expand their offerings. At the individual stores, data showed which products must be priced below competitors, which products had fewer price-sensitive customers, and which products must have regular low prices to be successful. In some cases, prices are store-specific, based on the customer information.

The information system has enabled Tesco to expand beyond groceries to books, CDs, DVDs, consumer electronics, flowers, and wine. The chain also offers services such as loans, credit cards, savings accounts, and travel planning.

a) What can Tesco management do now that they have a CRM that they could not do prior to the CRM implementation?

b) How does this system enable Tesco to increase the value provided to customers?

7. Ans:

a) Tesco can implement **differentiated pricing** strategies based on detailed information about price elasticity. Previously, management did not possess this level of detailed information.

b) The benefit to customers is that **coupons** and **discounts** can be targeted to their unique preferences. Rather than getting bombarded with sales announcements unrelated to their interests, this approach would be a welcomed change. Logically, both Tesco and its customers would benefit from this new system.