INFORMATION SYSTEM STRATEGY

MODULE CONTENT

BUSINESS & ADVANCED TECHNOLOGY CENTRE
UNIVERSITY TECHNOLOGY MALAYSIA

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- The Information Systems Strategy Triangle
- Strategic Use of Information Resources
- Group/Case Study
- Information Technology and the Design of Work
- Information Technology and Changing Business Processes

Day 2

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- Funding IT & (Legalities)
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Full module slides from Chapter 1 to 12 may be downloaded from:
http://www.zaipul.com/download/information-system-stgy/
LEcTURER INFORMATION

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Chapter 1
The Information Systems Strategy Triangle

Managing and Using Information Systems: A Strategic Approach
by Keri Pearlson & Carol Saunders

Introduction

• How knowledgeable must a general manager be about IS?
• What are the ramifications of an improperly implemented IS?
• Can IS be examined in isolation? Why or why not?
• What function does IS play in the business strategy of an organization?

The Impact of IS

• The Information Systems Strategy Triangle is a simple framework for understanding the impact of IS on organizations.
• Successful firms have an overriding business strategy.
• This business strategy drives both Organizational and Information strategy.
• All decisions are driven by the firm’s business objectives.

Figure 1.1 The Information Systems Strategy Triangle
IS Strategy Triangle

- Business Strategy drives all other strategies.
- Organizational and Information Strategy are then dependent upon the Business Strategy.
- Changes in any strategy requires changes in the others to maintain balance.
- IS Strategy is affected by the other strategies a firm uses.
- IS strategy always involves consequences.

BRIEF OVERVIEW OF BUSINESS STRATEGY FRAMEWORKS

Think About IT

- What is a business strategy?
- Which factors influences a business strategy?
- How does a business change its strategy without losing balance within its organization and IS structure?
- Are there specific events that induce a business to change its strategies and what are they?

Generic Strategies Framework

- Michael Porter describes how businesses can build a sustainable competitive advantage.
- He identified three primary strategies for achieving competitive advantage:
  - Cost leadership – lowest-cost producer.
  - Differentiation – product is unique.
  - Focus – limited scope.
Porter’s Competitive Advantage

- Remember that a company’s overall business strategy will drive all other strategies.
- Porter defined these competitive advantages to represent various business strategies found in the marketplace.
- Cost leadership strategy firms include Walmart, Suzuki, Overstock.com, etc.
- Differentiation strategy firms include Coca Cola, Progressive Insurance, Publix, etc.
- Focus strategy firms include the Ritz Carlton, Marriott, etc.

Differentiation Strategy Variants

- **Shareholder value model**: create advantage through the use of knowledge and timing (Fruhan)
- **Unlimited resources model**: companies with a large resource can sustain losses more easily than ones with fewer resources (Chain Store vs Mom & Pop).
- The problem with Porter and these variants are that the rate of change is no longer easily managed and sustained.

IS Planning and Strategic Advantage Models

- General Managers cannot afford to rely solely on IS personnel to make IS decisions.
- Business strategy drives IS decision making.
- Changes in IS potential should trigger business reassessments (i.e. the Internet).
- Information Systems Strategy Triangle shows the proper balance of strategies.
- The models are helpful in discussing the role of IS in building and sustaining competitive advantage.
<table>
<thead>
<tr>
<th>Framework</th>
<th>Key Idea</th>
<th>Application to Information Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Porter’s generic strategies framework</td>
<td>Firms achieve competitive advantage through cost leadership, differentiation, or focus.</td>
<td>Understanding which strategy is chosen by a firm is critical to choosing IS to complement that strategy.</td>
</tr>
<tr>
<td>D’Aveni’s hyper-competition model</td>
<td>Speed and aggressive moves and countermoves by a firm create competitive advantage</td>
<td>The 7 Ss give the manager suggestions on what moves and countermoves to make. IS are critical to achieve the speed needed for these moves.</td>
</tr>
</tbody>
</table>

Figure 1.3 Summary of key strategy frameworks.

Organizational Strategy

- Organizational strategy includes the organization’s design as well as the choices it makes in its work processes.
- How will the company organize in order to achieve its goals and implement its business strategy?
- Business Diamond – simple framework for identifying crucial components of an organization’s plan (Figure 1.4)
- Managerial Levers – another framework for organizational design, states that successful execution of the firm’s organizational strategy is the best combination of organizational, control, and cultural variables (Figure 1.5).
Understanding Organization Strategy

To understand organizational strategy we must answer the following questions:

1. What are the important structures and reporting relationships within the organization?
2. What are the characteristics, experiences, and skill levels of the people within the organization?
3. What are the key business processes?
4. What control systems are in place?
5. What is the culture of the organization?

<table>
<thead>
<tr>
<th>Framework</th>
<th>Key Idea</th>
<th>Usefulness in IS Discussions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Diamond</td>
<td>There are 4 key components of an organization: business processes, values and beliefs, management control systems, and tasks and structures.</td>
<td>Using IS in an organization will affect each of these components. Use this framework to identify where these impacts are likely to occur.</td>
</tr>
<tr>
<td>Managerial levers</td>
<td>Organizational variables, control variables, and cultural variables are the levers managers can use to affect change in their organizations</td>
<td>This is a more detailed model than the Business diamond and gives specific areas where IS can be used to manage the organization and to change it.</td>
</tr>
</tbody>
</table>
IS Strategy

- The plan an organization uses in providing information services.
- IS allows business to implement its business strategy.
- IS helps determine the company’s capabilities.
- Four key IS infrastructure components are key to IS strategy (Figure 1.7)
- These key components are sufficient to allow the general manager to assess critical IS issues.

<table>
<thead>
<tr>
<th></th>
<th>What</th>
<th>Who</th>
<th>Where</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware</td>
<td>List of physical components of the system</td>
<td>Individuals who use it Individuals who manage it</td>
<td>Physical location</td>
</tr>
<tr>
<td>Software</td>
<td>List of programs, applications, and utilities</td>
<td>Individuals who use it Individuals who manage it</td>
<td>What hardware it resides upon and where that hardware is located</td>
</tr>
<tr>
<td>Networking</td>
<td>Diagram of how hardware and software components are connected</td>
<td>Individuals who use it/ Individuals who manage it / Company service obtained from</td>
<td>Where the nodes are located, where the wires and other transport media are located</td>
</tr>
<tr>
<td>Data</td>
<td>Bits of information stored in the system</td>
<td>Individuals who use it Individuals who manage it</td>
<td>Where the information resides</td>
</tr>
</tbody>
</table>

Figure 1.7 Information systems strategy matrix.

FOOD FOR THOUGHT: ECONOMICS OF INFORMATION VS. ECONOMICS OF THINGS

- Every business is in the information business (Evans and Wurster).
- All forms of industry rely heavily on IS.
  - Mercedes cars computing power.
  - Marketing research, logistics, advertising, inventory management all rely on IS.
- Things wear out.
- Information never wears out.
- Figure 1.8 compares things with information.
### Summary

- Competitive advantage is gained through cost leadership, differentiation, or focus.
- The Information Systems Strategy Triangle shows that business strategy always drives organizational and information strategies.
- Hypercompetition defines competitive advantage as temporary.
- Understanding the influence of IS in organizational strategy is paramount.
Chapter 2
Strategic Use of Information Resources

Managing and Using Information Systems: A Strategic Approach

by Keri Pearlson & Carol Saunders

Introduction

• How have successful businesses utilized IS strategically?
• What resources are involved in crafting a strategic IS policy? Which one is most important?
• Many of today’s most successful companies have created strategic alliances. How has this helped them to create strategic advantage?

Real World Examples

• In 1994 Dell finally stopped selling PCs through retail stores.
• It moved completely to using an integrated IT platform that allow the order of customized systems.
• Strategic use of IS produced Cost savings from reduced inventories passed on to customers.
• This innovation created a competitive advantage for Dell, which used its information resources to achieve high volumes without the high costs of the industry’s traditional distribution channels (see www.dell.com)
Information Resources

• Over the past decades the use of information resources has changed.
• Organizations have moved from an “efficiency model” of the 1960’s to a “value creation model” of the 2000’s.
• Companies seek to utilize those technologies that give them competitive advantage.
• Maximizing the effectiveness of the firm’s business strategy requires the general manager to identify and use information resources.
• Figure 2.1 shows this change.

Information Resources

INFORMATION RESOURCES AS STRATEGIC TOOLS

• Information resources is defined as the available data, technology, and processes available to perform business processes and tasks.
• Relationships between general managers and IS managers.
• Resources available include:
  – IS Infrastructure
  – Information and knowledge
  – Proprietary technology
  – Technical skills of IT staff
  – End users of the IS and more.

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Advantages or Information Resources

- General managers evaluating an information resource for competitive advantage needs to ask:
  - What makes the information resource valuable?
  - Who appropriates the value created by the information resource?
  - Is the information resource equally distributed across firms?
  - Is the information resource highly mobile?
  - How quickly does the information resource become obsolete?

The Strategic Landscape

- Managers confront elements that influence the competitive environment.
- Slim tolerance for error.
- Managers must take multiple view of the strategic landscape, such as:
  - First view - Porter’s five competitive forces model.
  - Second view - Porter’s value chain.
  - Third view – focuses on the types of IS resources needed (Resource Based View).

HOW CAN INFORMATION RESOURCES BE USED STRATEGICALLY?

Using Information Resources to Influence Competitive Forces

- Porter’s five forces model show the major forces that shape the competitive environment of the firm.
  1. **Threat of New Entrants**: new firms that may enter a companies market.
  2. **Bargaining Power of Buyers**: the ability of buyers to use their market power to decrease a firm’s competitive position
  3. **Bargaining Power of Suppliers**: the ability suppliers of the inputs of a product or service to lower a firm’s competitive position
  4. **Threat of Substitutes**: providers of equivalent or superior alternative products
  5. **Industry Competitors**: current competitors for the same product.
  - Figure 2.2 and 2.3 show this model in detail.
Porter’s Value Chain Model

- Value chain model addresses the activities that create, deliver, and support a company’s product or service.
- Two broad categories:
  - Primary activities – relate directly to the value created in a product or service.
  - Support activities – make it possible for the primary activities to exist and remain coordinated.

Altering the Value Chain

- The Value Chain model suggests that competition can come from two sources:
  - **Lowering the cost** to perform an activity and
  - **Adding value to a product or service** so buyers will be willing to pay more.
- Lowering costs only achieves competitive advantage if the firm possesses information on the competitor’s costs.
- Adding value is a strategic advantage if a firm possesses accurate information regarding its customer such as: which products are valued? Where can improvements be made?
The Value Chain System

- The value chain model can be extended by linking many value chains into a **value system**.
- Much of the advantage of supply chain management comes from understanding how information is used within each value chain of the system.
- This can lead to the formation of entirely new businesses designed to change the information component of value-added activities. (Figure 2.5)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Grocery Chain's Value Chain</th>
<th>Supplier's Value Chain</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Activities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inbound Logistics</td>
<td>Analysis of buying patterns suggest items should be stocked at local stores, including amounts and optimum delivery times</td>
<td>Analysis of buying patterns can aid grocery chains in better determining demand, leading to better forecasting for both chain and supplier</td>
</tr>
<tr>
<td>Operations</td>
<td>Automated checkout can speed checkout operations; may lead to reduced staffing of registers/ lower operating costs</td>
<td>Analysis of buying patterns can reduce 'last-minute' orders and improve suppliers processing of orders</td>
</tr>
<tr>
<td>Outbound Logistics</td>
<td>Sharing analysis of buying patterns by grocery chain can aid supplier in scheduling</td>
<td></td>
</tr>
<tr>
<td>Marketing and Sales</td>
<td>Analysis of b. patterns can aid development of promotional strategies/ highlight customer preference</td>
<td>Suppliers may be able to offer economies of scale in its purchases</td>
</tr>
<tr>
<td>Service</td>
<td>Automated checkout lanes shorten customer waiting times</td>
<td>Sharing analysis of b. patterns allows better supplier service</td>
</tr>
</tbody>
</table>

Figure 2.4 Value chain of the firm.

Figure 2.5 The value system: interconnecting relationships between organizations.

Figure 2.6 Application of Value Chain Model
CRM and the Value Chain

• Customer Relationship Management (CRM) is a natural extension of applying the value chain model to customers.
• CRM includes management activities performed to obtain, enhance relationships with, and retain customers.
• CRM is a coordinated set of activities.
• CRM can lead to better customer service, which leads to competitive advantage for the business.

The Resource-Based View

• The Resource-Based View (RBV) looks at gaining competitive advantage through the use of information resources.
• Two subsets of information resources have been identified:
  – Those that enable firms to attain competitive advantage (rare and valuable resources that are not common place).
  – Those that enable firms to sustain competitive advantage (resources must be difficult to transfer or relatively immobile).

STRATEGIC ALLIANCES
The Value System and Strategic Alliances

- Many industries are experiencing the growth of strategic alliances that are directly linked to sharing information resources across existing value systems.
- E.g., Delta recently formed an alliance with e-Travel Inc to promote Delta’s inline reservation system.
- This helps reduce Delta’s agency fees while offering e-Travel new corporate leads.
- Also, Supply Chain Management (SCM) is another type of IT-facilitated strategic alliance.

Types of Strategic Alliances

- **Supply Chain Management**: improves the way a company finds raw components that it needs to make a product or service.
  - Technology, especially Web-based, allows the supply chain of a company’s customers and suppliers to be linked through a single network that optimizes costs and opportunities for all companies in the supply chain.
  - Wal-Mart and Proctor & Gamble.
- **Co-opetition**: a new strategy whereby companies cooperate and compete at the same time with companies in their value net.
  - Covisint and General Motors, Ford, and DaimlerChrysler.

Potential Risks

- There are many potential risks that a firm faces when attempting to use IT to outpace their competition.
- Executives should be aware of these risks before they surface.
- They are:
  - *Awakening a sleeping giant* – a large competitor with deeper pockets may be nudged into implementing IS with even better features.
  - *Demonstrating bad timing* – sometimes customers are not ready to use the technology designed to gain strategic advantage.
  - *Implementing IS poorly* – information systems that fail because they are poorly implemented.
  - *Failing to deliver what users want* – systems that don’t meet the firm’s target market likely to fail.
  - *Running afoul of the law* – Using IS strategically may promote litigation.
FOOD FOR THOUGHT:
TIME-BASED
COMPETITIVE
ADVANTAGE

The 21st Century will see organizations increasingly seeking to use technology to neutralize the competition as quickly as possible.

• Reaching individual customers and meeting their needs as close to instantaneously as possible will leave no room for competitive actions to change the customer’s mind.

• Typical planning cycles are thrown out the window because the organization needs to respond quickly to customer, competitor and environmental changes.

• Some firms, like Dell, have embraced this opportunity.

SUMMARY

• Using IS for strategic advantage requires more than just knowing the technology.

• Remember that not just the local competition is a factor in success but the 5 competitive forces model reminds us of other issues.

• Value chain analysis show us how IS add value to the primary activity of a business.

• Know the risks associated with using IS to gain strategic advantage.
Chapter 4  
Information Technology and the Design of Work

Managing and Using Information Systems: A Strategic Approach
by Keri Pearlson & Carol Saunders

Introduction

• How can the automation of work lower morale and job satisfaction?
• How can management help to prevent or at least minimize this impact?
• What is a job design framework?
• How does IT change the way work is done and where it is done?
• Discuss the advantages and disadvantages of telecommuting?

JOB DESIGN FRAMEWORK

• A simple framework can be used to assess how emerging technologies may affect work.
• This framework is useful in designing key characteristics of jobs by asking key questions (see figure 4.1). Such as:
  – What tasks will be performed?
  – How will the work be performed?
  – Who will do the work?
  – Where will the work be performed?
  – How can IS increase performance, satisfaction and effectiveness of the workers doing the work?
Creating New Types of Work

- IT has created many new jobs or types of work.
- Examples of newly created jobs now common in traditional organizations include:
  - Knowledge managers
  - Systems analysts
  - Database and network administrators
  - Webmasters and web site designers
  - IT Security professionals, and more.
- It has changed not only the organizational decision-making process, the information used in making decisions, plus the amount and type of information available to workers.
- The ITAA places the number of IT workers at 10.5 million in 2004.

New Ways to do Traditional Work

- Many traditional tasks are now done by computers, while many work processes have been greatly changed by the introduction of IT
- Communication patterns have also changed, workers now use mobile devices to send and receive messages and tap into databases, greatly affecting sales and service tasks.
- The cost and time needed to access information is dramatically lower, giving workers new tools.
- Work has become much more team oriented - an effect amplified by the Internet.
New Challenges in IT HR Management

- Organizations face the challenge of managing a workforce that is no longer in a single location.
- Work is more team oriented, making it more difficult to assess individual contributions.
- One solution is to use electronic employee monitoring systems automating supervision, but possibly hurting morale and undermining efforts encourage workers to contribute their ideas to the organization.

<table>
<thead>
<tr>
<th>Work</th>
<th>Traditional Approach: Subjective Observation</th>
<th>Newer Approach: Objective Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supervision: Personal. Manager is usually present or relies on others to ensure that employee is present and productive.</td>
<td>Electronic, or assessed by deliverable. As long as the employee is producing value, he does not need formal supervisions.</td>
</tr>
<tr>
<td></td>
<td>Evaluation: Focus is on process through direct observation. Manager sees how employee performed at work. Subjective (personal) factors are very important.</td>
<td>Focus is on output by deliverable or by target. As long as deliverables are produced and/or targets achieved, the employee is meeting performance expectations adequately.</td>
</tr>
<tr>
<td></td>
<td>Compensation and Rewards: Often individually-based.</td>
<td>Often team-based or contractually spelled out.</td>
</tr>
<tr>
<td></td>
<td>Hiring: Personal with little reliance on computers. Often more reliance on clerical skills.</td>
<td>Often electronic with recruiting websites and electronic testing. More informed work that requires a higher level of IT skills.</td>
</tr>
</tbody>
</table>

Figure 4.2. Changes to supervision, evaluation, compensation, and hiring

Fig. 4.3 Summary of IT’s Effects on Employee Life

HOW INFORMATION TECHNOLOGY CHANGES WHERE WORK IS DONE
The Growth of Telecommuting

• Telecommuting has gained popularity since the late 1990s because:
  – It lowers corporate overhead. Telecommuting workers don’t take up office space, lowering facilities costs
  – Workers who are giving increased flexibility are more productive and express higher levels of job satisfaction
• 2/3’s of Cisco employees occasionally work from home.
  – This has saved them $1M in overhead and increased productivity by 25%, as workers prefer to set their own schedules and work in more comfortable surroundings.

Enabling Factors for Telecommuting

• Three factors support the growth of telecommuting growth (Figure 4.4):
  – Work is increasingly knowledge-based so workers don’t need to be “at work” to do their jobs.
  – Telecommuting enables workers to shift their work to accommodate their lifestyles, esp. parenting or living in locations far from the office.
  – More powerful PCs + cheap, high speed telecom (ADSL, cable modem) mean telecommuters can connect to corporate network efficiently.

Driver Effect:

| Shift to knowledge-based work | Eliminates need that some work be done in a specific place |
| Changing demographics and lifestyle preferences | Provide workers with geographic and time-shifting flexibility |
| New technologies | Make remotely performed work practical and cost-effective |

New Technologies Supporting Telecommuting & Mobile Work

• Sales and service personnel can now quote orders at point of sale, improving customer satisfaction, reducing sales cycle time and cutting costs.
• Roles changing due to heavy use of four technologies: laptops, PDAs, handheld terminals and mobile phones (See Figure 4.5).
• High quality laptops are the most important and widely used of all mobile work technologies.
Disadvantages of Telecommuting and Mobile Work

- More difficult for managers to evaluate and compensate performance
- Workers must be extremely self-disciplined
- Can disconnect them from corporate culture
- Labor unions, politicians, etc., worry about foreign outsourcing of software development and computer services enabled by the same technologies

Employee Advantages of Telecommuting
- Reduced stress due to increased ability to meet schedules, heightened morale, and lower absenteeism
- Geographic flexibility
- Higher personal productivity
- Housebound individuals can join the workforce

Potential Problems
- Harder to evaluate performance, increased stress from inability to separate work from home life
- Employee may become disconnected from company culture
- Telecommuters are more easily replaced by electronic immigrants
- Not suitable for all jobs or employees

Managerial Issues In Telecommuting and Mobile Work

- Planning, business and support tasks must be redesigned to support mobile and remote workers
- Training should be offered so all workers can understand the new work environment
- Employees selected for telecommuting jobs must be self-starters
GROUP WORK

Groupware and Electronic Collaboration

• Groupware tools such as Lotus Notes, and technologies, such as video conferencing have made it cost-effective for distant workers to create, edit and share electronic documents and processes.
• Collaboration adds value to many types of tasks, particularly those that benefit from an exchange of ideas.

Whirlpool’s Product Design Management (PDM) system

• PDM unites design teams electronically using a central data repository.
• Engineers around the world collaborate online to create several basic designs using PDM.
• Each region then customizes generic design for local use.
• PDM halves design time, saves money and brings products to market more quickly.

Ford Motor Company

• Ford now develops cars for world markets by electronically linking design and engineering centers via videoconferencing and corporate intranets.
• Faster more efficient communication allows Ford to design and produce cars in less time.
GAINING ACCEPTANCE FOR IT-INDUCED CHANGE

Gaining acceptance for IT-induced Change

- To avoid resistance to change, system implementers and managers must actively manage the change process.
- The Technology Acceptance Model (TAM) (Figure 4.7) suggests that employee attitudes may change if they think the new system will help them to do more or better work for the same effort, and that it's easy to use.
- Employee participation in the system’s design and implementation also helps.

Figure 4.7 Technology Acceptance Model

FOOD FOR THOUGHT: THE PRODUCTIVITY PARADOX
Does IS/IT Investment Improve Worker Productivity?

- Some researchers argue ongoing costs outweigh productivity gains.
- Other research suggests employee productivity is rising.
- Some argue the measurement of productivity is flawed; e.g., fails to capture gains in service.
- Recent research suggests that heavy investment in IT is finally paying off.

Summary

- Technology has played a major role in transforming the way work is done.
- Individuals must become comfortable with new technologies to stay marketable.
- Managers must be sensitive to employees as new technologies are rolled out.
- Telecommuting is a reality and many corporations have a percentage of their workforce involved in this practice.
Chapter 5
Information Technology and Changing Business Processes

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by Keri Pearlson & Carol Saunders

Introduction
• How can IT enable business change?
  – Think of several examples.
• How can IT impede business change?
• What problems are caused by the functional (silo) perspective of a business?
• The process perspective keeps the big picture in view. How can IT help with this management style?
• How are TQM and BPR used to transform a business?

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

- Keeps the big picture in view.
- Focuses on work being done to create optimal value for the business.
- Advantages:
  - Helps avoid or reduce duplicate work.
  - Facilitate cross-functional communication.
  - Optimize business processes.
- Figure 5.2 shows a typical procurement process.
- Figure 5.3 shows the cross-functional view of processes as they cross departments (functions).

Figure 5.1 Hierarchical Structure

- Operations
- Marketing
- Accounting
- Finance
- Administration

Figure 5.2 – Sample business process

Figure 5.3 Cross-functional nature of business processes
Process Perspective (continued)

- When managers gain the process perspective they begin to lead their organizations to change.
- Question status quo.
- Don’t accept “because we have always done it that way” as an answer to why business is done in a particular way.
- Allows managers to analyze business’s processes in light of larger goals.
- Figure 5.4 summarizes the silo and process views.

<table>
<thead>
<tr>
<th>Silo Perspective</th>
<th>Business Process Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition</td>
<td>Interrelated, sequential set of activities and tasks that turns inputs into outputs</td>
</tr>
<tr>
<td>Focus</td>
<td>Cross-functional</td>
</tr>
<tr>
<td>Goal Accomplishment</td>
<td>Optimizes on functional goals, which might be a suboptimal organizational goal.</td>
</tr>
<tr>
<td>Benefits</td>
<td>Highlighting and developing core competencies; Functional efficiencies</td>
</tr>
</tbody>
</table>

Figure 5.4 Comparison of Silo Perspective and Business Process Perspective

THE TOOLS FOR CHANGE

TQM

- Total Quality Management (TQM) is a tool for change that uses small incremental changes.
- Personnel often react favorably to TQM.
- Greater personnel control and ownership.
- Change is viewed as less of a threat.
- Six-Sigma is one popular approach to TQM
**BPR**

- Business Process Reengineering (BPR) is a more “radical” change management tool.
- Attain aggressive improvement goals.
- Goal is to make a rapid, breakthrough impact on key metrics.
- Figure 5.6 shows the difference over time of the radical (BPR) and incremental (TQM) approaches to change.
- Greater resistance by personnel.
- Use only when radical change is needed.

**The Process for Radical Redesign**

- The different approaches for radical redesign all include:
  - Begin with a vision of which performance metrics best reflect the success of overall business strategy.
  - Make changes to the existing process.
  - Measure 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.
- Tool used to understand a business process is a workflow diagram.
Risks of Radical Redesign

- Difficult to manage the process.
  - Manager needs a strong set of skills.
- Insuring acceptance of the new process.
- Transformation champion needed.
- Clear and well thought out plan.
- Risk of failure of the new process.

Integrated Supply Chains

- Processes linked across companies.
- Supply chain begins with raw materials and ends with a product/service.
- Globalization of business and ubiquity of communication networks permits use of suppliers from anywhere.
- Requires coordination among partners of the integrated supply chain.
Integrated Supply Chain (continued)

- Challenges include:
  - Information integration.
  - Synchronized planning.
  - Workflow coordination.
- Leads to new business models.
  - For example when banks link up to businesses new financial services are offered such as on-line payments.
  - Companies list needs and vendors electronically bid to be the supplier.

Enterprise Systems

- A set of information systems tools used to enable information flow within and between processes.
- Enterprise systems are comprehensive software packages.
- ERP (Enterprise Resource Planning) software packages are the most frequently discussed type of enterprise system.
- Designed to manage the potentially hundreds of systems throughout a large organization.
- SAP is the most widely used ERP software package.

Characteristics of Enterprise Systems

- Integration – seamlessly integrate information flows throughout the company.
- Packages – they are commercial packages purchased from software vendors (like SAP, Oracle, Peoplesoft, etc.).
- Best practices – reflect industry best practices.
- Some assembly required – the systems need to be integrated with the existing hardware, OS’s, databases, and telecommunications.
- Evolving – the systems continue to change to fit the needs of the diverse marketplace.
Benefits and Disadvantages of Enterprise Systems

- **Benefits:**
  - All modules easily communicate together.
  - Useful tools for centralizing operations and decision making.
  - Can reinforce the use of standard procedures.

- **Disadvantages:**
  - Implementation is an enormous amount of work.
  - Most require some level of redesigning business processes.
  - Hefty price tag (sold as a suite).
  - They are risky.

The Adoption Decision

- Sometimes it is appropriate to let the enterprise system drive business process redesign.
  - When just starting out.
  - When organizational processes not relied upon for strategic advantage.
  - When current systems are in crisis.

- Sometimes it is inappropriate to let the enterprise system drive business process redesign.
  - When changing an organization's processes that are relied upon for strategic advantage.
  - When the package does not fit the organization.
  - When there is a lack of top management support.

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.

- Hammer argues that radical redesign is often distorted in one of five ways as listed on page 5-19.
Real World Examples

• Cigna needed to radically improve operational efficiency due to the following factors.
  – Income had fallen 11%.
  – Exceeded market costs of other companies.
  – Sagging productivity in crucial areas.
• IT investments were not supporting the strategic direction of the company and sophisticated new applications were being layered on top of existing organizations and processes.
• Cigna decided to initiate a program to radically redesign the company’s operating processes in key areas.
• Successes were replicated to other areas and the company realized savings of more than $100 million from more than 20 reengineering initiatives.
  – Operating expenses reduced by up to 42%.
  – Cycle time improvements of 100%
  – Customer satisfaction increased 50%
  – Quality improvements of 75%

SUMMARY

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.
Chapter 6
Architecture and Infrastructure

Managing and Using Information Systems: A Strategic Approach
by Keri Pearlson & Carol Saunders

Introduction

• What is the architecture of an organization?
• What is the infrastructure of an organization?
• How should a manager influence a company's architecture and infrastructure?
• How does a company move from architecture to infrastructure?

Real World Examples

In 1998 People’s Bank decided that its existing IT architecture was limiting.

They needed seamless links to external partners for support of real-time data transfer.

They developed a new 4-tier architecture that was up and running by October 2000 – Figure 6.1 shows this 4-tier architecture.

Benefits –

• The ability to introduce new services more rapidly at lower costs, and improved operational efficiency in many areas.
• Also, cut customer response time 30% and saved more than $100,000 on desktop administration.

Figure 6.1 Architecture/Infrastructure of People’s Bank

<table>
<thead>
<tr>
<th>Architecture</th>
<th>Infrastructure</th>
<th>About Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client</td>
<td>People’s Bank</td>
<td>The first (client) tier is composed of web browsers serving as the interface for customers and employees.</td>
</tr>
<tr>
<td></td>
<td>Customers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Call Center</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Representatives</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tellers at</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Branches</td>
<td></td>
</tr>
<tr>
<td>Web and</td>
<td>Tier 2</td>
<td></td>
</tr>
<tr>
<td>Application</td>
<td>Web Servers</td>
<td></td>
</tr>
<tr>
<td>Servers</td>
<td>3rd Party</td>
<td>In the second tier, IBM WebSphere Application Server, Advanced Edition, serves as the Web application server.</td>
</tr>
<tr>
<td></td>
<td>Data Sources</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tier 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Web Servers</td>
<td></td>
</tr>
<tr>
<td>Legacy</td>
<td>Client Server</td>
<td>In the third tier, transaction processing control is built around IBM WebSphere Application Server, Enterprise Edition. The architecture is integrated with external data sources via TCP/IP sockets.</td>
</tr>
<tr>
<td>Systems</td>
<td>Applications</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unisys Mainframe</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IBM S/390</td>
<td>The tier 3 servers and legacy systems communicate through message broker hub. Unisys mainframe runs core banking systems, while IBM S/390 runs general ledger, payroll and HR systems.</td>
</tr>
</tbody>
</table>
From Vision to Implementation

- Architecture translates strategy into infrastructure (see Figure 6.2).
- The architect develops plans based on a vision of the customer of the system (or in this example a house) which is a blueprint of the companies systems.
- This “blueprint” is used for translating business strategy into a plan for IS.
- The IT infrastructure is everything that supports the flow and processing of information (hardware, software, data, and networks).

The Manager’s Role

- Must understand what to expect from IT architecture and infrastructure.
- Must clearly communicate their business vision.
- May need to modify the plans if IT cannot realistically support them.
- Manager MUST be involved in the decision making process.
From Strategy to Architecture

- Manager must start out with a strategy.
- This strategy must then be used to develop more specific goals as seen in Figure 6.3.
- Business requirements must be fleshed out for each goal in order to provide the architect with a clear picture of what IS must accomplish.
- Figure 6.4 shows how this detailed process is accomplished.

Figure 6.3 – From Strategy to Business Requirements

Figure 6.4 – From Business Requirements to Architecture
From Architecture to Infrastructure

- This stage entails adding more detail to the architectural plan.
- This detail comprises the actual hardware, software, data, and networking. – Figure 6.5 shows this phase.
- These components must be combined in a coherent fashion.
- Global level – focus at the enterprise level; Inter-organizational level – focus on communications with customers, suppliers or other stakeholders.

A Framework for the Translation

- Consider the following when developing a framework for transforming business strategy into architecture and then infrastructure:
  - Hardware – physical components.
  - Software – programs.
  - Network – software and hardware.
  - Data – quantity and format of data is of utmost concern.
- The framework that guides analysis of these components is found in Figure 6.6a.

<table>
<thead>
<tr>
<th>Component</th>
<th>What</th>
<th>Who</th>
<th>Where</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware</td>
<td>What hardware does the organization have?</td>
<td>Who manages it?</td>
<td>Who uses it?</td>
</tr>
<tr>
<td>Software</td>
<td>What software does the organization have?</td>
<td>Who manages it?</td>
<td>Who uses it?</td>
</tr>
<tr>
<td>Network</td>
<td>What networking does the organization have?</td>
<td>Who manages it?</td>
<td>Who uses it?</td>
</tr>
<tr>
<td>Data</td>
<td>What data does the organization have?</td>
<td>Who manages it?</td>
<td>Who uses it?</td>
</tr>
</tbody>
</table>

Figure 6.6a Information systems analysis framework.
Analysis of Components

• Managers must begin with an overview that is complete.
• The framework must answer the what, who, and where questions for each infrastructure component.
  – What is the specific type of technology?
  – Who is involved (individuals, groups, departments)?
  – Where is everything located?
• Table 6.6b shows the connections between strategy and systems.

Architecture Examples

• The following are examples of architectures that are used in organizations.
  – Client/server - widely used and relies and clients that request services and servers that respond to these requests. The workload is shared and distributed.
  – Mainframe – employs a large centralized computer that handles all of the functionality of the system.
  – Peer-to-peer – networked computers share resources, every system is equal.
  – Wireless (mobile) – allow communication from remote locations.
• Managers must be aware each ones trade-offs.
• Figure 6.7 summarizes the characteristics of each of the architectures.

Other Frameworks

• Some companies apply even more complex frameworks.
• Two popular examples (built on an enterprise architecture) are:
  – Zachman – goes farther by asking how, when, and why?
  – TOGAF (The Open Group Architecture Framework) – seeks to provide a practical, standardized methodology to successfully implement an Enterprise Architecture into a company.
OTHER MANAGERIAL CONSIDERATIONS

Understanding existing architecture

• Understanding existing architecture allows managers to evaluate the IT requirements of an evolving business strategy vs. their current IT.
• Plans for the future architecture can then be compared with the current infrastructure to help identify which components of the current system can be used in the system being developed.

Relevant questions for managers:
• What IT architecture is already in place?
• Is the company developing the IT architecture from scratch?
• Is the company replacing an existing architecture?
• Does the company need to work within the confines of an existing architecture?
• Is the company expanding an existing architecture?

Strategic IT planning and legacy systems

• Managers usually must deal with adapting existing architectures as part of planning their new systems.
• In so doing they encounter both:
  – the opportunity to leverage the existing architecture and infrastructure and
  – the challenge to overcome the old system’s shortcomings.
Optimal conversion of legacy systems:

• The following steps allow managers to derive the most value and suffer the fewest problems when working with legacy systems:
  – 1. Objectively analyze the existing architecture and infrastructure
  – 2. Objectively analyze the strategy served by the existing architecture
  – 3. Objectively analyze the ability of the existing architecture and infrastructure to further the current strategic goals.

Distinguishing Current vs. Future Requirements

• Strategic Time Frame
  – What is the life span of the system?
• Technological Advances
  – Can the infrastructure and architecture support these advances? SOA (Service Oriented Architecture) defines a service or an interface as a reusable piece of software.
• Growth Requirements
  – Will it meet future demand? Is it scalable?

• Assessing Financial Issues
  – Evaluate on expected financial value.
  – Can be difficult to quantify.
  – Steps
    • Quantify costs
    • Determine the anticipated life cycles of system components
    • Quantify benefits
    • Quantify risks
    • Consider ongoing dollar costs and benefits

• Assessing Technical Issues
  – Scalability.
    • Plight of AOL (improperly estimated growth).
  – Standards.
  – Maintainability.
  – IT staff skill set.
• Differentiating Between Architecture and Infrastructure
  – Figure 6.8 shows how architecture and infrastructure are evaluated based on the previous criteria.
### FROM STRATEGY TO ARCHITECTURE TO INFRASTRUCTURE: AN EXAMPLE

**BluntCo. fictitious case**

- **BluntCo.**, a fictitious cigar clipper maker, serves to illustrate the process of creating IT architecture and infrastructure.

- **The process includes four steps:**
  
  **Step 1:** Defining the Strategic Goals
  **Step 2:** Define Related Architectural Goals
  **Step 3:** Apply Strategy-to-Infrastructure Framework
  **Step 4:** Evaluate Additional Issues

---

**Figure 6.8** Applicability of evaluation criteria to discussion of architecture and infrastructure.

---

**Figure 6.10** Blunt Co’s infrastructure components

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<table>
<thead>
<tr>
<th>Criteria</th>
<th>Architecture</th>
<th>Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic time frame</td>
<td>Very applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Technological advances</td>
<td>Very applicable</td>
<td>Somewhat applicable</td>
</tr>
<tr>
<td>Assessing financial issues</td>
<td>Somewhat applicable</td>
<td>Very applicable</td>
</tr>
<tr>
<td>Net present value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Payback analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incidental investments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growth requirements/scalability</td>
<td>Very applicable</td>
<td>Very applicable</td>
</tr>
<tr>
<td>Standardization</td>
<td>Very applicable</td>
<td>Very applicable</td>
</tr>
<tr>
<td>Maintainability</td>
<td>Very applicable</td>
<td>Very applicable</td>
</tr>
<tr>
<td>Staff experience</td>
<td>Very applicable</td>
<td>Very applicable</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
<th>Network</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 servers:</td>
<td>ERP system with modules for:</td>
<td>Cable modem to ISP</td>
<td>Database:</td>
</tr>
<tr>
<td>Sales</td>
<td>Manufacturing</td>
<td>Dial-up lines for backup</td>
<td>• Sales</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>• Sales</td>
<td>Routers</td>
<td>• Manufacturing</td>
</tr>
<tr>
<td>Accounting</td>
<td>• Accounting</td>
<td>Hubs</td>
<td>• Accounting</td>
</tr>
<tr>
<td></td>
<td>• Inventory</td>
<td>Switches</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Storage systems</td>
<td>Firewalls</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enterprise Application Integration (EAI) software</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Step 1: Defining the Strategic Goals

- Blunt Cos. business strategy is to respond to possible changes in demand by outsourcing clipper manufacturing.
- The company’s strategic goals are as follows:
  - To lower costs by outsourcing manufacturing
  - To lower costs by clipper distribution
  - To improve market responsiveness by outsourcing clipper manufacturing
  - To improve market responsiveness by outsourcing clipper distribution

Step 2: Define Related Architectural Goals

- Consider the first goal: outsourcing clipper manufacturing. How can the company’s IT architecture support this goal?
- It must provide the following interfaces to its new manufacturing partners:
  - Sales to manufacturing partners: send forecasts, confirm orders received
  - Manufacturing partners to sales: send capacity, confirm orders shipped
  - Manufacturing partners to accounting: confirm orders shipped, electronic invoices, various inventory levels, returns
  - Accounting to manufacturing partners: transfer funds for orders fulfilled

Step 3: Apply Strategy to Infrastructure Framework

- Translating the strategic goals to the architectural and infrastructural framework means asking the what, who and where questions discussed before.
- For example, for the network:
  - Arch.: What is the anticipated volume of transactions between BluntCo and its manufacturing partners?
  - High volume may require leased lines to carry transaction data, dial-up connections may suffice for low volume (i.e., what’s the best leased line to use?).
- See Fig. 6.7 for a detailed list of such questions

Step 4: Evaluate Additional Issues

- The last step is to compare managerial considerations such as strategic time frame, technological advances, etc., with the architectural goals listed in step 2.
- For example, regarding HR compatibility:
  - Architecture: The new model will displace some current human resources. BluntCo must analyze costs and the effect on morale.
  - Infrastructure: Current staff not familiar with EDI; must be trained, some new staff hired. BluntCo must analyze associated costs.
FOOD FOR THOUGHT: BUSINESS CONTINUITY PLANNING

Business Continuity Planning (BCP)

- BCP is an approved set of preparations and sufficient procedures for responding to a range of disaster events, such as:
  1. **Planning stage** – alternative business recovery operating strategies are determined
  2. **Emergency Response Procedures** – designed to prevent/limit injury to personnel on site, damage to structures/equipment and the degradation of vital business functions
  3. **Employee Awareness and Training Programs** – must be well communicated throughout the organization

Summary

- Strategy drives architecture.
- Managers must understand how to plan IT to realize business goals.
- Logical framework is used to guide the translation from business strategy to IS design.
- Know the state of existing architecture and infrastructure when translating strategy into architecture and then infrastructure.
- A business continuity plan is an approved set of preparations and sufficient procedures for responding to a disaster event.
- It is becoming more important that business managers effectively translate business strategy into IT infrastructure.
Chapter 7
Doing Business on the Internet

Managing and Using Information Systems: A Strategic Approach
by Keri Pearlson & Carol Saunders

Introduction
• How has the Internet changed business?
• What is the difference between the Internet and Intranets and Extranets?
• What is EDI and why did it not grow as predicted?
• What is disintermediation and how has it impacted the music industry?
• What are the four key building blocks of e-commerce?
• How can managers assist in the prevention of identify theft?

Real World Examples
• VeriSign, Inc. helps millions of Internet users each day.
• VeriSign makes money by providing security, billing, and payment services to telecommunications and online retail customers.
• They are an example of a completely new business made possible by the Internet.
• They have grown their reputation for “trust” into a business customers are willing to pay a fee.

OVERVIEW OF THE INTERNET
Internet

• The Internet is a global, interconnected network of millions of computers (hosts).
  – Began in 1969 with the US DOD’s ARPANET.
  – In 1985 NSF built NSFNET.
• Today no single “owner” owns the Internet but it is shared.
• Relies on the TCP/IP protocol.
  – Figure 7.1 shows an example of a TCP/IP packet.
• Broadband has permitted many to gain fast access to the Internet making it a very useful tool.

TCP/IP Packet

<table>
<thead>
<tr>
<th>Computer address of sender</th>
<th>Computer address of receiver</th>
<th>Packet length</th>
<th>Data</th>
<th>Checksum</th>
</tr>
</thead>
<tbody>
<tr>
<td>(HEADER)</td>
<td>(HEADER)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Regular Mail

<table>
<thead>
<tr>
<th>Return address</th>
<th>Address</th>
<th>Letter</th>
</tr>
</thead>
</table>

Figure 7.1 Comparison of regular mail and TCP/IP packet.

World Wide Web

• An increasingly popular method of accessing the Internet.
• Documents transmitted over the “web” are in HTML format (Hypertext Markup Language), or in any number of other compatible languages.
• HTML was created in 1989 by Tim Berners-Lee at CERN.
• Web browsers (Internet Explorer and Netscape) are commonly used tools for accessing the web.

More Nets

• Intranets, extranets, and virtual private networks (VPN’s) are other networks that use web technology.
  – Intranet looks like the Internet but is used only internally by an organization (university, business, etc.).
  – Extranet is similar to an intranet but includes access available to partners, or customers.
  – VPN’s are used to connect private data using the public telecommunications system. VPN’s use tunneling.
Evolution of E-Business

• Conducting business over electronic channels has been a reality for decades.
• EDI (Electronic Data Interchange) is one of the oldest forms of e-business.
  – EDI is the direct computer to computer transfer of business information, using a standard format.
  – Software programs on different systems can exchange information without human intervention.
    • Quote requests, order forms, etc.
  – EDI was never widely used due to substantial setup effort.

Now, the term e-business refers to business conducted over the Internet.
Business on the Internet has evolved through a number of stages:
  – Content Provider: Stage I
  – Transaction Forum: Stage II
  – Integrator: Stage III
  – Catalyst for Industry Restructuring: Stage IV

E-channel Patterns

• An e-channel is a chain of electronic “relationships between companies and partners/resellers”
• They can lead to industry restructuring when there are massive changes brought about by:
  – e-channel compression (disintermediation – Figure 7.3), and
  – e-channel expansion (the adding of brokering functionality)
    • These brokers provide information for users (like Edmunds.com, or KBB.com for automobile research).
    • E-channel expansion is also seen in e-marketplaces (special kind of B2B network).

<table>
<thead>
<tr>
<th>B2B</th>
<th>Business-to-business targets sales and services primarily to other businesses.</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2C</td>
<td>Business-to-consumer targets sales and services primarily to consumers.</td>
</tr>
<tr>
<td>B2E</td>
<td>Business-to-employee provides services other companies can use to interface with employees (like retirement funds management, health care management, and other benefits management).</td>
</tr>
<tr>
<td>B2G</td>
<td>Business-to-government involves companies who sell the bulk of their goods and services to state, local, and national governments.</td>
</tr>
<tr>
<td>C2C</td>
<td>Consumer-to-consumer sites primarily offer goods and services to assist consumers to interact (e.g., auctions).</td>
</tr>
<tr>
<td>Hybrid</td>
<td>Combines B2B and B2C models.</td>
</tr>
</tbody>
</table>

Figure 7.2 Basic business models for the Internet.
E-Commerce Framework

- Kalakota and Whinston offer a generic framework for e-commerce (see Figure 7.4).
- This framework assumes that new technology will be built on existing technology infrastructure.
- It uses four key building blocks and two supporting pillars.

Four key building blocks:
1. Common business services infrastructure
2. Message and information distribution
3. Multimedia content and network publishing
4. The Internet (infrastructure)

Two supporting pillars:
1. Public policy (“governance”)
2. Technical standards
Common Business Services Infrastructure

- The common business infrastructure for electronic commerce consists of four main elements:
  - Security
  - Authentication
  - Encryption
  - Electronic Payments

Security

- Major concern for doing business on the Internet.
- Businesses feel vulnerable to attack.
- Encryption is used to help secure data.
- HTTPS (HTTP with SSL) is used to encrypt data to ensure its integrity and safety.
  - Secure Sockets Layer (SSL) is a standard for secure interactions use on the Web. SSL, uses a combination of private key encryption (using a one-time session key) and digital signatures to enhance the security of transmission.
- Concerns remain for e-commerce transactions since there are numerous examples of data and privacy issues.

Authentication

- Authentication is the security process of verifying that a user is who he or she says they are.
- Passwords are the most common type of authentication.
  - It is important that users understand strong passwords.
- Digital signatures are now gaining popularity for authenticating transmitted information.

Authentication: Digital Signatures

- Digital signatures take the place of ordinary signatures in online transactions to prove that the sender of a message is who he or she claims to be.
- When received, the digital signature is compared with a known copy of the sender’s digital signature.
- Digital signatures are also sent in encrypted form to ensure they have not been forged.
Encryption

• Encryption systems translate data into a secret code (many types of encryption used).
• Encryption systems include 4 main components:
  – **Plaintext**: the unencrypted message
  – An **encryption algorithm**: that works like the locking mechanism to a safe
  – A **key** that works like the safe’s combination
  – **Ciphertext** is produced from the plaintext message by the encryption function.
  – **Decryption** is the same process in reverse (like a modulation/demodulation), but it doesn’t always use the same key or algorithm. Plaintext results from decryption.

Symmetric Encryption

• **Symmetric** or **private key encryption**, uses the same algorithm and key to both encrypt and decrypt a message.
• Historically, this is the most common encryption technique.
• Since the key must be distributed, however, it is vulnerable to interception. This is an important weakness of symmetric key encryption.
• DES uses symmetric encryption.

Asymmetric or Public Key Encryption

• A second popular technique is asymmetric or **public key encryption** (PKE).
• PKE is called asymmetric since it uses two different “one way” keys:
  – a **public key** used to encrypt messages, and
  – a **private key** used to decrypt them.
• PKE greatly reduces the key management problem since the private key is never distributed.
• PGP (pretty good privacy) is a popular form of PKE available as shareware.

Encryption Techniques

• The two main encryption techniques now in use (see figure 7.5):
  – **Symmetric** encryption in which both sender and receiver use the same key.
  – **Asymmetric** or public key encryption, which uses two separate keys, called public and private keys.
### Electronic Payments

- A number of payment methods are used by businesses to make and receive payments on the Internet.
- These methods are basically the equivalent of off-line payment methods.
- Here are a few of the most popular types:
  - Virtual Terminals.
  - Transaction Processors.
  - Internet Checking.
  - Electronic Funds Transfer (EFT).

### Search Engines

- Search engines are used to index the contents of the Internet so that information about a specific topic can be located.
- Managers should pay attention to search engines for two reasons:
  - They provide useful and extensive access to information.
  - And, they can provide the visibility that becoming listed with them provides.
- Google, founded in 1991 by two Stanford Ph.D. students, is the most popular search engine.

### Web Services & Personalization

- A web service is a standardized way of integrating web-based applications.
  - Organizations can share data transparently.
  - Web services are the basic building blocks of the SOA (Service Oriented Architecture).
  - They are excellent for integrating systems across organizational boundaries.
- Personalization is the “selective delivery of content and services to customers and prospective customers”.
  - Can offer customized services to meet the past and future interests of customers.
Messaging and Information Distribution Infrastructure

• Second building block of supporting framework for e-commerce.
• Includes email, instant messaging, Voice over IP (VoIP), point-to-point file transfers (FTP), and groupware.
• E-mail is still largest use in this area.
  – ISP (Internet Service Provider) connects the user to the Internet.

Internet Infrastructure

• Fourth building block of supporting framework for e-commerce. Includes data communications circuits over which information travels. Includes:
  – Packet-switched networking (telephony is circuit-switched)
  – Packets contain overhead information including addressing
  – They are also routed, like mail
  – All of this flows across Internet backbones
  – Newer Internet access technologies include wireless access, cable access and DSL.

Multimedia Content

• Third building block of supporting framework for e-commerce. Includes standards for various multimedia file types. Examples of materials transported in this way include:
  – Video
  – Audio
  – Text/Electronic documents
  – Graphics & Photos
  – Realtime/Non-realtime applications

Figure 7.6 A sample journey of information from one Internet computer to another.
Public Policy

• Public policy is one of two supporting pillars for e-commerce. Public policy issues include:
  – universal access,
  – privacy,
  – information pricing,
  – information access.
• Privacy issues include what information is private and/or who should have the right to use/sell information about Internet users:
  – Requesting personal information on visiting a web site
  – Creating customer profiles
  – Leaving electronic footprints when visiting a web site

Technical Standards

• Standardization is the second supporting pillar for e-commerce. Standards are critical for electronic interaction.
• Secure Electronic Transaction (SET) for secure payments of online credit card transactions is one of the most heavily promoted standards
• Other application standards include file transfer protocol (FTP), hypertext transfer protocol (HTTP), simple network management protocol (SNMP), post office protocol (POP), and multimedia internet mail extensions (MIME)

Identity Theft

• Managers must be aware of this danger and properly train employees on the proper handling of personal data.
• Identity theft takes place when a thief steals a person’s identity to open a credit card account, or steal funds from their bank.
• It can be categorized in two ways:
  – True name – thief uses personal information to open new accounts.
  – Account takeover – uses personal information to gain access to the person’s existing accounts.
• In 2004 ID theft losses cost over $500 million.
• There were over 388,000 cases reported.
• See figure 7.7 for ways to combat identity theft.

Figure 7.7 Precautions to take to avoid identity theft.

• Do not share passwords or PIN numbers with anyone (95%).
• Do not reply to, or click on links within emails or pop-up messages that ask for personal or financial information (92%).
• Update virus protection software regularly (91%)
• Update security patches for web browsers and operating systems regularly (90%).
• Protect your social security numbers at all costs (i.e., do not give it out unless it is mandatory) (90%).
• Shred, or otherwise destroy, all documents with personal information prior to disposal (90%).
• Monitor personal credit reports and statements from financial accounts regularly (89%).
• Install firewall software (88%).
• Before transmitting personal information online, verify that the connection is secure (84%).
• Do not email personal or financial information (71%).
FOOD FOR THOUGHT 1: E-LEARNING

- Businesses do not want their employees to ever stop learning.
- E-Learning is using the Internet to enable learning (eliminates time and distance barriers).
- Include:
  - Computer-based training.
  - Distance learning.
  - Online learning.
  - On-demand learning.
- Embedding learning within the business processes.

FOOD FOR THOUGHT 2: WEB LOGS AND BLOGS

- Online journals that link together into a large network of information sharing.
- Blogs discuss topics from poetry to political opinions.
- In 2005 there were 9 million blogs with an estimated 40,000 new ones generated every day.
- Can take on different forms:
  - Moblogging
  - Vlogging
  - Podcasting
- Make every individual a virtual publisher.
Summary

1. The Internet is an entirely new marketplace that will soon be second nature to consumers.
2. Intranets and Extranets, similar to the Internet, are used for private communications within an organization or between organizations.
3. Managers must understand the elements that comprise e-commerce.
4. Building blocks of e-commerce include:
   - Common business services infrastructure.
   - Messaging and information distribution infrastructure.
   - Multimedia content.
   - Information superhighway infrastructure.
5. Managers can expect a future in which the Internet becomes larger, faster, more powerful and commonplace.
Chapter 9
The Management Information Systems Organization

Managing and Using Information Systems: A Strategic Approach
by KeriPearlson & Carol Saunders

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Introduction

• What are the major MIS positions in an organization?
• What is the main role of the CIO?
• What should a manager expect from the MIS organization?
• What does the MIS organization NOT do?
• How can outsourcing be used to provide competitive advantage?
• What are some of the disadvantages of outsourcing?

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Real World Examples

• The Southern Company is the dominant utility company in the southeast.
• Every year since 1948 they have paid a dividend.
• The company has seen a reduction in IT billings across the company by $54 million while functions have grown.
• Much of the success can be attributed to its IT chargeback system.
  – This system helps to assure that IT initiatives align with business goals.

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UNDERSTANDING THE MIS ORGANIZATION

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CIO

• The CIO (Chief Information Officer) is the head of the IS organization.
• CIO’s primary goal is to manage IT resources to implement enterprise strategy.
• Provide technology vision and leadership for developing and implementing IT initiatives to help the enterprise maintain a competitive advantage.
• As the importance of technology has increased so has the position of the CIO.
  – Reports directly to the CEO.

Twelve Main Responsibilities

• The following responsibilities often define the role of the CIO:
  1. Championing the organization.
  2. Architecture management.
  4. Business technology planning.
  5. Application development.
  6. IT infrastructure management.
  7. Sourcing.
  8. Partnership developer.
 11. Training.

CTO, CKO, and Others

• The CIO, particularly in larger organizations, cannot guide the enterprise toward the future alone.
• Other strategic areas require more focused guidance.
• New positions created to deal with this growing need.
  – Figure 9.1 shows a list of other IT managers and their responsibilities.
  – Figure 9.2 lists other IT responsibilities within an organization (such as DBA, Business Analyst, etc.).
  – Figure 9.3 shows the reporting relationships between the CIO and other IT positions.

<table>
<thead>
<tr>
<th>Title</th>
<th>Responsibility</th>
</tr>
</thead>
</table>
| Chief technology officer (CTO)             | Track emerging technologies  
                                            Advise on technology adoption  
                                            Design and manage IT architecture to insure consistency and compliance |
| Chief knowledge officer (CKO)              | Create knowledge management infrastructure  
                                            Build a knowledge culture  
                                            Make corporate knowledge pay off |
| Chief telecommunications officer (CTO)     | Manage phones, networks, and other communications technology across entire enterprise |
| Chief network officer                      | Build/maintain internal and external networks                                 |
| Chief resource officer                     | Manage outsourcing relationships                                              |
| Chief information security officer         | Insures information management practices are consistent with security requirements |
| Chief privacy officer                      | Responsible for processes and practices that insure privacy concerns of customers, employees and vendors are met |

Figure 9.1 The CIO’s lieutenants
Systems Development

- The manager needs to understand the processes internal to the IS group.
- Systems development is the primary processes performed.
  - Building and developing systems.
  - Involves business analysts, programmers, systems analysts, users, etc. to test and make sure the system works and meets the business objectives.
- Includes installation and configuration.
Systems Maintenance

- Includes a number of personnel to keep the system running and performing.
  - Such as DBAs, systems developers, business personnel, managers, auditors, etc.

- Some of the functions of systems maintenance include –
  - Daily transaction processing.
  - Report writing
  - Problem reporting and repairing.
  - Compliance conforming (Sarbanes-Oxley Act).

Other IS Processes

- Data center operations.
  - Core computing systems location.
  - Managers have little interaction with.

- Information management and database administration.
  - Activities of collecting and storing the actual data created, developed, or discovered.

- Internet services.
  - Includes intranets, extranets, email, etc.

- Networking services.
  - Responsible for designing network architecture.

- General support.
  - Help desk.

Eight Core Activities

- Anticipating new technologies.
  - IT must keep an eye on emerging technologies.
  - Work closely with management to make appropriate decisions.
  - Weigh risks and benefits of new technologies.

- Strategic direction.
  - IS can act as consultants to management.
  - Educate managers about current technologies/trends.

- Process innovation.
  - Review business processes to innovate.
  - Survey best practices.

- Supplier management.
  - Carefully manage outsourced IT.
Eight Core Activities (continued)

- **Architecture and standards.**
  - Be aware of incompatibilities.
  - Inconsistent data undermines integrity.
- **Security**
  - Important to all general managers.
  - Much more than a technical problem.
- **Business continuity planning**
  - Disaster recovery.
  - "What if" scenarios.
- **Human resource management.**
  - Hiring, firing, training, outsourcing, etc.

**Figure 9.4** User management activities

What IS Does Not Do

- **Does not perform core business functions such as:**
  - Selling
  - Manufacturing
  - Accounting.
- **Does not set business strategy.**
  - General managers must not delegate critical technology decisions.
ORGANIZING AND CONTROLLING IS PROCESSES

Drivers
- Offer cost savings
- Ease transition to new technologies
- Offer better strategic focus
- Provide better mgmt of IS staff
- Handle peaks
- Consolidate data centers
- Infuse cash

Disadvantages
- Abdication of control
- High switching costs
- Lack of technological innovation
- Loss of strategic advantage
- Reliance on outsourcer
- Problems with security/confidentiality
- Evaporation of cost savings

Figure 9.5 Drivers and disadvantages of outsourcing

Outsourcing
- The purchase of a good or service that was previously provided internally.
- Drivers include:
  - Reducing costs; Transition to new technologies; Focus on core business strategies; Provide better management and focus of IT personnel;
- Disadvantages are present in outsourcing and include losing control, expensive to undue decisions, etc.
- Figure 9.5 provides details on drivers and disadvantages.
- Backsourcing is when a company brings back previously outsourced IS functions.

Outsourcing Models
- Classic model
  - Outsource only those functions that do not give the company competitive advantage (prevailing method of the 70s and 80s).
- Kodak effect.
  - Put ALL functions of IS up for “grabs” (can include offshoring).
- New models:
  - Application Service Provider – rents the use of an application to the customer.
  - Full vs. Selective Outsourcing – complete outsourcing vs. only outsourcing specific functions.
Avoiding Outsourcing Pitfalls

• Decisions must be made with adequate care and deliberation.
• Offshoring is an increasingly popular form of outsourcing (using employees in other countries like India).
  – Functions include routine IT transactions, to higher end knowledge-based business processes.
  – Labor savings range from 40-70%.
  – Long transition periods.
  – Workers often have advanced degrees.
  – Countries with high levels of English proficiency are more attractive.
  – Risks can be considerable as the project size grows.
  – What could/should be offshored?

Do not focus negotiation solely on price
Craft full life-cycle services contracts that occur in stated.
Establish short-term supplier contracts.
Use multiple, best-of-breed suppliers.
Develop skills in contract management.
Carefully evaluate your company's own capabilities.
Thoroughly evaluate outsourcers' capabilities.
Choose an outsourcer whose capabilities complement yours.
Base a choice on cultural fit as well as technical expertise.
Determine whether a particular outsourcing relationship produces a net benefit for your company.
Plan transition to offshoring.

Figure 9.6 Steps to avoid pitfalls.

Overview

• Centralized – bring together all staff, hardware, software, data, and processing into a single location.
• Decentralized – the components in the centralized structure are scattered in different locations to address local business needs.
• Federalism – a combination of centralized and decentralized structures.
• Figure 9.7 shows the continuum of where these structures fall.
The 5 Eras of Information Usage

1. 1960s - mainframes dictated a centralized approach.
2. 1970s - remained centralized due in part to the constraints of mainframe computing
3. 1980s - advent of the PC and decentralization
4. 1990s - the Web, with its ubiquitous presence and fast network speeds, shifted some businesses back to a more centralized approach
5. 2000+ - the increasingly global nature of many businesses makes complete centralization impossible

Federalism

- Most companies would like to achieve the advantages derived from both centralized and decentralized organizational paradigms.
- This leads to federalism – a structuring approach which distributes, power, hardware, software, data and personnel between a central IS group and IS in business units.

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Managing the Global Considerations

• Large global MIS organizations face many of the same organizational issues as any other global department.
• For IS, a number of issues arise that put the business at risk beyond the typical global considerations.
• Table 9.11 summarizes how a global IT perspective affects six information management issues.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Global IT Perspective</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Political Stability</td>
<td>How risky is investment in a country with an unstable government?</td>
<td>India, a country that faces conflict with Pakistan</td>
</tr>
<tr>
<td>Transparency</td>
<td>Domestically, an IT network can be end-to-end with little effort compared to global networks</td>
<td>SAP-R3 can be used to support production processes but only if installed</td>
</tr>
<tr>
<td>Business Continuity Planning</td>
<td>When crossing borders, it is important to make sure that contingency plans are in place</td>
<td>Concern when crossing borders is will data center be available when/if needed</td>
</tr>
<tr>
<td>Cultural Differences</td>
<td>IT systems must not offend or insult those of a different culture</td>
<td>Using images or artifacts may be insulting to another culture</td>
</tr>
<tr>
<td>Sourcing</td>
<td>Some technologies cannot be exported or imported into specific countries</td>
<td>Exporting it to some countries, especially those who are not political allies is not possible</td>
</tr>
<tr>
<td>Data Flow across Borders</td>
<td>Data, especially private or personal data, is not allowed to cross some borders.</td>
<td>For example: Brazil</td>
</tr>
</tbody>
</table>

Figure 9.11 Global Considerations for the MIS Organization

Managing a Global Network

• Managing a global network is a challenge, particularly when different parts of it are owned by different enterprises.
• Offshoring is used (as covered earlier) by more and more companies.
• Offshoring has resulted in a high number of lost IT jobs (500,000 in 2004 in the U.S.).
  – Some states are attempting to curb this trend by regulating the privatization of state services.
  – There is likely to be continued pressure on curbing offshoring by government and major corporations.
  – However, offshoring has cut consumer costs by 10-30%.

FOOD FOR THOUGHT: GOING OFFSHORE FOR IS DEVELOPMENT
Summary

- The CIO is a high-level IS officer.
- There are a variety of key job titles in the IS organization.
- IS organizations can be expected to anticipate new technologies, set strategic direction, etc.
- Managers must work with IT leaders to develop a lean, competitive enterprise, where IT acts as a strategic enable.
- Full or selective outsourcing offers organizations alternatives to keeping strategic IT services.
- Offshoring is growing and is a controversial issue.
Introduction

- How are IT costs best allocated across an organization?
- Is there a method that is most likely to be fair and accurate?
- How do companies determine what the real costs are for IT investments?
- What metrics (ROI, NPV, etc.) should be used to evaluate IT investments?
- What is TCO (Total Cost of Ownership)?

Funding the IT department

- How are costs associated with designing, developing, delivering and maintaining IT systems recovered?
- There are three main funding methods:
  - Chargeback
  - Allocation
  - Corporate budget
- The first two are done for management reasons, while the latter recovers costs using corporate coffers
Chargeback

• IT costs are recovered by charging individuals, departments, or business units
• Rates for usage are calculated based on the actual cost to the IT group to run the system and billed out on a regular basis
• They are popular because they are viewed as the most equitable way to recover IT costs
• However, creating and managing a chargeback system is a costly endeavor

Allocation

• Recovers costs based on something other than usage, such as revenues, log-in accounts, or number of employees
• Its primary advantage is that it is simpler to implement and apply
• True-up process is needed where total IT expenses are compared to total IT funds recovered from the business units.
• There are two major problems:
  • The 'free rider' problem
  • Deciding the basis for charging out the costs

Corporate Budget

• Here the costs fall to the corporate P&L, rather than levying charges on specific users or business units
• In this case there is no requirement to calculate prices of the IT systems and hence no financial concern raised monthly by the business managers
• However, there are drawbacks, as shown in the next slide (Figure 10.1).

<table>
<thead>
<tr>
<th>Funding Method</th>
<th>Description</th>
<th>Why do it?</th>
<th>Why not do it?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chargeback</td>
<td>Charges are calculated based on actual usage</td>
<td>Fairest method for recovering costs since it is based on actual usage</td>
<td>Must collect details on usage; often expensive and difficult</td>
</tr>
<tr>
<td>Allocation</td>
<td>Expenditures are divided by non-usage basis</td>
<td>Less bookkeeping for IT</td>
<td>IT department must defend allocation rates</td>
</tr>
<tr>
<td>Corporate Budget</td>
<td>Corporate allocates funds to IT in annual budget</td>
<td>No billing to the businesses. Good for encouraging use of new technologies.</td>
<td>Have to compete with all other budgeted items for funds</td>
</tr>
</tbody>
</table>

Figure 10.1 Comparison of IT funding methods

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HOW MUCH DOES IT COST?

The most basic method of determining costs is to add up all of the hardware, software, network, and people involved in IS.

Real cost is not as easy to determine.

Most companies continue to use the oversimplistic view of determining cost and never really know the real cost.

Activity Based Costing

• Activity Based Costing (ABC) counts the actual activities that go into making a specific product or delivering a specific service.
• Activities are processes, functions, or tasks that occur over time and have recognized results. They consume assigned resources to produce products and services.
• Activities are useful in costing because they are the common denominator between business process improvement and information improvement across departments.

Total Cost of Ownership

• Total Cost of Ownership (TCO) is fast becoming the industry standard
• It looks beyond initial capital investments to include costs associated with technical support, administration, and training.
• This technique estimates annual costs per user for each potential infrastructure choice; these costs are then totaled.
• Careful estimates of TCO provide the best investment numbers to compare with financial return numbers when analyzing the net returns on various IT options.
TCO Component Breakdown

• For shared components like servers and printers, TCO estimates should be computed per component and then divided among all users who access them
• For more complex situations, such as when only certain groups of users possess certain components, it is wise to segment the hardware analysis by platform
• Soft costs, such as technical support, administration, and training are easier to estimate than they may first appear

TCO as a Management Tool

• TCO also can help managers understand how infrastructure costs break down
• It provides the fullest picture of where managers spend their IT dollars as TCO results can be evaluated over time against industry standards
• Even without comparison data, the numbers that emerge from TCO studies assist in decisions about budgeting, resource allocation, and organizational structure

IT Portfolio Management

• IT investments should be managed as any other investment would be managed by an organization.
• IT Portfolio Management refers to the process of evaluating and approving IT investments as they relate to other current and potential IT investments.
• Often involves picking the right mix of investments.
• Goal is to invest in most valuable IT initiatives.
Asset Classes

- According to Weill and Aral, there are four asset classes of IT investments:
  - Transactional systems – systems that streamline or cut costs on business operations.
  - Informational systems – any system that provides information used to control, manage, communicate, analyze or collaborate.
  - Strategic systems – any system used to gain competitive advantage in the marketplace.
  - Infrastructure systems – the base foundation or shared IT services used for multiple applications.

Relative Investment Profile

- Average firm allocates 54% to infrastructure each year and only 13% to transactional systems.
- Service companies (such as food service) allocate:
  - 26% to informational systems
  - 18% to transactional systems
  - 45% to infrastructure systems
  - 11% to strategic systems
- Figure 10.4 summarizes a typical IT portfolio.
- Table 10.5 summarizes the differences of strategies.

<table>
<thead>
<tr>
<th></th>
<th>Infrastructure investments</th>
<th>Transactional investments</th>
<th>Informational investments</th>
<th>Strategic investments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Firm</td>
<td>54%</td>
<td>13%</td>
<td>20%</td>
<td>13%</td>
</tr>
<tr>
<td>Cost Focus</td>
<td>42%</td>
<td>40%</td>
<td>13%</td>
<td>5%</td>
</tr>
<tr>
<td>Agility Focus</td>
<td>58%</td>
<td>11%</td>
<td>14%</td>
<td>17%</td>
</tr>
</tbody>
</table>

Table 10.5 IT Investment strategies compared
Project and Portfolio Management

• Collecting information needed is a challenge.
• Project and Portfolio Management (PPM) systems exist that often have expanded capabilities.
• These tools are called IT governance systems.
• Several successful companies produce systems used for PPM.

Valuing IT Investments

• Soft benefits, such as the ability to make future decisions, make it difficult to measure the payback of IT investment
  – First, IT can be a significant part of the annual budget, thus under close scrutiny.
  – Second, the systems themselves are complex, and calculating the costs is an art, not a science.
  – Third, because many IT investments are for infrastructure, the payback period is much longer than other types of capital investments.
  – Fourth, many times the payback cannot be calculated because the investment is a necessity rather than a choice, and there is no tangible payback
• Figure 10.6 show the valuation methods used.

<table>
<thead>
<tr>
<th>Valuation Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return on Investment (ROI)</td>
<td>ROI = (Estimated lifetime benefits - Estimated lifetime costs)/Estimated lifetime costs</td>
</tr>
<tr>
<td>Net Present Value (NPV)</td>
<td>Calculated by discounting the costs and benefits for each year of system’s lifetime using present value</td>
</tr>
<tr>
<td>Economic Value Added (EVA)</td>
<td>EVA = net operating profit after taxes</td>
</tr>
<tr>
<td>Payback Analysis</td>
<td>Time that will lapse before accrued benefits overtake accrued and continuing costs</td>
</tr>
<tr>
<td>Internal Rate of Return (IRR)</td>
<td>Return that the IT investment is compared to the corporate policy on rate of return</td>
</tr>
<tr>
<td>Weighted Scoring Methods</td>
<td>Costs and revenues/savings are weighted based on their strategic importance, etc</td>
</tr>
<tr>
<td>Prototyping</td>
<td>A scaled-down version of a system is tested for its costs and benefits</td>
</tr>
<tr>
<td>Game Theory or Role-playing</td>
<td>These approaches may surface behavioral changes or new tasks attributable to a new system</td>
</tr>
<tr>
<td>Simulation</td>
<td>A model is used to test the impact of a new system or series of tasks; low-cost method</td>
</tr>
</tbody>
</table>

Figure 10.6 Valuation Methods
MONITORING IT INVESTMENTS

IT Investment Monitoring

• “If you can’t measure it, you can’t manage it”.
• Management needs to make sure that money spent on IT results in organizational benefit.
• Must agree upon a set of metrics for monitoring IT investments.
• Often financial in nature (ROI, NPV, etc.).

The Balanced Scorecard

• Focuses attention on the organization’s value drivers (which include financial performance)
• Companies use it to assess the full impact of their corporate strategies on their customers and workforce, as well as their financial performance
• This methodology allows managers to look at their business from four perspectives: customer, internal business, innovation/learning, and financial
• Figure 10.7 shows the relationship of these perspectives.

Figure 10.7  The Balanced Scorecard perspectives
The Balanced Scorecard applied to IT

• Applying the categories of the balanced scorecard to IT might mean interpreting them more broadly than originally conceived
• For example, for the MIS scorecard, the customer is a user within the company, not an external customer
• The questions asked when using this methodology within the IT department are summarized in the next slide

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Description</th>
<th>Example IT Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Perspective</td>
<td>Measures that reflect factors that really matter to customers</td>
<td>User defined operational metrics</td>
</tr>
<tr>
<td>Internal Business Perspective</td>
<td>Measures of what the company must do internally to meet customer expectations.</td>
<td>IT process metrics, project completion rates, system operational performance metrics</td>
</tr>
<tr>
<td>Innovating and Learning</td>
<td>Measures of the company’s ability to innovate, improve and learn</td>
<td>IT R&amp;D, New technology introduction success rate, training metrics</td>
</tr>
<tr>
<td>Financial Perspective</td>
<td>Measures to indicate contribution of activities to the bottom-line</td>
<td>IT project ROI, NPV, IRR, cost/benefit, TCO, ABC</td>
</tr>
</tbody>
</table>

Figure 10.8 Balanced Scorecard applied to IT departments

The IT Balanced Scorecard

• A scorecard used within the IT department.
  – Helps senior IS managers understand their organization’s performance, and measure it in a way that supports its business strategy
• The IT scorecard is linked to the corporate scorecard, by insuring that the measures used by IT are those that support the corporate goals

IT Dashboards

• IT dashboards summarize key metrics for senior managers in a way that provides quick identification of the status of the organization
• Dashboards provide frequently-updated information on areas of interest within the IT department.
• The data tends to focus on project status or operational systems status.
• Problems can also be identified and handled without waiting for the monthly CIO meeting
FOOD FOR THOUGHT: OPTIONS PRICING

Options Pricing

• Options pricing offers management the opportunity to take some future action in response to uncertainty about changes in the business and its environment.
• It offers a risk-hedging strategy to minimize the negative impact of risk when uncertainty can be resolved by waiting to see what happens.
• To be applied, managers need to have a project that can be divided into investment stages, and be armed with estimates of costs of the project at each stage, the projected revenues or savings and the probability of these costs and revenues/savings being realized.

NPV vs. Option Pricing View

• The next slide offers a very simple example of how options pricing would work for a new Customer Relations Management (CRM) system that has two major components:
  • A customer identification module
  • A customer tracking module
• (NB: in this model all costs and revenues reflect discounting)

Figure 10.8 NPV vs. Option Pricing View.
Security and Controls

- Ernst and Young survey suggests that most companies rely on luck rather than proven IS controls.
- Companies turn to technical responses to deal with security threats (worms, viruses, etc.).
- Managers go to great lengths to make sure that their systems are secure.
  - Firewalls, IDS systems, password systems, and more.
- Future solutions will include hardware and software.
- Managers must be involved in the decisions about security and control.

Sarbanes-Oxley Act

- The Sarbanes-Oxley Act of 2002 was enacted to increase regulatory visibility and accountability of public companies and their financial health.
  - All companies subject to the SEC are subject to the requirements of the act.
  - CEO’s and CFO’s must personally certify and be accountable for their firm’s financial records and accounting.
  - Firms must provide real-time disclosures of any events that may affect a firm’s stock price or financial performance.
  - IT departments realized that they played a major role in ensuring the accuracy of financial data.

IT Control and Sarbanes-Oxley

- In 2004 and 2005 IT departments began to identify controls, determined design effectiveness, and validated operation of controls through testing.
- Five IT control weaknesses were uncovered by auditors:
  1. Failure to segregate duties within applications, and failure to set up new accounts and terminate old ones in a timely manner.
  2. Lack of proper oversight for making application changes, including appointing a person to make a change and another to perform quality assurance on it.
  3. Inadequate review of audit logs to not only ensure that systems were running smoothly but that there also was an audit log of the audit log.
  4. Failure to identify abnormal transactions in a timely manner.
  5. Lack of understanding of key system configurations.
FOOD FOR THOUGHT: ETHICS AND THE INTERNET

Ethics and the Internet

• The Internet crosses international boundaries posing challenges that are not readily resolved.
• Different cultures, laws, customs, and habits insure that different countries police the Internet in very different ways.
• Managers face challenges in navigating their organizations through the murky waters of ethical use of the Internet.
• Example: Free speech and censorship.
  – The U.S. provides for free speech protection, but other countries do not.
  – An Internet code of ethics by the IFIP is being debated.

Summary

• IT is funded using either chargeback, allocation, or corporate budget.
• Chargeback is viewed as most equitable.
• TCO is used to understand ALL costs associated with a technology.
• Activity-based costing can be a meaningful measure of determining cost.
• The portfolio of IT investments must be carefully evaluated and managed.
• Balanced scorecards and IT dashboards are used to communicate the status and benefits of IT.
• Options pricing offers risk-hedging.

Summary

• Ethics is important to the IS field particularly since new technologies and innovations are arriving at an untold pace.
• IS professionals must seek to uphold the ethical handling and dissemination of information adhering to international, federal, state, and local laws concerning the ethical handling of data under their supervision.
• Improper handling and use of IS can lead not only to internal organization problems but to legal problems as well.
• Don’t jeopardize your future by the mishandling of IS
INFORMATION SYSTEM STRATEGY

EXECUTIVE DIPLOMA POST MODULE ASSIGNMENT

BUSINESS & ADVANCED TECHNOLOGY CENTRE
UNIVERSITY TECHNOLOGY MALAYSIA

Develop an Information System Strategic Plan for your company. Your report could be a working document for the board of directors, so it shouldn’t be too long and complicated.

Your report may include:-

- Company background (summary)
- Business problem to be solved (summary)
- Analysis of the options considered
- Your proposed business solution and your justification
- Relevance of the solution to the business problem
- How IS/IT will be uses
- Expected business benefits
- Implementation plan
- Any other management issues.

60% of the marks are awarded for this PMA which must be an individual assignment and not group work. You may use power point presentation to present your plan with text attachments to explain the details of each slide otherwise you may use a full text report format for the plan.

End.