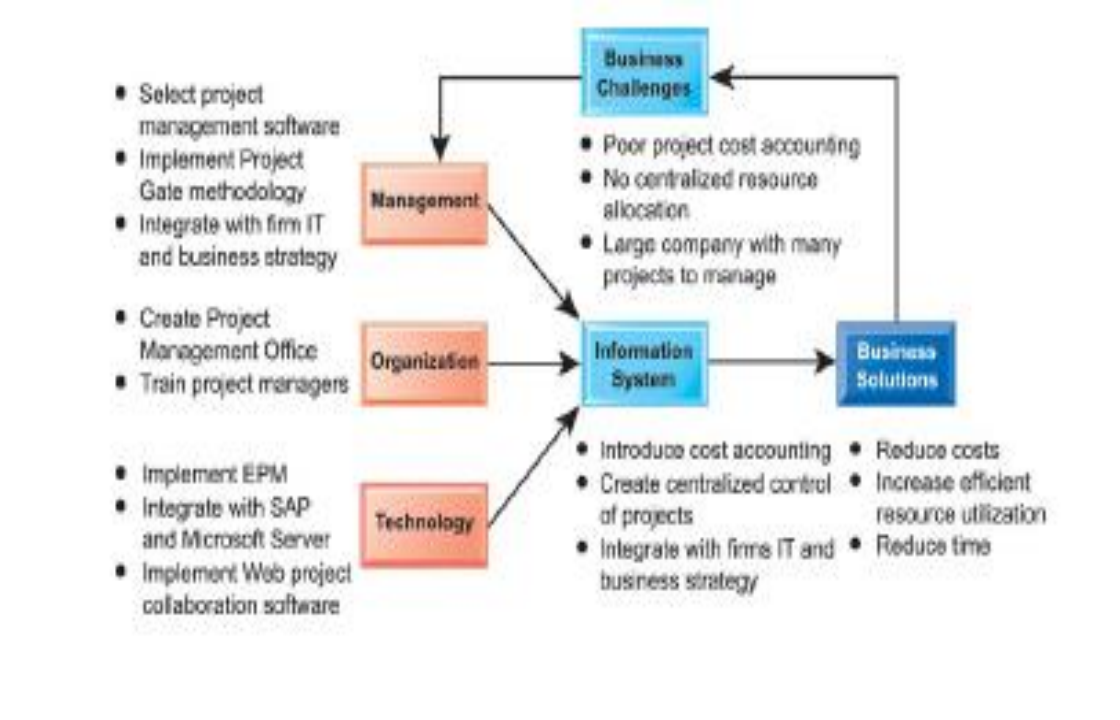
Chapter 14

Understanding the Business Value of Systems and Managing Change



Objectives

1. How can our company measure the business benefits of our information systems? What models should be used to measure that business value?
2. Why do so many system projects fail? What are the principal reasons for system failures?
3. How should the organizational change surrounding a new system be managed to ensure success?

Objectives

4. Are there any special challenges to implementing international information systems?

5. What strategies can an organization use to manage the system implementation process more effectively?

Management Challenges

1. Determining benefits and costs of a system when they are difficult to quantify.
2. Dealing with the complexity of large-scale systems projects.

Two Kinds of Information System Investments

- System Projects
- Infrastructure

IT Investment Values

- Improvement in business processes
- Improvement in management decision making

Longer Term Values

- Improve strategic position
- Implement new technologies and products

Traditional Capital Budgeting Models

Capital Budgeting

- Rely on measuring cash inflows and outflows
- 6 capital budgeting models
  - Payback method
  - Accounting rate of return on investment (ROI)
  - Net present value
  - Cost-benefit ratio
  - Profitability index
  - Internal rate of return (IRR)

Traditional Capital Budgeting Models

Costs and Benefits of Information Systems

- Costs:
  - Hardware, telecommunications, software, services, personnel
- Tangible benefits (cost savings):
  - Increased productivity, lower operational costs, reduced workforce, etc.
- Intangible benefits:
  - Improved asset utilization, improved resource control, improved organizational planning, etc.

Traditional Capital Budgeting Models

Limitations of Financial Models

- Costs and benefits don't occur in same time frame
- Difficulties in measuring intangible benefits
- Bias toward applications with specific business functions
- Overlook social and organizational costs and benefits

Case Example: Capital Budgeting for a New Supply Chain Management System

Heartland Stores

General merchandise retail chain upgrading supply chain management system

- Reduce inventory costs: Items stocked in inventory
- Reduce labor costs: Inventory and tracking personnel
- Reduce telecommunication costs: Less time on phone tracking inventory and shipments
- Reduce transportation costs: Consolidating shipments, more efficient shipping schedules

Understanding the Business Value of Information Systems

Costs and benefits of the new supply chain management system

Estimated Costs & Benefits - New Supply Chain Management System

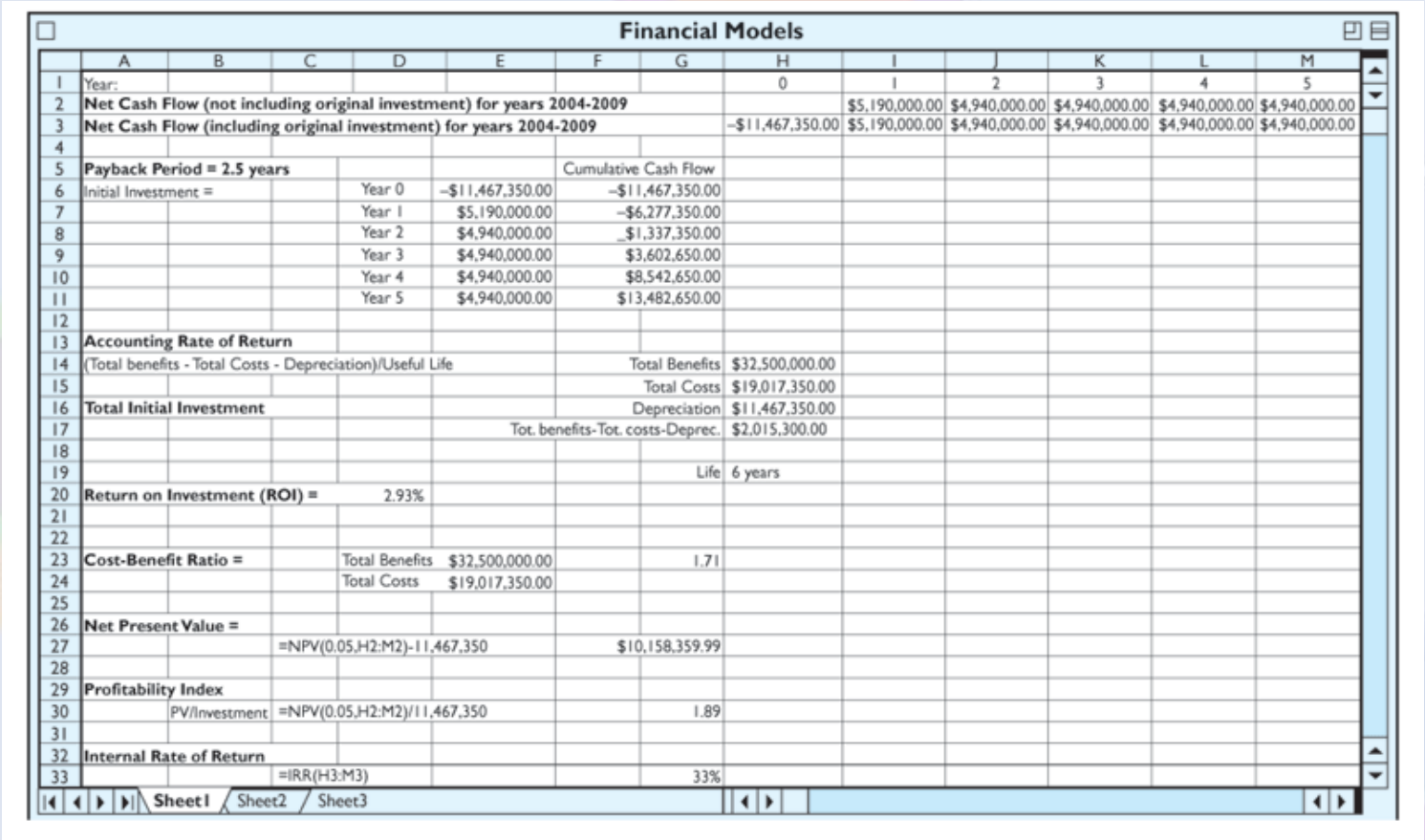
	A	B	C	D	E	F	G	H	I	J	K	L
1	Year :					0	1	2	3	4	5	
2						2004	2005	2006	2007	2008	2009	
3	**Costs Hardware**											
4		Servers			7@ 80000	560,000						
5		Backup servers			4@ 80000	320,000						
6		PCs at loading dock			100@ 1250	125,000						
7		Radio-frequency devices			1000@ $1175	1,175,000						
8		Storage				800,000						
9												
10	**Network infrastructure**											
11		Routers and hubs			300@ 4100	1,230,000						
12		Firewalls			2@ 6300	12,600						
13		Wireless RF network				1,750,000						
14		Backup network system				1,150,000						
15		Telecom links				74,250	225,000	225,000	225,000	225,000	225,000	
16												
17	**Software**											
18		Database				475,000						
19		Web servers (Apache)				0						
20		Supply chain planning & execution modules				1,187,500						
21												
22	**Labor**											
23		Business staff				425,000	115,000	115,000	115,000	115,000	115,000	
24		IS staff				1,225,000	525,000	525,000	525,000	525,000	525,000	
25		External consultants				576,000	95,000	95,000	95,000	95,000	95,000	
26		**Training (end users)**				382,000	35,000	35,000	35,000	35,000	35,000	
27	**Sub Total**					11,467,350	995,000	995,000	995,000	995,000	995,000	
28												
29	**Maintenance and Support**											
30		Hardware maintenance & upgrades					240,000	240,000	240,000	240,000	240,000	
31		Software maintenance & upgrades					275,000	275,000	275,000	275,000	275,000	
32		**Sub Total**					515,000	515,000	515,000	515,000	515,000	
33	**Total by Year**					11,467,350	1,510,000	1,510,000	1,510,000	1,510,000	1,510,000	
34												
35	**Total Costs**					19,017,350						
36	**Benefits**											
37		Reduced labor costs					1,650,000	1,650,000	1,650,000	1,650,000	1,650,000	
38		Reduced inventory costs					3,500,000	3,500,000	3,500,000	3,500,000	3,500,000	
39		Reduced transportation costs					1,300,000	1,300,000	1,300,000	1,300,000	1,300,000	
40		Reduced telecommunications costs					250,000	250,000	250,000	250,000	250,000	
41												
42	**Sub Total**					0	6,700,000	6,450,000	6,450,000	6,450,000	6,450,000	
43												
44	**Net Cash Flow**					−11,467,350	5,190,000	4,940,000	4,940,000	4,940,000	4,940,000	
45												
46	**Total Benefits**					32,500,000						

Sheet1 Sheet2 Sheet3

Figure 14-1

Understanding the Business Value of Information Systems

Financial models



Financial Models

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Year:							0	1	2	3	4	5
2	**Net Cash Flow (not including original investment) for years 2004-2009**								$5,190,000.00	$4,940,000.00	$4,940,000.00	$4,940,000.00	$4,940,000.00
3	**Net Cash Flow (including original investment) for years 2004-2009**							-$11,467,350.00	$5,190,000.00	$4,940,000.00	$4,940,000.00	$4,940,000.00	$4,940,000.00
4													
5	**Payback Period = 2.5 years**					Cumulative Cash Flow							
6	Initial Investment =			Year 0	-$11,467,350.00	-$11,467,350.00							
7				Year 1	$5,190,000.00	-$6,277,350.00							
8				Year 2	$4,940,000.00	-$1,337,350.00							
9				Year 3	$4,940,000.00	$3,602,650.00							
10				Year 4	$4,940,000.00	$8,542,650.00							
11				Year 5	$4,940,000.00	$13,482,650.00							
12													
13	**Accounting Rate of Return**												
14	(Total benefits - Total Costs - Depreciation)/Useful Life						Total Benefits	$32,500,000.00					
15							Total Costs	$19,017,350.00					
16	**Total Initial Investment**						Depreciation	$11,467,350.00					
17						Tot. benefits-Tot. costs-Deprec.		$2,015,300.00					
18													
19							Life	6 years					
20	**Return on Investment (ROI) =**			2.93%									
21													
22													
23	**Cost-Benefit Ratio =**			Total Benefits	$32,500,000.00		1.71						
24				Total Costs	$19,017,350.00								
25													
26	**Net Present Value =**												
27			=NPV(0.05,H2:M2)-11,467,350				$10,158,359.99						
28													
29	**Profitability Index**												
30		PV/Investment	=NPV(0.05,H2:M2)/11,467,350				1.89						
31													
32	**Internal Rate of Return**												
33			=IRR(H3:M3)				33%						

Sheet1 Sheet2 Sheet3

Figure 14-2

Case Example: Capital Budgeting for a New Supply Chain Management System

Payback Method

Time required to pay back initial investment of project

$$\frac{\text{Original investment}}{\text{Annual net cash inflow}} = \text{Number of years to pay back}$$

Understanding the Business Value of Information Systems

Case Example: Capital Budgeting for a New Supply Chain Management System

Accounting Rate of Return on Investment (ROI)

Desired rate of return must equal or exceed cost of capital

$$\frac{\text{(Total benefits – Total cost – Depreciation)}}{\text{Useful life}} = \text{Net benefit}$$

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

Case Example: Capital Budgeting for a New Supply Chain Management System

Net Present Value

Compare investment with future savings and earnings

Present value of expected cash flows	-	Initial investment cost	=	Net present value

Understanding the Business Value of Information Systems

Case Example: Capital Budgeting for a New Supply Chain Management System

Cost-Benefit Ratio

Ratio of benefits to cost

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

Understanding the Business Value of Information Systems

Case Example: Capital Budgeting for a New Supply Chain Management System

Profitability Index

Allows ranking of different possible investments

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

Case Example: Capital Budgeting for a New Supply Chain Management System

Internal Rate of Return (IRR)

- Rate of return, or profit, that an investment is expected to earn
- Discount (interest) rate that will equate the present value of the projects future cash flows to the initial investment cost

Understanding the Business Value of Information Systems

Strategic Considerations

Portfolio Analysis

Analysis of portfolio of potential applications to determine risks and benefits, and select among alternatives

Scoring Models

Method for deciding among alternative systems based on a system of ratings

Understanding the Business Value of Information Systems

A system portfolio

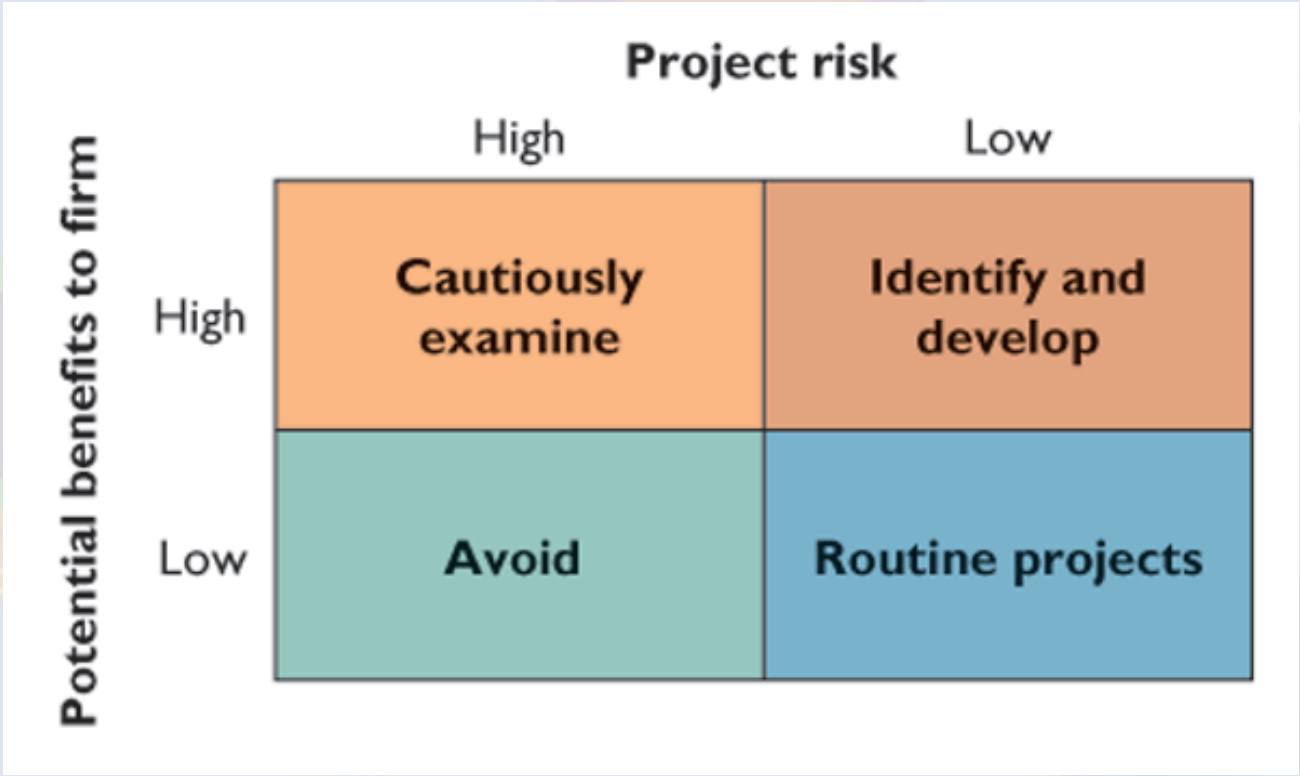


Figure 14-3

Strategic Considerations

Real Options Pricing Models

Models using techniques for valuing financial options to evaluate information technology investments with uncertain returns

Knowledge Value–Added Approach

- Focuses on knowledge input into a business process
- Determines costs and benefits of changes in business processes from new information systems

Information Technology Investments and Productivity

Multi-Factor Productivity

- Measure of firm's efficiency in converting inputs to outputs
- Amount of capital and labor required to produce a unit of output
- "Productivity Paradox"

Information Technology Investments and Productivity

Information Technology Contributions

- Manufacturing: Increased productivity
- Service sector: Benefits unclear
- Information and knowledge industries: Benefits difficult to measure

The Importance of Change Management in Information System Success and Failure

Information system problem areas

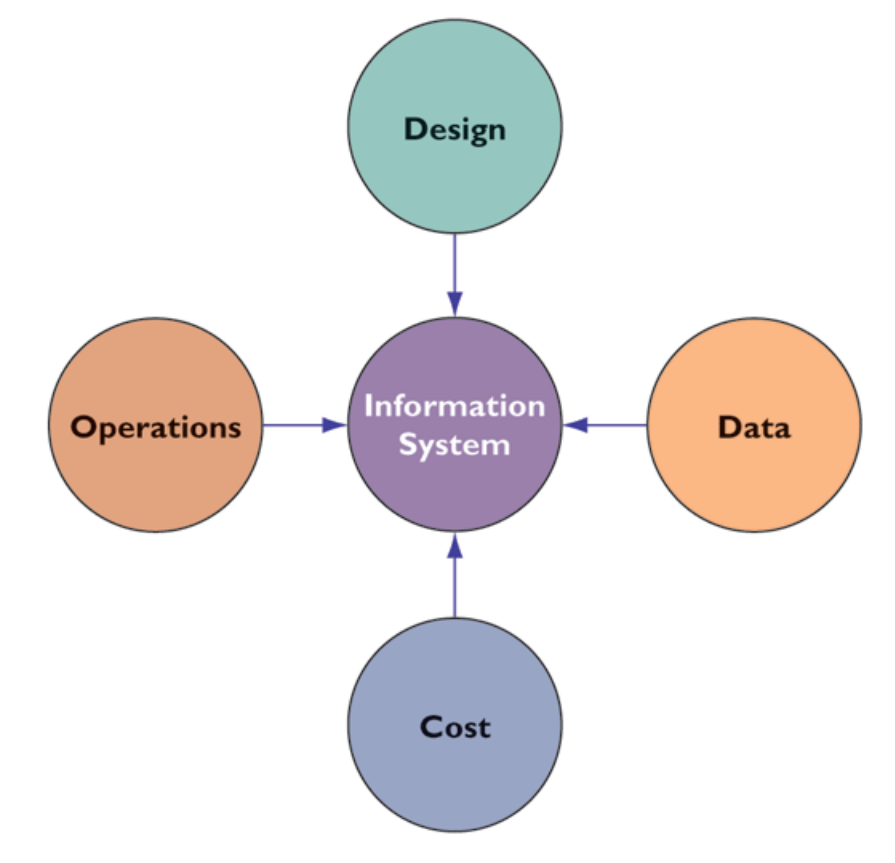


Figure 14-4

The Importance of Change Management in Information System Success and Failure

Information System Problem Areas

- Design
  - Failure to capture essential business requirements
  - Information in difficult to use format; poor user interface
  - Incompatible with organization structure, culture, goals

The Importance of Change Management in Information System Success and Failure

Information System Problem Areas

- Data
  - Inaccuracy, inconsistency of data
  - Not organized properly for business purposes
- Cost
  - Cost to implement and run prohibitive
- Operations
  - Computer operations breaking down
  - Information delays, slow response times

The Importance of Change Management in Information System Success and Failure

Change Management and the Concept of Implementation

- Implementation
  - All organizational activities working toward the adoption, management, and routinization of an innovation
- Change Agent
  - Individual acting as catalyst during the change process

The Importance of Change Management in Information System Success and Failure

Causes of Implementation Success and Failure

- User Involvement and Influence
  - Molding system to user priorities and business requirements
  - Positive involvement in system
  - Users can take limited view of system
  - User-designer communications gap

The Importance of Change Management in Information System Success and Failure

Factors in information system success or failure

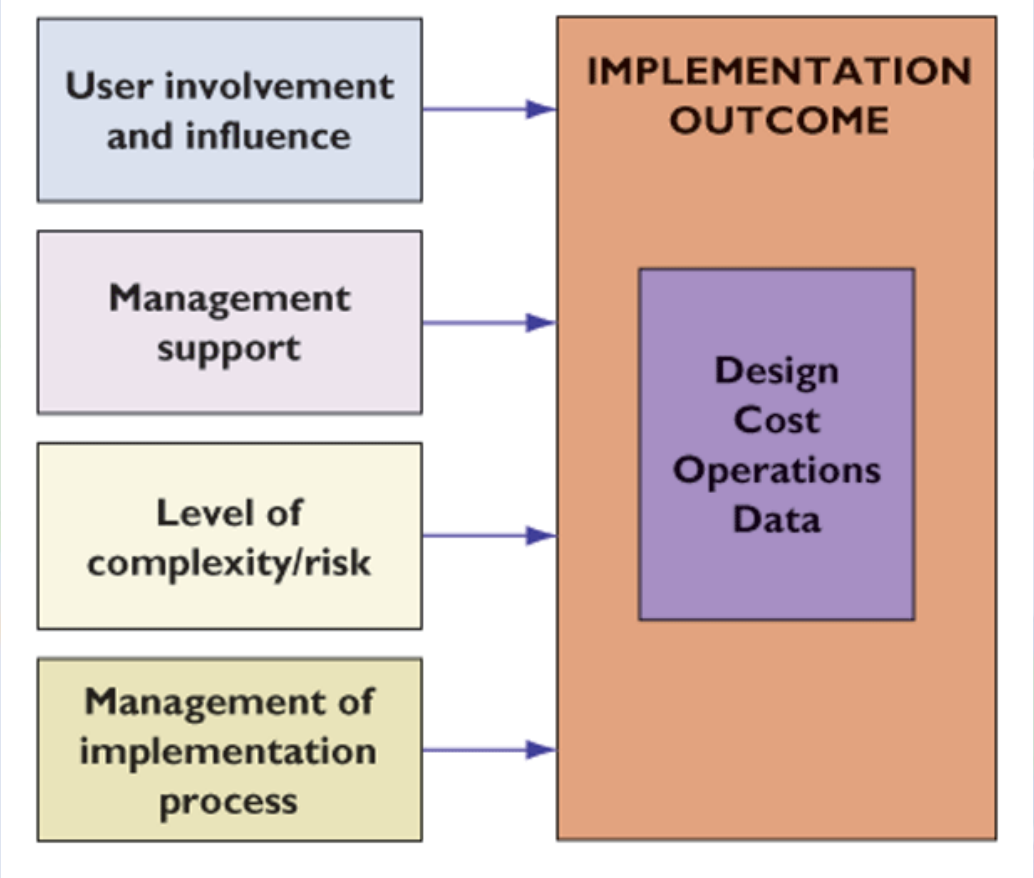


Figure 14-5

The Importance of Change Management in Information System Success and Failure

Causes of Implementation Success and Failure

- Management Support and Commitment
  - Positive perception
  - Inducement to participation
  - Sufficient funding and resources
  - Enforcement of workflow changes

The Importance of Change Management in Information System Success and Failure

Causes of Implementation Success and Failure

- Level of Complexity and Risk
  - Project size: Greater risk with larger projects
  - Project structure: Greater risk with less defined outputs and processes
  - Experience with technology: Greater risk if project team and information systems staff lack required expertise

Causes of Implementation Success and Failure

Results of Poorly Managed Systems Projects

- Costs that vastly exceed budgets
- Unexpected time slippage
- Technical shortfall; poor performance
- Failure to obtain anticipated benefits

The Importance of Change Management in Information System Success and Failure

Consequences of poor project management

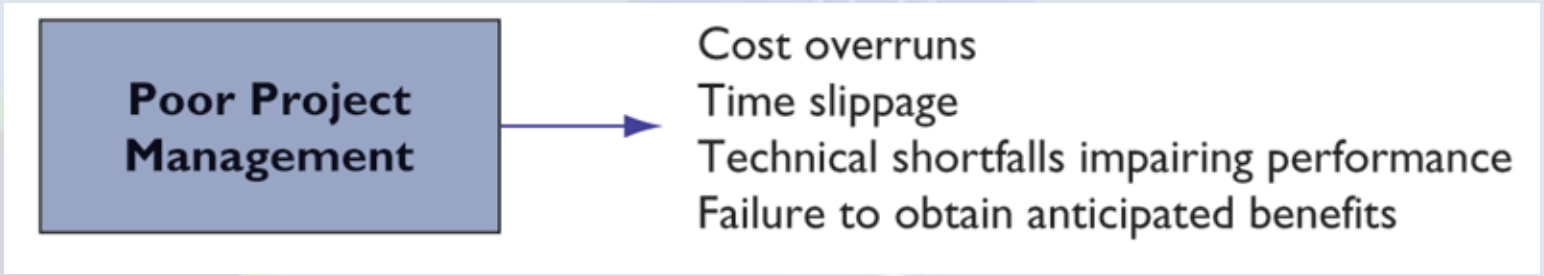


Figure 14-6

Causes of Implementation Success and Failure

Factors in Poor Management:

- Ignorance and optimism
- The mythical man-month
  - When adding labor can slow productivity
- Falling behind
  - Bad news travels slowly upward

The Importance of Change Management in Information System Success and Failure

Change Management Challenges for Business Process Reengineering (BPR) Enterprise Applications, and Mergers and Acquisitions

- 70% failure rate in BPR projects
- High failure rate in enterprise applications
- Poor implementation; inadequate change management
- M&As: Require considerable organizational change and system projects to combine information systems of two companies

The Challenge of Implementing Global Systems

- Disparate information requirements and business processes
  - Local facility differences
  - National accounting laws
  - Transborder data flow
  - Language

The Importance of Change Management in Information System Success and Failure

The Challenge of Implementing Global Systems

- Technology hurdles: lack of standards and connectivity
  - Standardizing computer hardware platform
  - Software for international teamwork
  - Integrated global networks difficult, costly to install
  - Standards for networking and EDI are industry and country specific
- Local user resistance to global systems

Window on Organizations

Global E-Commerce: Good and Bad News

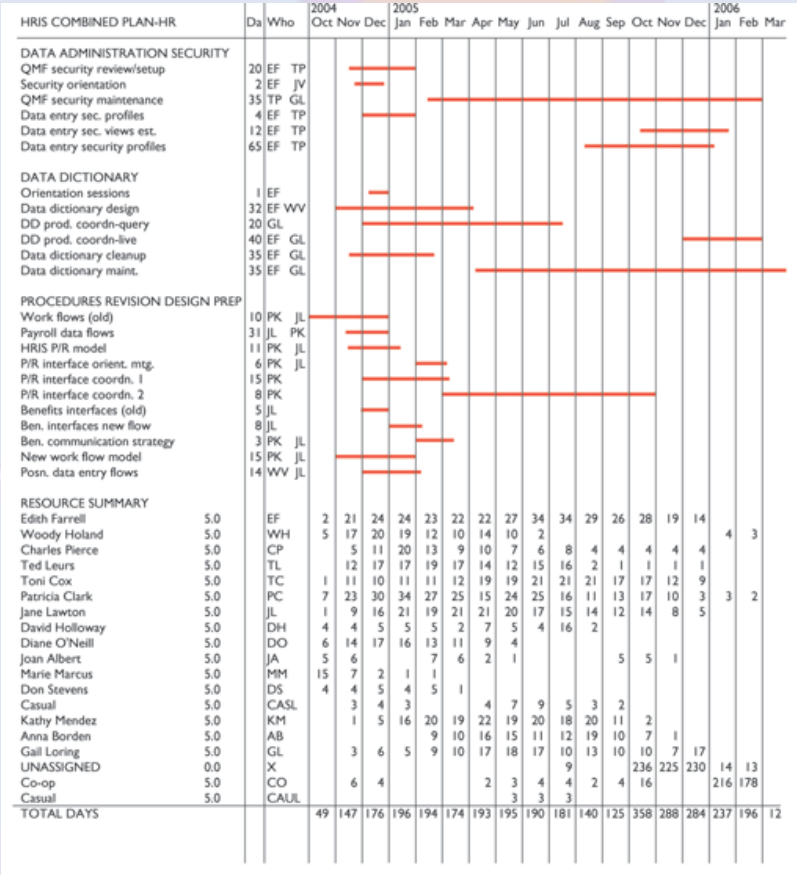
What management, organization, and technology issues should be addressed when developing a global Web strategy?

Controlling Risk Factors

- Managing technical complexity
  - Internal integration tools
- Formal planning and control tools
  - Program Evaluation and Review Technique (PERT)
  - Gantt charts
- Increasing user involvement and overcoming user resistance
  - External integration tools
  - User participation, education and training, incentives

Managing Implementation

Formal planning and control tools help to manage information systems projects successfully



HRIS COMBINED PLAN-HR	Da	Who	2004 Oct	Nov	Dec	2005 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2006 Jan	Feb	Mar
DATA ADMINISTRATION SECURITY																				
QMF security review/setup	20	EF TP																		
Security orientation	2	EF JV																		
QMF security maintenance	35	TP GL																		
Data entry sec. profiles	4	EF TP																		
Data entry sec. views est.	12	EF TP																		
Data entry security profiles	65	EF TP																		
DATA DICTIONARY																				
Orientation sessions	1	EF																		
Data dictionary design	32	EF WV																		
DD prod. coordn-query	20	GL																		
DD prod. coordn-live	40	EF GL																		
Data dictionary cleanup	35	EF GL																		
Data dictionary maint.	35	EF GL																		
PROCEDURES REVISION DESIGN PREP																				
Work flows (old)	10	PK JL																		
Payroll data flows	31	JL PK																		
HRIS P/R model	11	PK JL																		
P/R interface orient. mtg.	6	PK JL																		
P/R interface coordn. 1	15	PK																		
P/R interface coordn. 2	8	PK																		
Benefits interfaces (old)	5	JL																		
Ben. interfaces new flow	8	JL																		
Ben. communication strategy	3	PK JL																		
New work flow model	15	PK JL																		
Posn. data entry flows	14	WV JL																		
RESOURCE SUMMARY																				
Edith Farrell	5.0	EF	2	21	24	24	23	22	22	27	34	34	29	26	28	19	14			
Woody Holand	5.0	WH	5	17	20	19	12	10	14	10	2							4	3	
Charles Pierce	5.0	CP		5	11	20	13	9	10	7	6	8	4	4	4	4	4			
Ted Leurs	5.0	TL		12	17	17	19	17	14	12	15	16	2	1	1	1	1			
Toni Cox	5.0	TC	1	11	10	11	11	12	19	19	21	21	21	17	17	12	9			
Patricia Clark	5.0	PC	7	23	30	34	27	25	15	24	25	16	11	13	17	10	3	3	2	
Jane Lawton	5.0	JL	1	9	16	21	19	21	21	20	17	15	14	12	14	8	5			
David Holloway	5.0	DH	4	4	5	5	5	2	7	5	4	16	2							
Diane O'Neill	5.0	DO	6	14	17	16	13	11	9	4										
Joan Albert	5.0	JA	5	6			7	6	2	1				5	5	1				
Marie Marcus	5.0	MM	15	7	2	1	1													
Don Stevens	5.0	DS	4	4	5	4	5	1												
Casual	5.0	CASL		3	4	3			4	7	9	5	3	2						
Kathy Mendez	5.0	KM		1	5	16	20	19	22	19	20	18	20	11	2					
Anna Borden	5.0	AB					9	10	16	15	11	12	19	10	7	1				
Gail Loring	5.0	GL		3	6	5	9	10	17	18	17	10	13	10	10	7	17			
UNASSIGNED	0.0	X										9			236	225	230	14	13	
Co-op	5.0	CO		6	4				2	3	4	4	2	4	16			216	178	
Casual	5.0	CAUL								3	3	3								
TOTAL DAYS			49	147	176	196	194	174	193	195	190	181	140	125	358	288	284	237	196	12

Figure 14-7

Designing for the Organization

Organizational Factors in Systems Planning and Implementation

- Employee participation and involvement
- Job design
- Standards and performance monitoring
- Ergonomics
- Employee grievance resolution procedures
- Health and safety
- Government regulatory compliance

Managing Implementation

Designing for the Organization

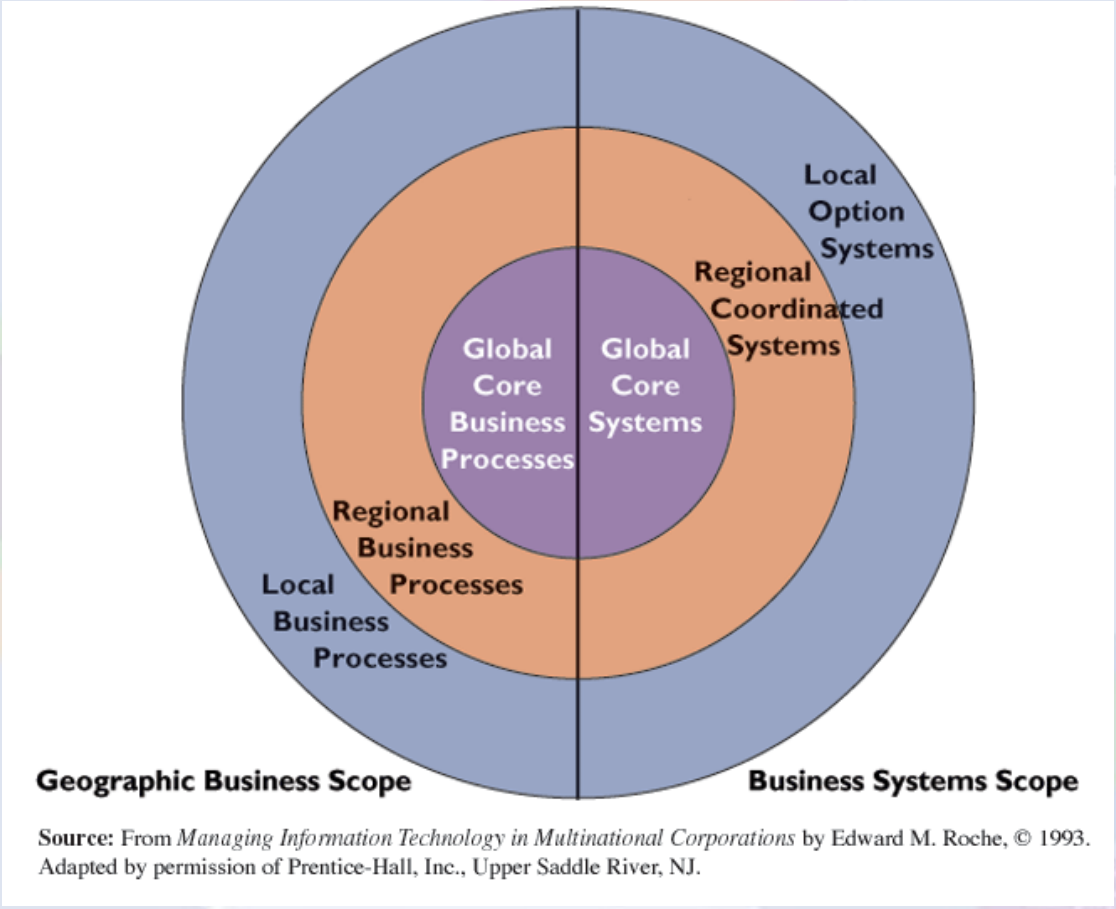
- Organizational impact analysis
  - Study of how a proposed system will affect the organization structure, attitudes, decision making, and operations
- Sociotechnical design
  - Establishes human objectives
  - Separate sets of technical and social design solutions
  - Design based on best fit to technical and social needs

Managing Global Implementations

- Limit transnational development to core systems
- Cooptation
  - Bringing opposition into development process
- Separate transnational systems developed by separate country units
- Global technology infrastructure
  - International private network, VANs
  - Internet technology: VPNs, intranets

Managing Implementation

Local, regional, and global systems



Source: From *Managing Information Technology in Multinational Corporations* by Edward M. Roche, © 1993. Adapted by permission of Prentice-Hall, Inc., Upper Saddle River, NJ.

Figure 14-8

Managing Implementation

"Fourth Generation" Project Management

- Project planning as an enterprise-wide focus
- Managers focus on solving problems as they arise and meeting challenges
- Seek ways to adapt to unforeseen uncertainties that could provide additional opportunities

Chapter 14 Case Study

Cigna Stumbles with a New Customer Service System

1. Evaluate Cigna using the value chain and competitive forces models. What was Cigna's business strategy?

2. What was the relationship of its information systems to Cigna's business systems and business strategy? How well did its systems support its strategy? How did they provide value for the company?

3. What management, organization, and technology factors contributed to Cigna's problems?

Chapter 14 Case Study

Cigna Stumbles with a New Customer Service System

4. Classify and describe the problems that Cigna faced in trying to modernize its customer-facing systems using the categories described in this chapter on the causes of system failure.

5. Evaluate the risks of the Cigna systems modernization project as seen at its outset, and then outline its key risk factors. Describe the steps you would have taken during the planning stage of the project to control these factors.