Understanding the Business Value of Systems and Managing Change
OBJECTIVES

• Evaluate models for understanding the business value of information systems

• Analyze the principal causes of information system failure

• Assess the change management requirements for building successful systems
• Select appropriate strategies to manage the system implementation process

• Identify the challenges posed by implementing new systems and management solutions
• **Challenge:** Change the organization and business processes at one of the world’s largest retail banking firms in order to support V-Banking systems

• **Solutions:** develop new business processes, retrain workforce, develop a customer-centric culture

• Train customers in the use of new digital banking services

• Illustrates the importance of changing the organization and culture in a business to support technology change
Two kinds of IS investments:

- Projects with 12-24 month objectives
- Longer periods infrastructure investments

Two ways for producing value:

- Improvement in business processes to increase firm efficiency
- Improvements in management decision making
Additional IS value from:

- Strengthening firm strategically (ties to partners, customers, increasing flexibility, etc.)
- Enabling future implementation of new technologies
Traditional Capital Budgeting Models

- **Capital Budgeting:** Process of analyzing and selecting various proposals for capital expenditures

**Capital expenditures:**

- Expand production to meet anticipated demand
- Modernize production equipment to reduce costs
- Can be noneconomic, e.g. installing pollution control equipment
Six capital budgeting models for evaluating capital projects:

- The payback method
- The accounting rate of return on investment (ROI)
- The net present value
- The cost-benefit ratio
- The profitability index
- The internal rate of return (IRR)
Limitations of Financial Models

- Do not express the risks and uncertainty of their own costs and benefits estimates.

- Costs and benefits do not occur in the same time frame.

- Inflation may affect costs and benefits differently.

- Intangible benefits are difficult to quantify.
Case Example: Capital Budgeting for a New Supply Chain Management System

Heartland Stores:

• General merchandise retail chain in eight Midwestern states

• Five regional distribution centers, 377 stores, and about 14,000 different products in each store
Investment strategy and goals:

- New software and hardware to upgrade its supply chain management system
- Reduce inventory and inventory costs
- Reduce labor costs
- Reduce telecommunications costs
- Reduce transportation costs
Costs and Benefits of the New SCM System

Figure 9-1
CHAPTER 9 UNDERSTANDING THE BUSINESS VALUE OF SYSTEMS AND MANAGING CHANGE

UNDERSTANDING THE BUSINESS VALUE OF INFORMATION SYSTEMS

Financial Models

Figure 9-2
The Payback Method

- **Payback method:** Measures the time required to pay back the initial investment of a project

\[
\frac{\text{Original Investment}}{\text{Annual net cash inflow}} = \text{Number of years to pay back}
\]

- **Heartland Stores:** More than 2 years to pay back initial investment
Accounting Rate of Return on Investment (ROI):
Calculates rate of return by adjusting the cash inflows produced by the investment for depreciation

1. Calculate net benefit

\[
\text{Net benefit} = \frac{(\text{Total benefits} - \text{Total cost} - \text{Depreciation})}{\text{Useful life}}
\]
2. Calculate ROI by dividing net benefit by the total initial investment

$$\frac{\text{Net benefit}}{\text{Total initial investment}} = \text{ROI}$$

Heartland Stores ROI: 2.93 %
Net Present Value

- **Present value:** The value in current dollars of a payment or stream of payments to be received in the future

It can be calculated by using the following formula:

\[
\text{Payment} \times \frac{1 - (1+\text{interest})^{-n}}{\text{Interest}} = \text{Present value}
\]
• **Net present value:** Amount of money an investment is worth, taking into account its cost, earnings, and the time value of money

1. Calculate present value of stream of benefits:

   \[
   \text{Payment} \times \frac{1 - (1+\text{Interest})^{-n}}{\text{Interest}} = \text{Present value}
   \]

2. Calculate net present value:

   \[
   \text{Present value of expected cash flows} - \text{Initial investment cost} = \text{Net present value}
   \]
Heartland Stores present value = $21,625,709

Investment cost = $11,467,350

Net Present value = $10,98,359
Cost-Benefit Ratio:

\[
\frac{\text{Total benefits}}{\text{Total costs}} = \text{Cost-benefit ratio}
\]

Heartland Stores Cost-Benefit Ratio: 1.71

Profitability Index: Can be used to compare the profitability of alternative investments

\[
\frac{\text{Present value of cash inflows}}{\text{Investment}} = \text{Profitability index}
\]

Heartland Stores Profitability Index: 1.89
Internal Rate of Return (IRR):

- Rate of return or profit that an investment is expected to earn, taking into account the time value of money.
- The discount (interest) rate that will equate the present value of the project’s future cash flows to the initial cost of the project.
- Value of $R$ (discount rate) is such that $\text{Present value} - \text{Initial cost} = 0$.

Heartland Stores IRR: 33%
Strategic Considerations

Portfolio Analysis:
Seeks to develop

• An overall understanding of where the firm is making information technology investments

• Based on inventory of all information systems projects and assets, including infrastructure, outsourcing contracts, and licenses

• Assigns risk and benefit profiles to IS investments
A System Portfolio

![A System Portfolio Diagram]

- **High Potential Benefits to Firm**: Cautiously examine if Project Risk is High. Identify and develop if Project Risk is Low.
- **Low Potential Benefits to Firm**: Avoid if Project Risk is High. Routine projects if Project Risk is Low.

**Figure 9-3**

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Scoring Models:

- A quick and sometimes compelling method for arriving at a decision on alternative systems.

- The most important outcome of a scoring model is not the score but agreement on the criteria used to judge a system.

- Best practice is to cycle through the scoring model several times, changing the criteria and weights, to see how sensitive the outcome is to reasonable changes in criteria.
Real Options Pricing Models (ROPM):

• Uses the financial industry concept of options valuation

• An option is the right, but not obligation, to act at a future date.

• An initial expenditure on IS technology creates the right, but not the obligation, to obtain the benefits associated with further development and deployment of the technology.
Real Options Pricing Models (ROPM): (Continued)

- Capital investments cannot be traded on a market and differ in value based on the firm.

- Factors, such as prior expertise, skilled labor force, market conditions, and other factors
Value of IT project (real option) is a function of the following:

- Value of underlying IT asset (present value of expected revenues)
- Volatility of value of asset (exercise price)
- Risk-free interest rate
- Option time to maturity (length of project deferment)
Knowledge Value-Added Approach:

- Any program that uses information technology to change business processes requires knowledge input.
- The value of the knowledge used to produce improved outputs of the new process can be used as a measure of the value added.
- Knowledge inputs can be measured in terms of learning time to master a new process, and a return on knowledge can be estimated.
Information Technology Investments and Productivity

• Productivity is a measure of the firm’s efficiency in converting inputs to outputs. It refers to the amount of capital and labor required to produce a unit of output.

• Information technology has increased productivity in manufacturing, but productivity gains in service sector are unclear.
Information Technology Investments and Productivity (Continued)

- Contribution of IT to productivity in information and knowledge industries is difficult to quantify.

- Information technology investments are more likely to improve firm performance if accompanied by complementary investments in new business processes, organizational structures, and organizational learning.
Information Systems Problem Areas

Figure 9-4
Design:

- System design may fail to capture essential business requirements or improve organizational performance.

- **Information may not be timely:** Information may be in a format that is difficult to understand or have a poor user interface.
Data:

• The data in the system may have a high level of inaccuracy or inconsistency, may be inaccessible or incomplete.

Cost:

• Some systems operate quite smoothly, but their costs to implement and run on a production basis may be way over budget.
Operations:

- The system does not run well or breaks down and information is not provided in a timely and efficient manner.
- System response time is too long.
- Operations problems can be attributed to technical features, but most stem from organizational factors.
Change Management and the Concept of Implementation

- **Implementation**: All organizational activities working toward the adoption, management, and routinization of a new system change agent.
Change Management and the Concept of Implementation (Continued)

- The systems analyst who develops technical solutions and redefines the configurations, interactions, job activities, and power relationships of various organizational groups

- Acts as catalyst for the entire change process and is responsible for ensuring that all parties involved accept the changes created by a new system
Causes of Implementation Success and Failure

Figure 9-5

Information Systems Success or Failure Factors
User Involvement and Influence:

• If users are heavily involved in systems design, they have more opportunities to mold the system according to their priorities and business requirements and control the outcome.

• Involved users are more likely to react positively to the completed system.
User-Designer Communications Gap:

- Users can have limited understanding of other issues and solutions.

Management Support and Commitment:

  Commitment of management to

  - An information systems project usually results in a more positive perception and acceptance by users and the technical services staff.
Management Support and Commitment: (Continued)

- Management backing also ensures that a systems project receives sufficient funding and resources to be successful

- All the changes in work habits and procedures and any organizational realignment associated with a new system depend on management backing
Level of Complexity and Risk:

The level of project risk is influenced by:

- Project size
- Project structure
- Level of technical expertise of the information systems team
Management of the Implementation Process

Consequences of Poor Project Management

Cost overruns
Time slippage
Technical shortfalls impairing performance
Failure to obtain anticipated benefits
Likely Consequences of Poor Project Management:

- Costs that vastly exceed budgets
- Unexpected time slippage
- Technical shortfalls resulting in performance that is significantly below the estimated level
Likely Consequences of Poor Project Management:

- Failure to obtain anticipated benefits

Possible reasons for poor management:

- Ignorance and optimism

- Mythical man-month

- Falling behind: Bad news travels slowly upward
Change Management Challenges for Business Process Reengineering, Enterprise Applications, and Mergers and Acquisitions

Successful implementation includes addressing employees’ concerns about change

- Resistance by key managers
- Changing job functions, career paths, recruitment practices
- Managing training
System Implications of Mergers and Acquisitions (M&As):

As are major growth engines for businesses, enabling firms to

- Gain market share and expertise very quickly
- Critical issues include the organizational characteristics of the merging companies and IT infrastructures
System Implementation of Mergers and Acquisitions (M&As): (Continued)

- Realistic costs of integration
- Estimated benefits of economies in operation, scope, knowledge, and time
- Problematic systems that require major investments to integrate
- More than 70 percent of all M&As result in a decline in shareholder value
Managing technical complexity:

- Formal planning and control tools
- Increasing user involvement and overcoming user resistance
Managing technical complexity: (Continued)

- **External integration tools**: Ways to link the work of the implementation team to users at all organizational levels

- **Counter implementation**: Deliberate strategy to thwart the implementation of an information system or an innovation in an organization
Formal Planning and Control Tools Help to Manage Information Systems Projects Successfully

### Figure 9-7

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**MANAGING IMPLEMENTATION**

Formal Planning and Control Tools Help to Manage Information Systems Projects Successfully.
Designing for the Organization

• Systems development must address how the organization will change when the new system is installed, including installation of intranets, extranets, and Web applications

• Organizational impact analysis
Designing for the Organization: (Continued)

Allowing for the human factor

- User performance standards
- Ergonomics
Sociotechnical Design:

- Explores workgroup organization and impacts from technical solutions
- Blends technical efficiency with sensitivity to human and organizational needs
- Raises productivity without sacrificing human and social goals
Management Opportunities:

New information systems can produce extraordinarily high returns if system builders can

- Manage the change process and
- Accurately calculate the costs and benefits of the investments
Management Challenges:

• Determining system benefits and costs when they are difficult to quantify

• Dealing with the complexity of large-scale systems projects
Solution Guidelines:

Obtaining more value from information technology investments:

- Full documentation of the firm’s applications and IT infrastructure and periodic reviews of the firm’s IT portfolio

- Use of appropriate metrics for monitoring project outcomes
Solution Guidelines: (Continued)

• Ensure IS investments are closely linked to business objectives. Clear identification of project risks and returns, with real options analysis

• Measure business value throughout the duration of new system projects and weed out underperforming projects if necessary
Solution Guidelines: (Continued)

New approaches to project management:

- Assuming an enterprise-wide focus, driven by the firm’s strategic business vision and technology architecture
- Solving problems and meeting challenges as they arise rather than simply meeting formal project milestones
- Emphasize learning as well as planning, seeking ways to adapt to unforeseen uncertainties and chaos that, if properly handled, could provide additional opportunities and benefits