

# IS6640

## IS Planning and Strategy

Lecture 11 - Sourcing Strategies & IS/IT Governance

# Sourcing Strategies

- Managing IT Service Delivery

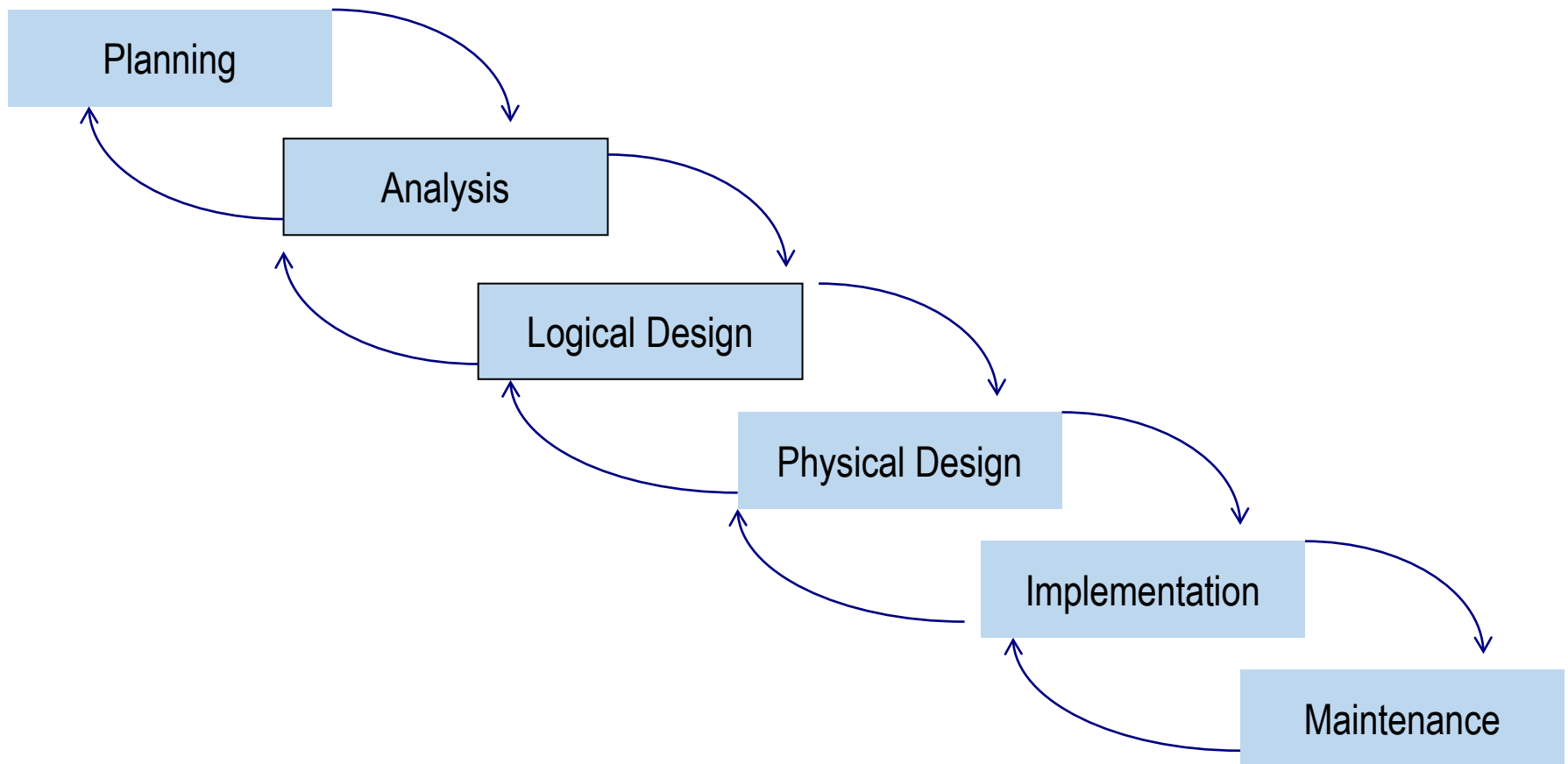
# Need for Alternatives to Building Systems Yourself

- Building systems in-house is always an option, unless you are faced with:
  - Situation 1: Limited IS staff
    - Staff may be too small.
    - Staff may be occupied in other ways.
    - Staff is not capable of developing the system without additional hiring.
  - Situation 2: IS staff has limited skill set
    - Many organizations have outside groups manage their Web sites.
      - Take advantage of specialized skills.

# Managing Project Execution

- **Development methodologies** represents IT projects as a sequence of phases:
  - Analysis and design
    - Analysis of requirements, specification of system capabilities
  - Construction
    - Select equipment, create/buy/adapt software programs, test the system
  - Implementation
    - From IT-driven construction to user-driven management of the complete system
  - Operations and maintenance
    - Fix and changes to the system after implementation
- Examples:
  - Systems development life cycle (SDLC)

# Systems Development Life Cycle



# Managing Project Execution

- **Adaptive methodologies** calls for quickly building a preliminary version of the system (prototype) without going through a lengthy or formal requirement definition or design phase
  - Iterative: design, construction, and implementation occur incrementally with each iteration.
  - Fast cycles: loop through each phase quickly
  - Feedback: early delivery to end users of (limited) functionality to allow in-progress learning
  - Midcourse adjustment: incorporate user feedback and learning into performance improvement
- Examples:
  - Adaptive software development; Extreme programming;

# Extreme Programming

- ▶ Stress on customer satisfaction
- ▶ Emphasize team work
  - ▶ (manager, customer, developer)
- ▶ Pair programming
- ▶ Simple and clean design
- ▶ Test from Day One



# External Acquisition

- Purchasing an existing system from an outside vendor such as IBM, HP Enterprise Services, or Accenture
- Similar to the process of deciding which car best meets your needs
  - Requires up-front analysis of your needs
    - How much can you afford to spend?
    - What basic functionality is required?
    - Number of users?



# Steps in External Acquisition

- Competitive bid process—find the best system for lowest possible price.
  - Systems planning and selection
  - Systems analysis
  - Development of a request for proposal
  - Proposal evaluation
  - Vendor selection
- The first two steps are similar to SDLC.

# Development of a Request for Proposal (RFP)

- RFP—documentation detailing system requirements sent to prospective vendors
  - Invitation to present bids for the project
  - Often set up in the form of a Web site
- Examples of RFP:
  - [Hemisfair AR Project](#)
  - [Website Design and Development](#)
  - [Data Analytics RFP](#)
  - [Digital Media](#)
- Source: [Responsive IO](#)

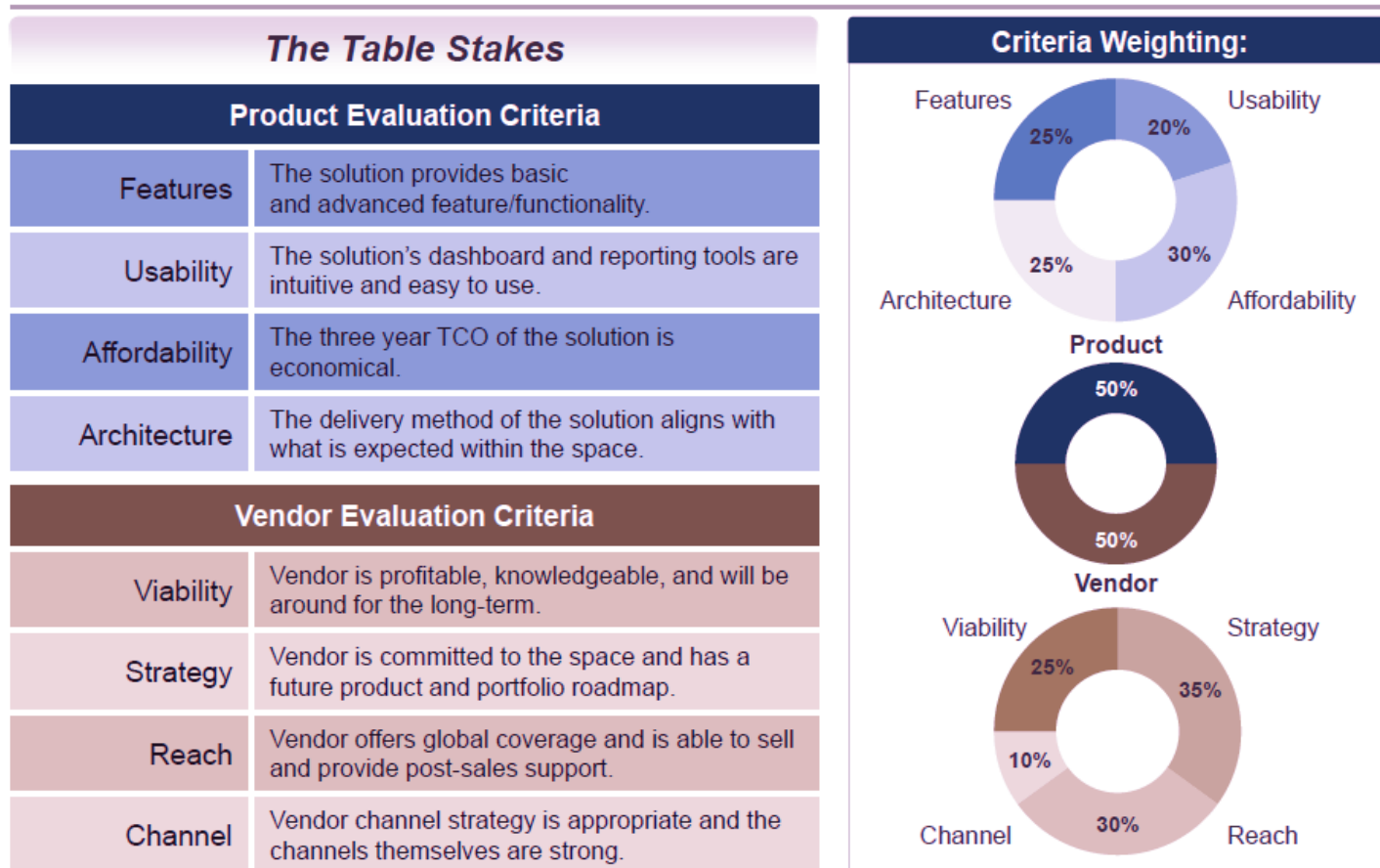
# Proposal Evaluation

- Proposal evaluation—An assessment of proposals received from vendors.
  - May include system demonstrations
  - System benchmarking
    - Standardized tests to compare different proposed systems
    - Common system benchmarks
      - Response time given a specified number of users
      - Time to sort records
      - Time to retrieve a set of records
      - Time to produce a given record
      - Time to read in a set of data

# Vendor Selection

- Usually more than one system will meet the criteria.
- Determine the best fit
- Need to prioritize/rank the proposed systems
  - Best ranking system is chosen.
  - Formal approach—devise a scoring system for the criteria
  - Less formal approaches:
    - Checklists
    - Subjective processes

# Evaluation Criteria



# Vendor Evaluation Criteria

Rank	Vendor Selection Criteria – External Chassis & Modules	Rank	Vendor Selection Criteria – Plug-In Analog I/O Boards
1	Price	1	Price
2	Application Support	2	Stability
3	Experience/Relationship with Vendor	3	General Service/Support
4	General Service/Support	4	Availability/Delivery
5	Stability	5	Application Support
6	Availability/Delivery	6	Experience/Relationship with Vendor
7	Programming Support	7	Product Documentation
8	Product Documentation	8	Large, Well Established Vendor
9	Brand Name Recognition	9	Maintenance Service/Support
10	Maintenance Service/Support	10	Hardware/Software from one source
11	Hardware/Software from one source	11	Programming Support
12	Installation Support	12	Reputation
13	Warranty	13	Installation Support
14	Longevity in Business	14	Longevity in Business
15	Reputation	15	Warranty

Ref: <http://www.infotivty.com/>

# Outsourcing Systems Development

- Outsourcing systems development—Turning over responsibility for some or all of an organization's IS development and operations to an outside firm.
  - Your IS solutions may be housed in their organization.
  - Your applications may be run on their computers.
  - They may develop systems to run on your existing computers (within your organization).

# Outsourcing

- What is Outsourcing? (2:52) –  
<https://www.youtube.com/watch?v=iXRWP7DRGEc>
- Outsourcing Explained (3:30mins)-  
<https://www.youtube.com/watch?v=DcQraUl1Zjg>
- The Different Types and Models of Outsourcing (4:54mins)
- <https://www.youtube.com/watch?v=o2EjVngZU2M>
- Outsourcing Pros and Cons (1:16mins) -  
[https://www.youtube.com/watch?v=za4VmBB8\\_F8](https://www.youtube.com/watch?v=za4VmBB8_F8)
- Outsourcing and Offshoring (1:29mins) -  
<https://www.youtube.com/watch?v=qQhb-n6uKUo>



# Why Outsourcing? (cont'd)

- Financial factors—liquidation of IT assets.
- Organizational culture—external IS groups are devoid of political ties.
- Internal irritants—external IS group may be better accepted by other organizational users.

# New Service Models

- Reliable and secure connections to public networks provide new options for delivery of IT services

## What could be different now?

- **Software** execution and **data storage** location no longer need to be local.
- Services historically provided by IT departments now can be acquired from service providers

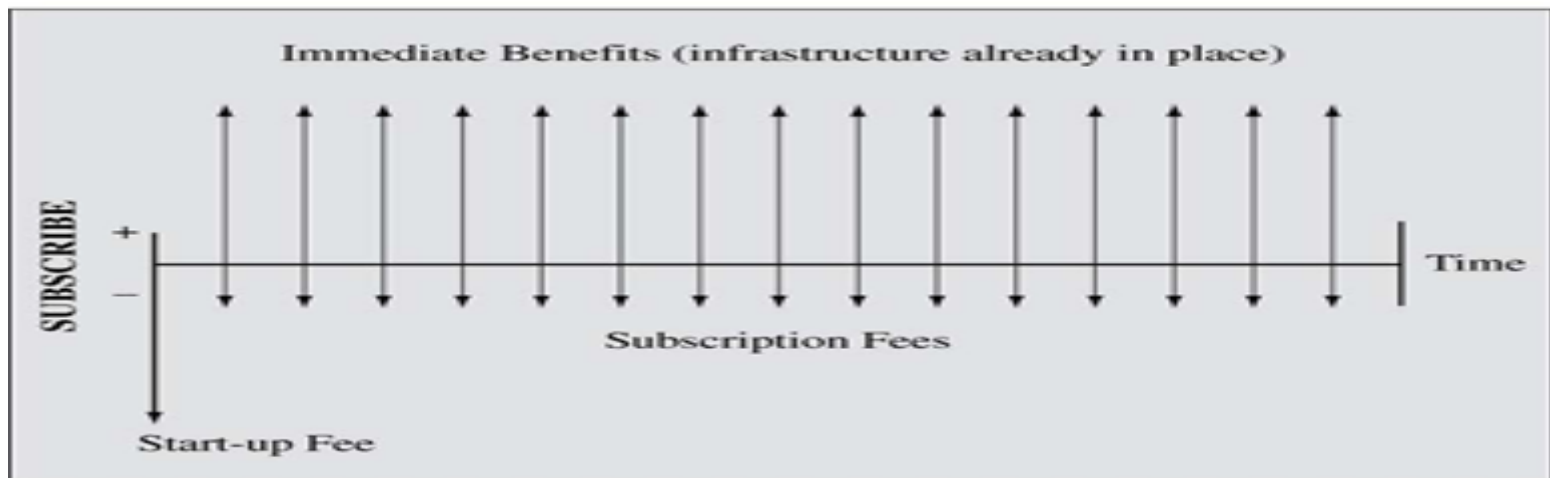
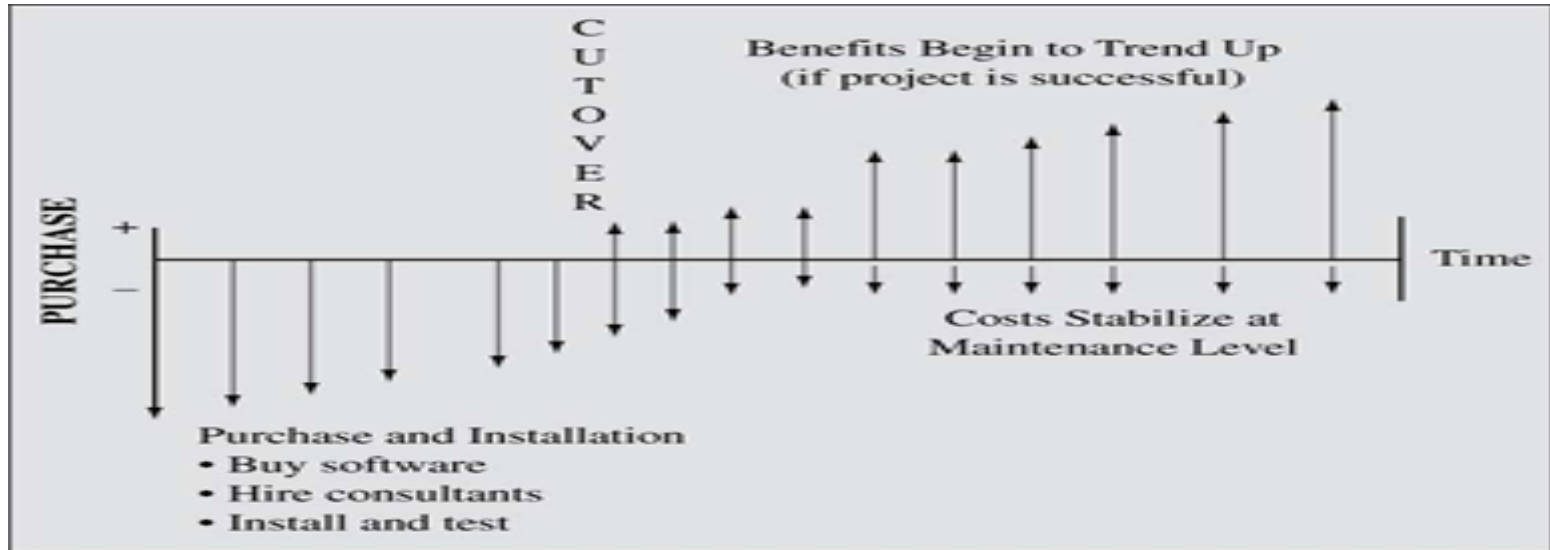
## New service models

- On Demand, Software as a service (SaaS) model
  - Manage fluctuating demands efficiently
  - Rent IT capabilities as needed, e.g., pay a monthly fee
  - E.g., [Salesforce](#)
- Example: Criteria for SaaS:

<https://www.zdnet.com/article/saas-checklist-nine-factors-to-consider-when-selecting-a-vendor/>

<https://www.techtarget.com/searchcloudcomputing/tip/Follow-this-SaaS-vendor-checklist-to-find-the-right-provider>

# Purchase versus Subscribe Cash Flows



# Managing risk through incremental outsourcing

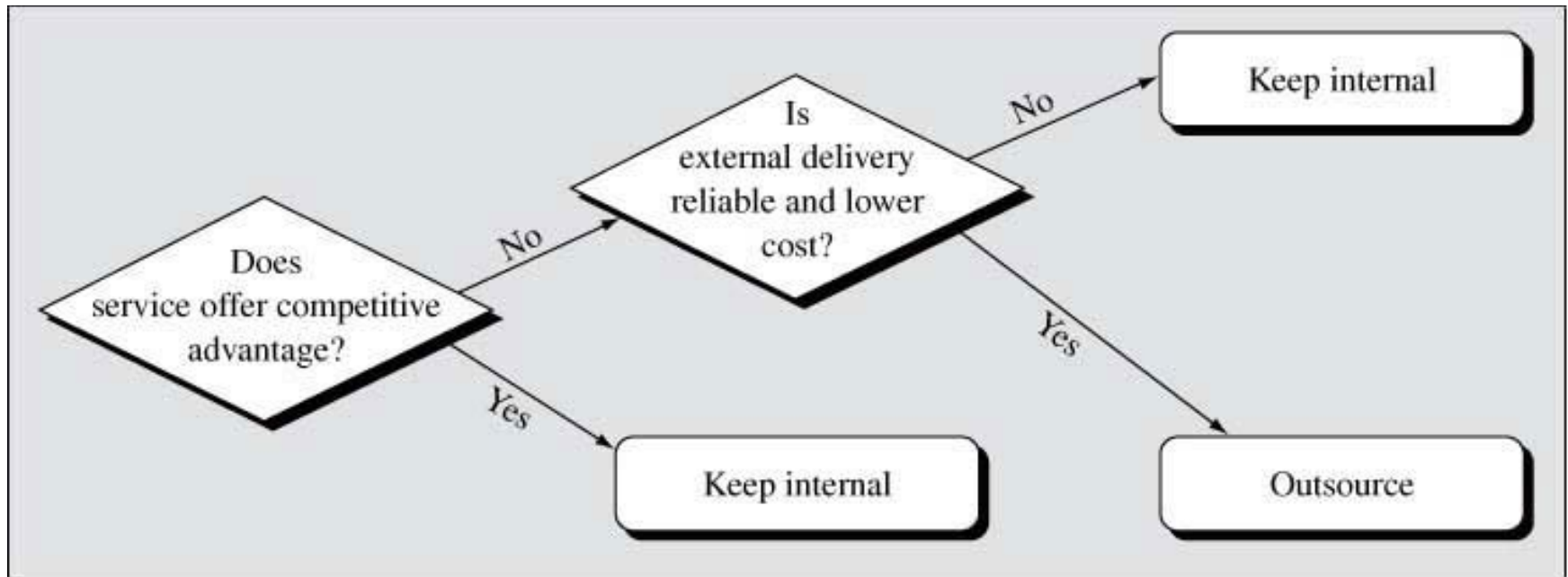
- In the past, managers often faced two equally unpleasant choices:
  - Do nothing and risk slipping behind competitors
  - Wholesale replacement of major components of computing infrastructure, which risks huge cost overruns and potential business disruptions as consequences of an implementation failure
- Incremental outsourcing offers new and attractive choices to improve IT infrastructure
  - Options lie between all-or-nothing choices

# Eg: Hosting service provider industry

Level of Service	Description of Service
Business operating services	Administering and operating an application
Application support services	Support for software above the operating system level; application support; application performance monitoring and tuning; design of applications for scalability, reliability, security
Platform services	Support for hardware, operating system, reboot services; data backup and disaster recovery services; URL monitoring
Network services	Connectivity within the facility and externally to the public Internet and to private peering networks; monitoring of network traffic at the transport layer; service-level assurances at the packet loss and network availability layers; network security
Real estate services (lowest level)	Suitable floor space and physical facilities; maintenance of the space and facilities

- The higher the level of service, the larger the \$\$ the client firm spends and the % of effort outsourced

# Which service to outsource?



© Robert Austin 2009

# Which service to outsource?

- IT services that are unique to a company and provide it with significant advantages over competitors
  - Tend not to be outsourced
  - Not to vendors that are trying to sell similar services to all of their customers
  - Exception?
- Commodity-like IT services, the priorities are reliability and low cost
  - Tend to be outsourced

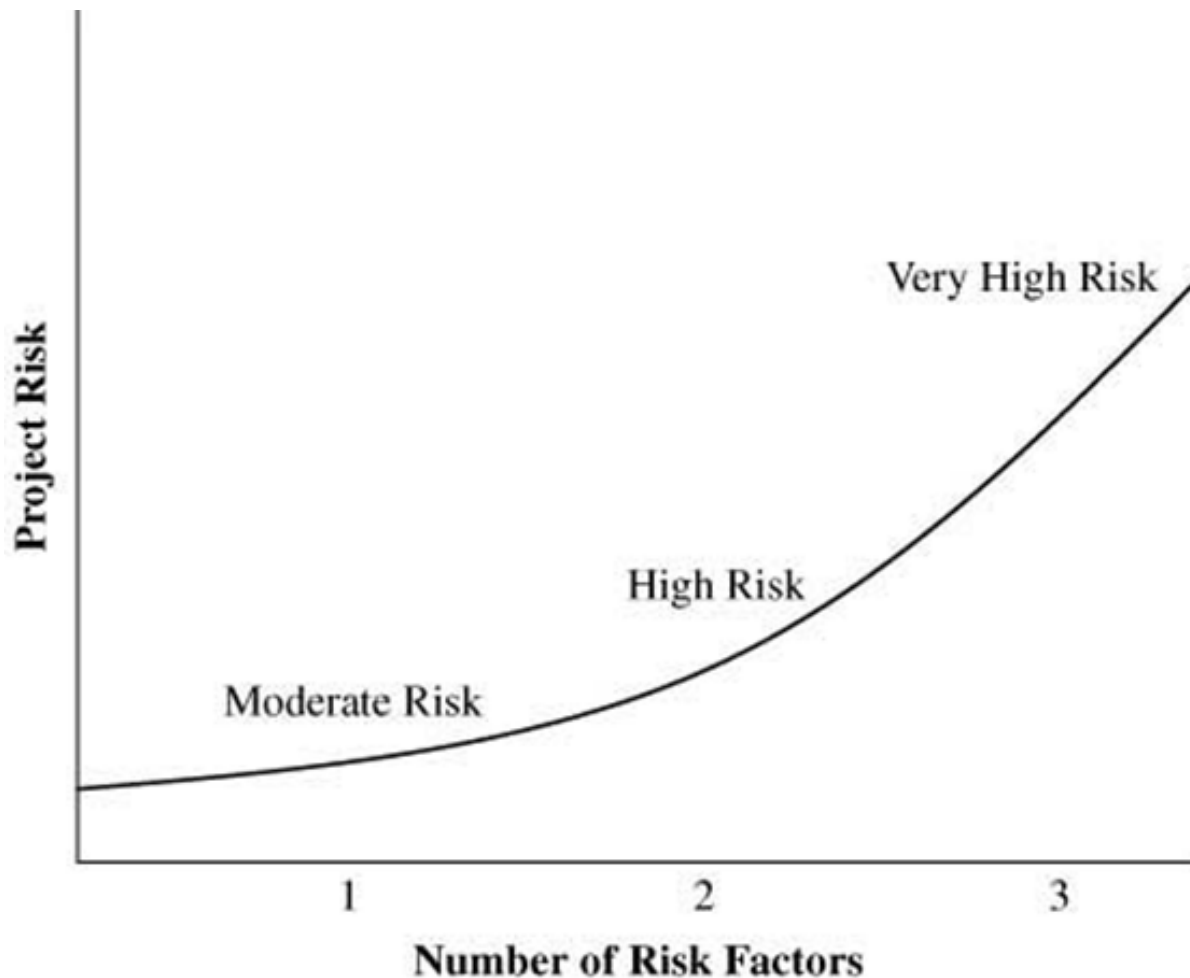
# Managing IT Project delivery



# Sources of Implementation Risk

- Disastrous IT projects still occur
- Three project dimensions influence inherent implementation risk
  - **Project size**
    - Budget, staffing levels, duration, number of departments affected
  - **Experience with the technology**
    - Familiarity with technology, expertise
  - **Requirement volatility**
    - Whether nature of the task clearly defines what is required of project outputs (stable or evolving requirements)

## Effects of Additional Risk Factors (Large Size, High Technology, High Requirements Volatility) on Project Risk



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# Managing the “Dip”

Major improvement programs are usually “sold” within an organization with a picture (sometime implicit) that looks something like this:



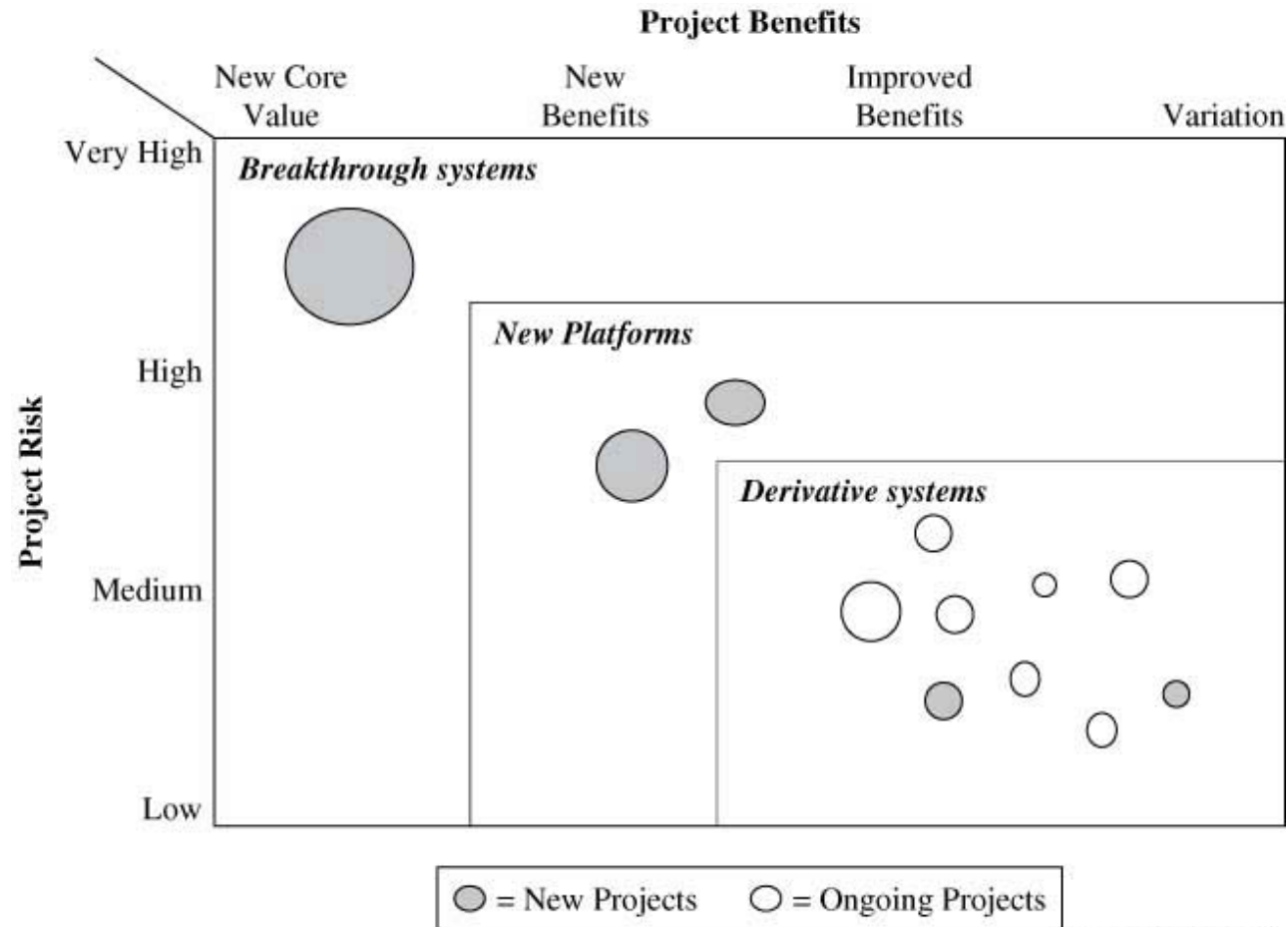
When these programs begin, they proceed in accord with a picture that looks more like this:



# Managing the dip

- Managing the “dip” during project implementation
  - Stay focus despite a possible torrent of complaints and problems
  - Problems tackled in order of importance
  - Educate senior managers about the inevitability of performance dip and seek for help from them
- Change Management
  - (10 Principles) - Processes and roles to address changes
  - 10 Change Management Models Explained in 10 Minutes

# A Portfolio of Projects



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# Managing Portfolio Risk

- Managing portfolio risk
  - Alignment with business strategies: e.g. “aggressive use of technology to maintain competitive advantage”
  - A portfolio loaded with high-risk projects is vulnerable to operational disruptions
  - Projects that are financially justified one at a time may lose sight of the big picture
- IT portfolio view
  - Highlights total implementation risk
  - Enable rebalancing of portfolio to key priorities
  - Ensure limited resources are linked to critical company needs

# Availability of IT services

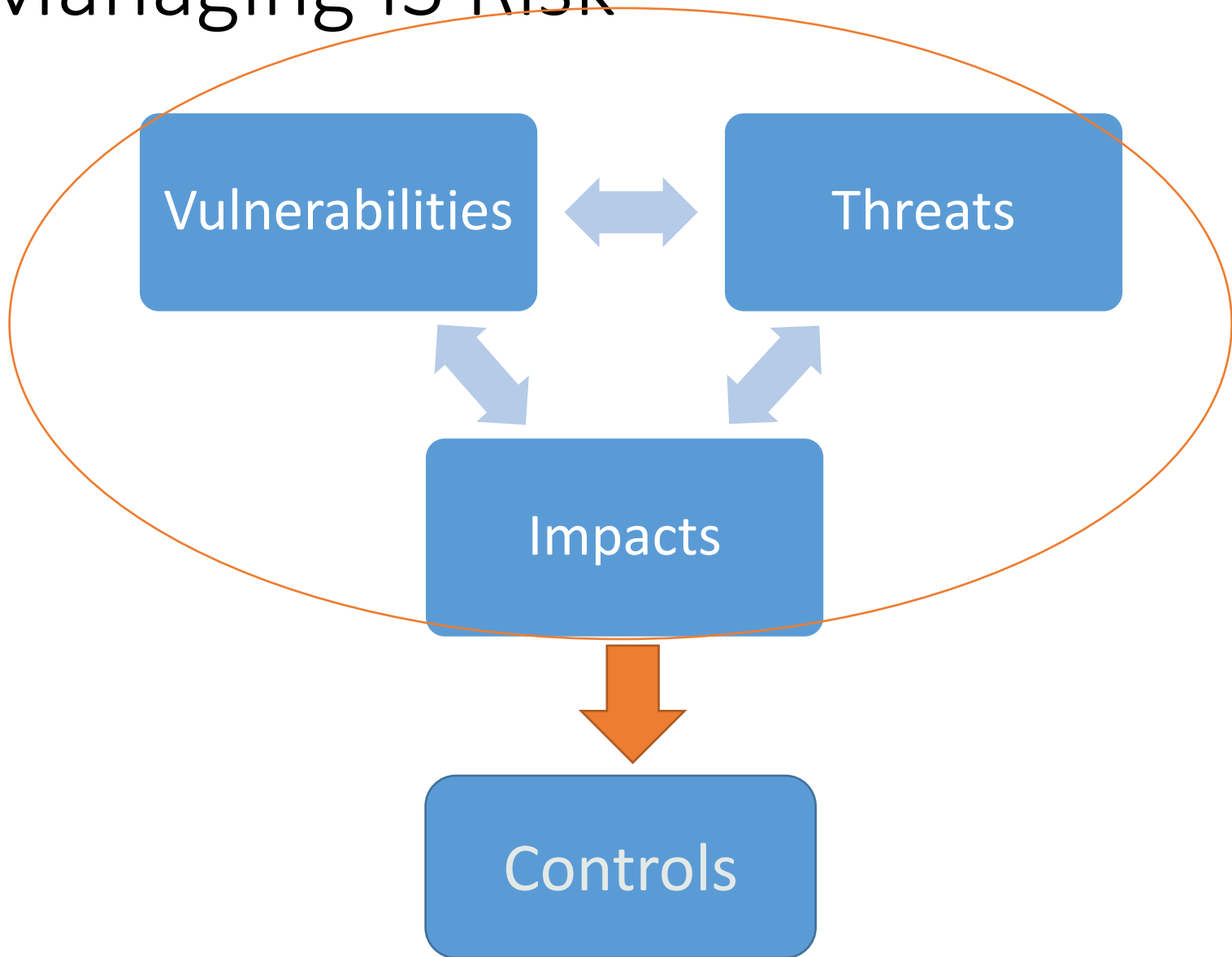
- Reliability of computing infrastructure
  - Availability of IT services / systems
    - 24/7 operations
  - Reliability through redundancy comes at a price
- A business's tolerance for outage varies by system and situation
  - An online airline reservation system can lose \$1,500 per minute of downtime
  - An online retail business can lose \$15,000 per minute of downtime
  - E-commerce applications typically have a downtime cost per minute of about \$7,800
- How much availability to have is a management decision

# Managing IS Risk

- Any information system can be compromised
- Organizations need to manage risks
- Three components:
  - Threats: undesirable events such as fire, software error, hacking, computer viruses
  - Vulnerabilities: weaknesses that can be exploited by threats to cause damage
  - Impacts: severity of the consequence(s) of a threat exploiting a vulnerability and resulting in damage



# Managing IS Risk

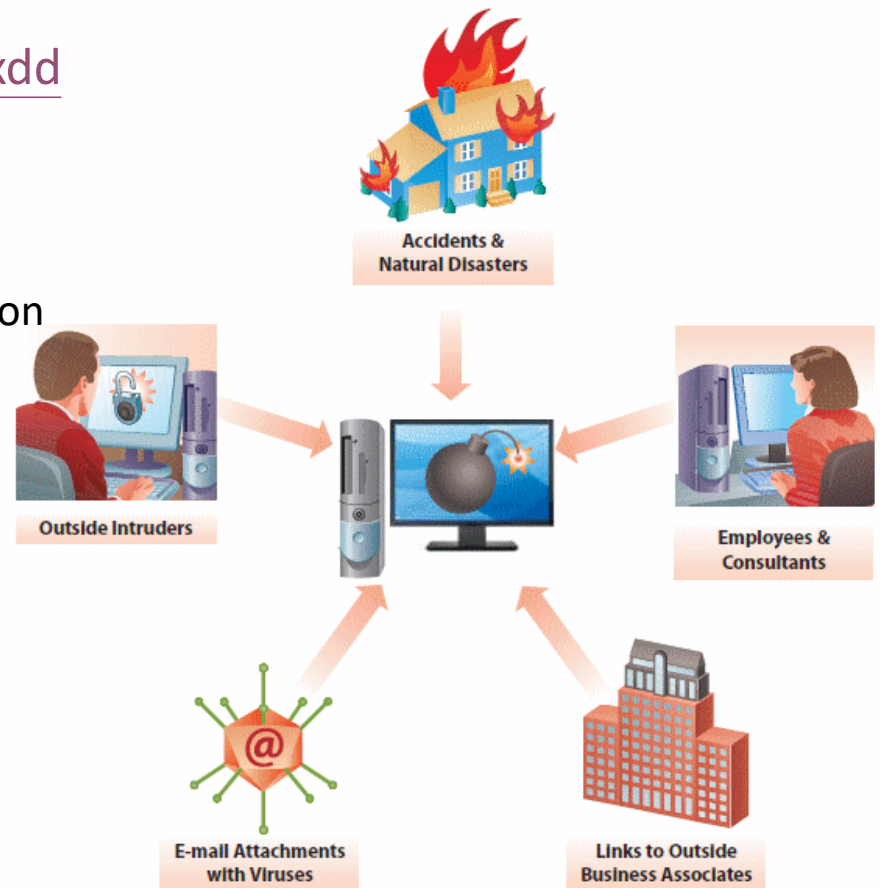


# Threat – malicious attacks

- External attacks
  - Actions against computing infrastructure without actually gaining access to it
  - e.g. Distributed Denial of Service (DDoS)
- Intrusion
  - Gain access to internal IT infrastructure
  - e.g. Social Engineering: the act of manipulating people to divulge confidential information
  - e.g. sniffer software
- Viruses and Worms
  - Malicious software programs that replicate and spread themselves to other computers
- List of CyberAttacks
- 10 Most Common Types of Cyberattacks (Reference: CrowdStrike)

# Primary Threats to Information Systems Security

- \*How to Protect Your Data Online  
<http://www.youtube.com/watch?v=sdpxddDzXfE>
- Intentional or unintentional
- Natural disasters
  - Power outages, hurricanes, floods, and so on
- Accidents
- Employees and consultants
- Links to outside business contacts
  - Travel between business affiliates
- Outsiders
  - Viruses
- Company policies



# Managing IS Risk

- Understand interplay of the three components
- Implement IS controls
  - Preventive controls
  - Detective controls
  - Corrective controls

# IT Infrastructure

# Evolution of Corporate IT Infrastructure

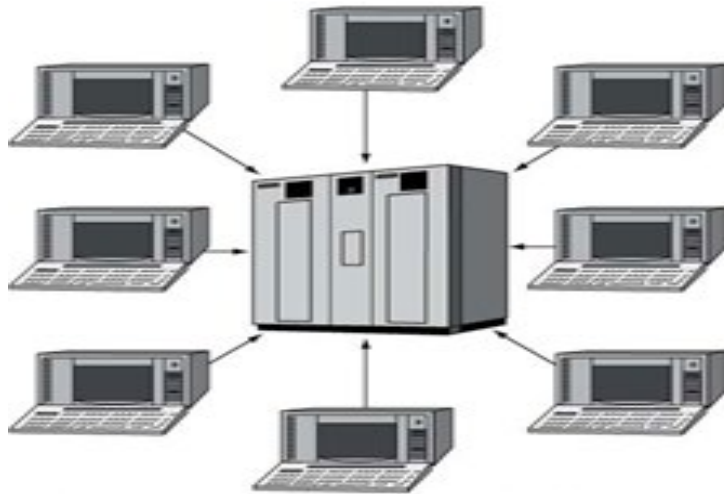
- Mainframe-based centralized computing
  - Pre-1980
- PC-based distributed computing
  - 1980s
- Client-Server computing
  - Late 1980s, Early 1990s
- Internetwork-based computing
  - Mid-1990s to present



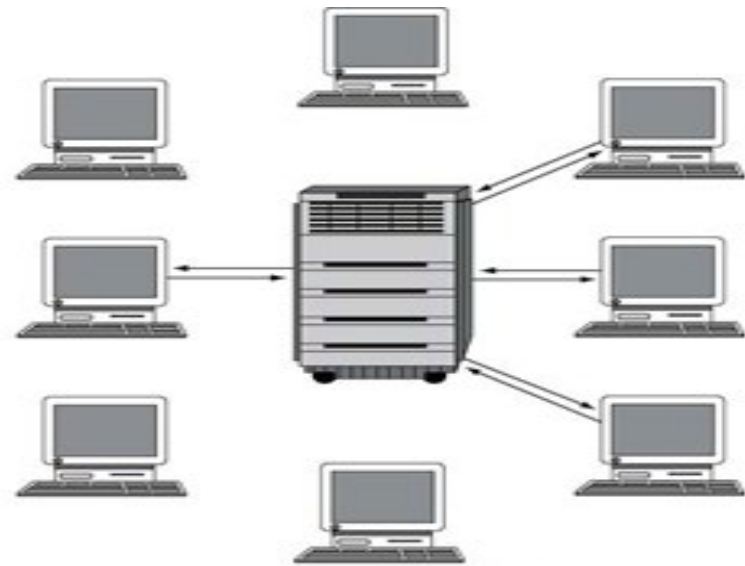
**Moor's Law**  
**Metcalf's Law**

**Better chips, bigger  
pipes**

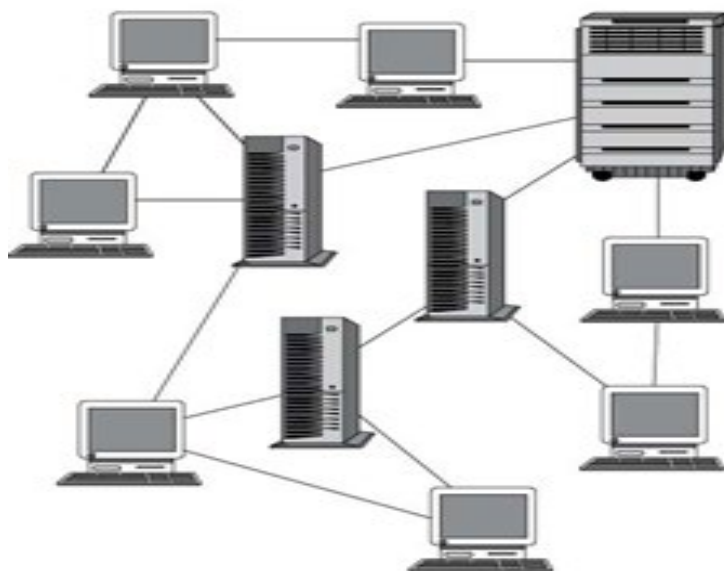
# The Evolution of Corporate IT Infrastructure



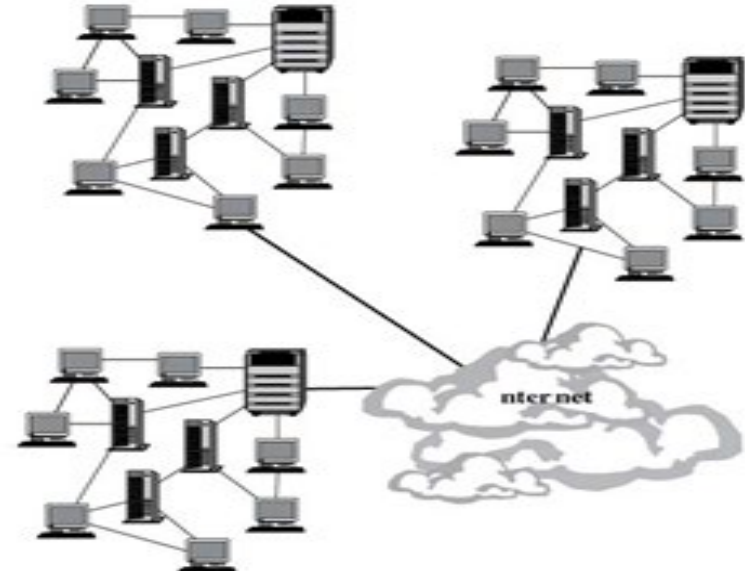
**Mainframe-Based Centralized Computing (Pre-1980)**



**PC-Based Distributed Computing (1980s)**



**Client-Server Computing (late 1980s to early 1990s)**



**Internetwork-Based Computing (Mid-1990s to Present)**

# Operational Characteristics of Internetworks

- Internetworking technologies are based on **open** standards
  - The Internet
- Internetworking technologies operate **asynchronously**
- Internetworking technologies have inherent **latency**
  - Wait time in service delivery
- Internetworking technologies are naturally **decentralized**
  - No single point of failure
- Internetworking technologies are **scalable**
  - Relatively easy reorganization of subnetworks allows for flexible expansion



# Business Implications of Internetworks

- The emergence of real-time infrastructure
  - Better data, better decision
  - Improved process visibility
  - Improved process efficiency
  - From make-and-sell to sense-and-respond
- Broader exposure to operational threats
  - Automation of process could lead to a chain reaction with unexpected effects
  - Demanding for availability
  - Vulnerability to intrusion and attack

# Business Implications of Internetworks

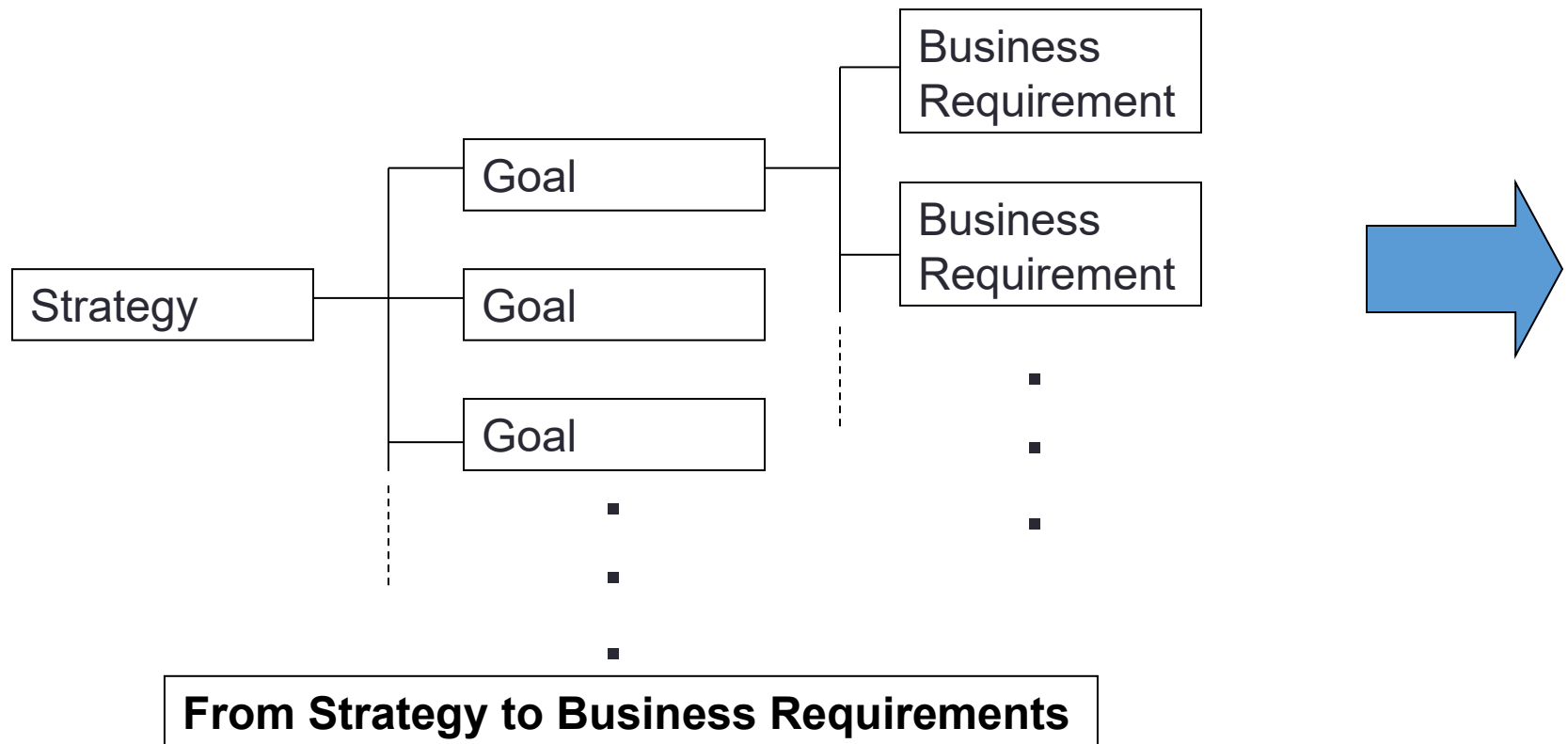
- **New models of service delivery**
  - Standardization and technology advances permit specialization by individual firms in value chains to achieve economies of scale and higher service levels
  - Over-the-Net service delivery model
  - Partners and relationship with service providers are vital for reliable service delivery
- **Managing legacies**
  - Technical: systems integration and compatibility of old and new technologies
  - Non-technical: Legacy processes, organizations, and cultures

# From Strategy to Architecture

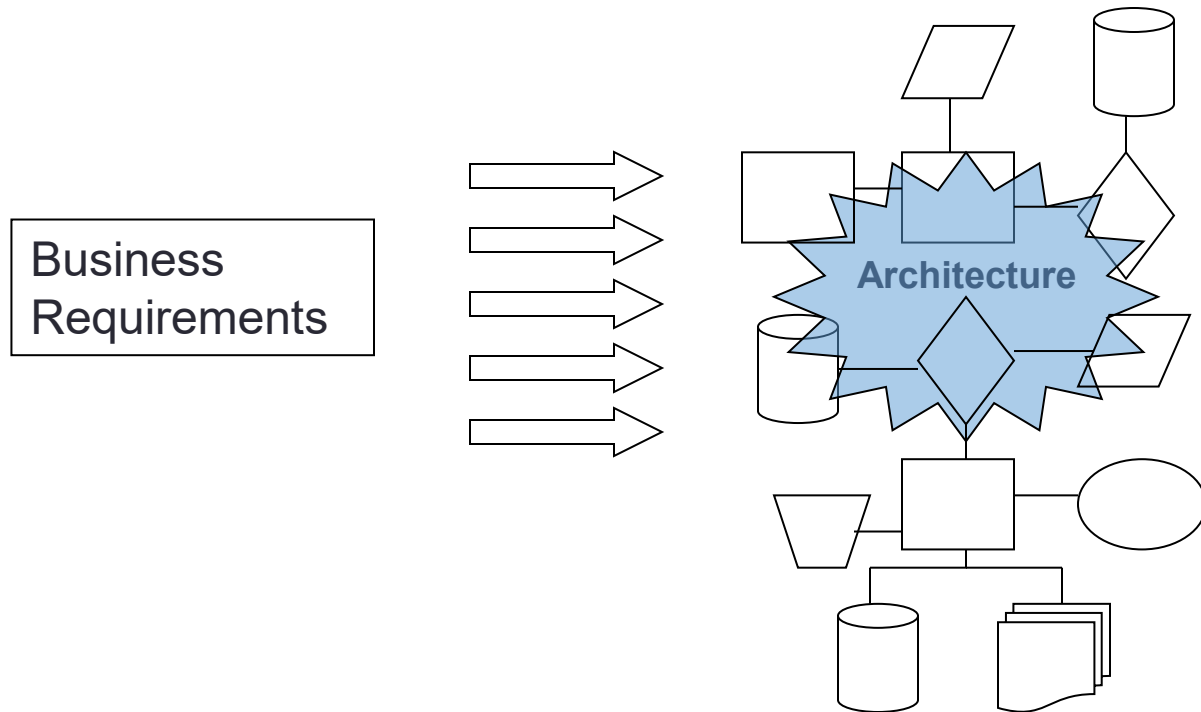
- Manager must start out with a **strategy**.
- This strategy must then be used to develop more specific **goals**
- Business requirements must be fleshed out for each goal in order to provide the architect with a clear picture of what IS must accomplish.

# From Strategy to Architecture

- Considering business strategy when defining an organization's IT building blocks.



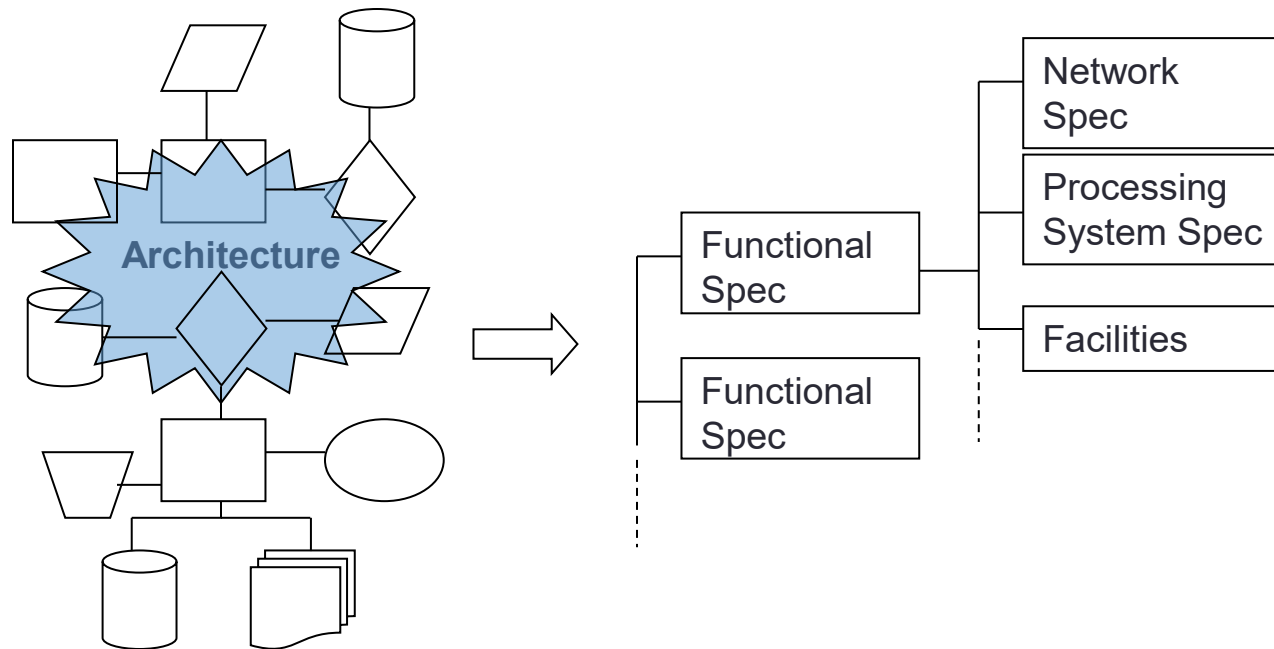
# From Strategy to Architecture



- **From Business Requirements to Architecture**
  - Translating these requirements into a more detailed view of the systems requirements, standards, and processes that shape an IT architecture.

# From Architecture to Infrastructure

- This stage entails adding more detail to the architectural plan.



- Comprises the actual networks, processing systems and facilities
- Location of data and access procedures, location of firewalls, link specifications, interconnection design, etc.
- Combined in a coherent pattern to have a viable infrastructure

# Governance of IT Function

# Agency problem

- **Agency problem**

- Separation between the owners (principals) of a company and its managers (agents)
- Managers make decisions that maximize their own benefits but may be detrimental to the interests of the owners
- To minimize the agency problem, certain control and monitoring systems are used to ensure conformance
  - A board of directors to oversee organizational strategies, structures, and systems on behalf of the shareholders
  - An external auditor to ensure the reliability of the company's financial statements.



# Governance

- What is governance?
  - The process of establishing lines of responsibility, authority, and communication as well as policies, standards, measurement, and internal control mechanisms that guide people in fulfilling their roles and responsibilities.

# Why IT Governance?

- The need to ensure IT creates value
  - Mechanisms and measures to enhance the day-to-day efficiency and effectiveness of IT are needed
  - IT governance should help achieve greater alignment of IT with business
- The need to mitigate risk to the business
  - Increasing IT project complexity requires IT governance
  - Senior executives and the board need to be held accountable for managing IT risks through good governance practice
- Enabler of Corporate governance and compliance
  - Most business processes flow through the IT environment
  - Effective governance improve internal control and data accessibility

# IT and Corporate Regulatory Compliance

- Two major phenomena trigger a series of new regulations
  - September 11, 2001, terrorist attack
  - Major corporate and accounting scandals (e.g., Enron)
- Examples
  - Internal financial control: to improve accuracy and reliability of corporate disclosure
    - Internal checks and balances
    - Instituting levels of control and signoff
    - IT must comply: ensure standard processes and IT-related controls
  - Financial risk management
    - IT needs to ensure internal systems are able to measure and report credit risk and operational risk

# IT Governance

- IT governance goals
  - Attainment of strategic goals
  - Efficient operation
  - Reliable measurement
  - Compliance management
- Elements
  - Leadership roles
  - Organizational structures
  - Business processes
  - Standards
  - Measures of compliance to these standards
- To
  - Shape decisions concerning IT
  - Determine criteria to assess conformance to these decisions
  - Define mechanisms to communicate, implement and enforce these decision

# Themes of IT Governance

- IT-business alignment
  - Organizational planning and communication processes that connect IT leaders and business leaders, e.g. IT steering committee
- Investment value
  - Processes to ensure involvement of all relevant stakeholders
  - Standard procedures for determining the business worth and risks of IT related investments
  - Criteria for selecting and prioritizing investments
- Project delivery
  - Responsibilities and accountabilities
  - Processes, standards and measures
  - Central oversight of overall IT architecture
- Service delivery
  - Structures, roles and techniques for managing and controlling IT services, e.g. charge-backs, SLA

# Themes of IT Governance (Cont.)

- Resource management
  - Formation of organizational structures for overseeing and directing all organization's IT resources
  - Processes to ensure priority of IT requirements
  - Structures, criteria and processes of outsourcing
  - Procedures and timeframes to develop skills and expertise
- Measurement of performance
  - Quantify measurements: balanced scorecard technique measures overall IT performance on dimensions such as achievement of business goals, user satisfaction, operational excellence, and support for learning and growth.
- Risk management
  - Considers the overall portfolio of IT investment
  - Identifies various possible sources of risk
  - Determines acceptable levels of each type of risk
  - Defines metrics for monitoring and measuring each type of risk

# Leadership of the IT Function

# Leadership as a Critical Success Factor of IT Governance

- Leadership
  - Board-level leadership and oversight for IT activities
  - Executive involvement aligns IT decisions with organizational strategy
  - Clear ownership ensures authority and accountability
  - Broad participation ensures IT governance becomes part of enterprise management culture
- Different aspects of IT Leadership
  - <https://www.cio.com/article/221721/10-it-management-certifications-for-it-leaders.html>



# The Role of IT in Enterprise

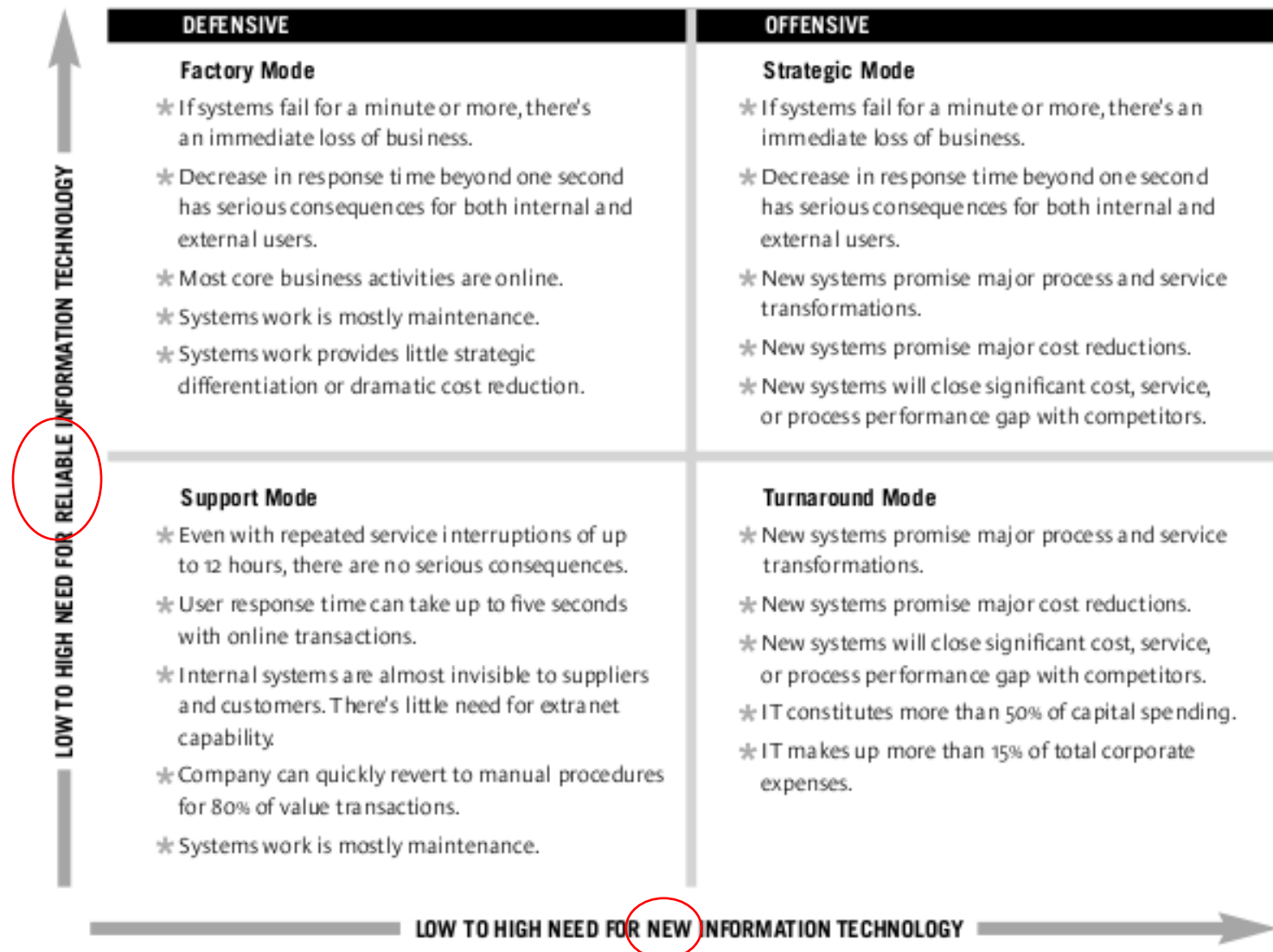
- Corporate information assets can account for 50% of capitals spending.
- Boards
  - Need to oversight for IT activities  
(<https://corpgov.law.harvard.edu/2013/02/14/directors-and-information-technology-oversight/>)
  - How?
    - **No One-Size-Fits-All model**
      - E.g., depending on company's size, industry, competitive situation
    - The IT Strategic Impact Grid
      - Recognize the firms' positions
      - Decide whether to be less or more involved in IT decisions.

# The Role of IT in Enterprise

- Defensive IT
  - IT is critical for sustaining enterprise operations.
    - IT excellence in execution
- Offensive IT
  - Critical to growing the enterprise and gaining competitive edge
    - IT innovations
- IT governance

A routine matter ← ← ----- → → A vital asset  
(by audit committee) (by board-level scrutiny and assistance)

# The IT Strategic Impact Grid



# Support Mode (Defensive)

- Role of IT
  - Sustaining current business operations (limited)
    - Not be operational dependent on IT
  - Shaping future business operations or strategy (limited)
    - Not as a means to reposition themselves
- **Audit committee** can review IT operations
- E.g., small retail shops, conventional professional services firms (e.g., law firms)
  - Serve customers even during a major IT failure

# Factory Mode (Defensive)

- Role of IT
  - Sustaining current business operations (critical)
    - Be operational dependent on IT
  - Shaping future business operations or strategy (limited)
    - Not as a means to reposition themselves
- **Boards:** disaster recovery and security procedures
  - Not keen in being the first to implement a technology
- E.g., Airlines, Nasdaq Stock Exchange
  - Reliable, zero-defect operation of IT is essential for performing core activities (within organization) and across the extended business network (customers, suppliers, and partners).
    - A few seconds/minutes system failure can halt or seriously hinder business.

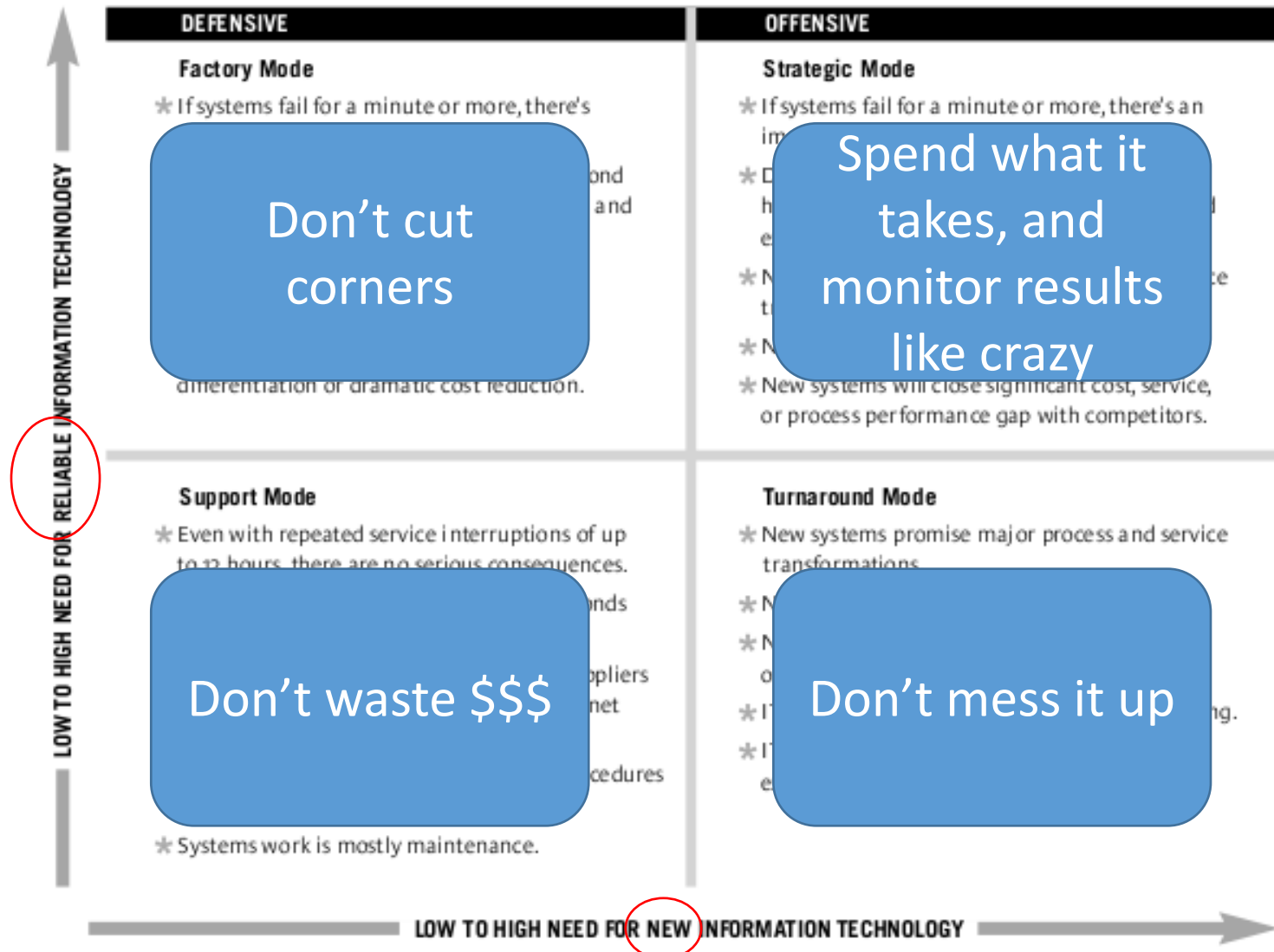
# Turnaround Mode (Offensive)

- Role of IT
  - Sustaining current business operations (limited)
    - Not be operational dependent on IT
  - Shaping future business operations or strategy (critical)
    - A means to exploit emerging strategic opportunities or transform business capability.
- **Boards**: oversight strategic IT plans
- This mode is usually temporary for most firms
  - American Airlines: SABRE (turnaround → factory)
  - Medtronic (turnaround → strategic)
    - A medical technology company providing lifelong solutions to people with chronic disease
      - IT-enabled services such as remote monitoring (telemedicine)

# Strategic Model (Offensive)

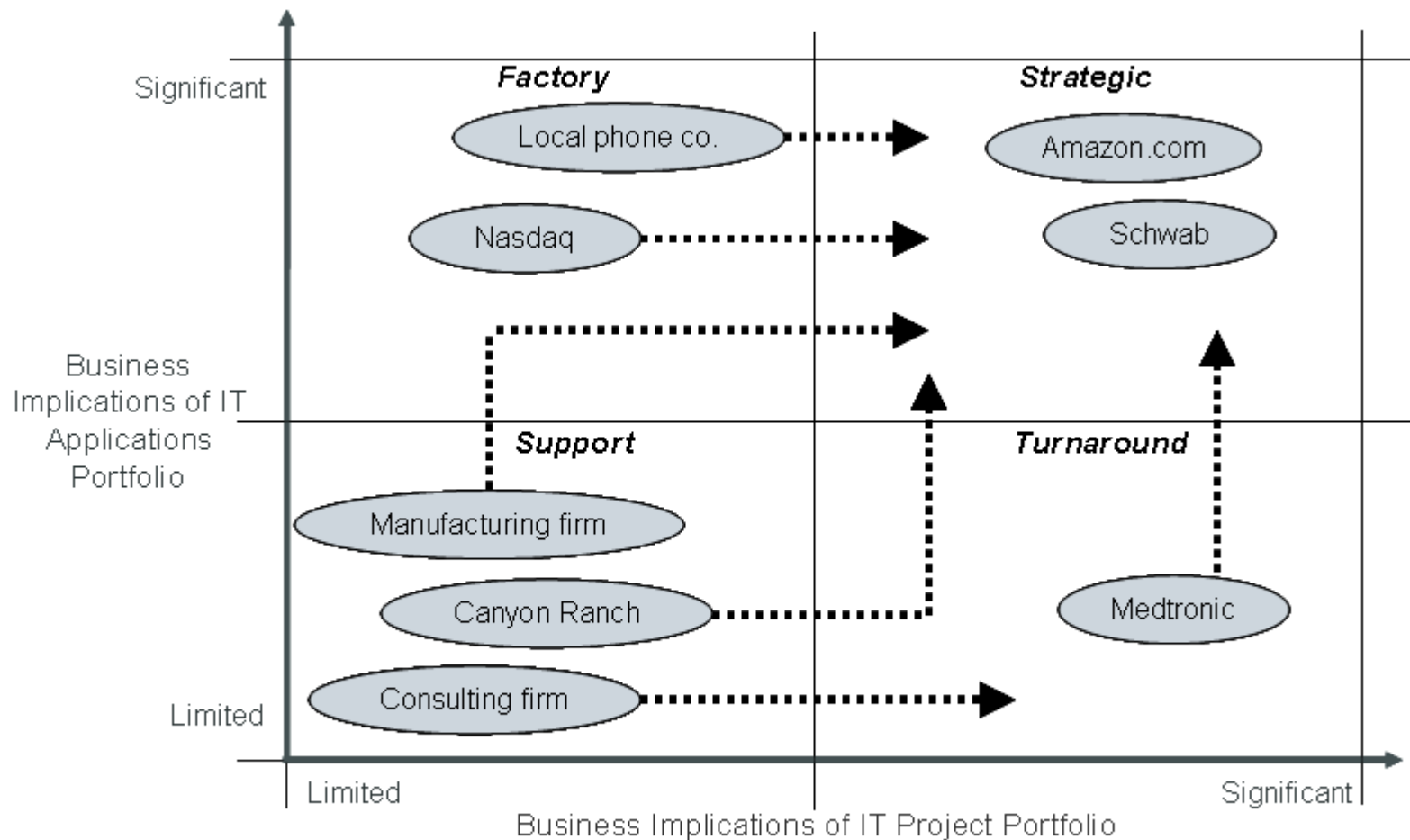
- Role of IT
  - Sustaining current business operations (critical)
    - Be operational dependent on IT
  - Shaping future business operations or strategy (critical)
    - A means to exploit emerging strategic opportunities or transform business capability.
- **Boards and IT experts:** oversight strategic IT plans
- E.g., Charles Schwab
  - A discount brokerage firm
  - IT and business strategy are intertwined.
    - “An IT firm that happens to be in the financial services business”
  - IT leadership and governance and investment decisions are done by boards

# The IT Strategic Impact Grid





# Transitions in the Role of IT



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# How to conduct IT oversight – Boards

- Inventory the assets (tangible and intangible IT assets)
  - All modes
  - Estimate IT infrastructure so as to determine whether it's getting adequate return from IT investments.
- Assure security and reliability
  - Factory and strategic modes
  - Regularly review the security and reliability measures. Oversight often takes place following a crisis.

# How to conduct IT oversight – Boards

- Avoid surprises
  - Factory, turnaround, and strategic modes
  - Surprises often come from lax or inefficient project management (e.g., larger project scale, inadequate service level agreements, legacy system).
- Keep an eye out for fresh threats and opportunities
  - Turnaround and strategic modes
  - Interrogate the CIO and line management about new technologies
    - Technology trade or industry conferences.
    - Monitor firms in other industries that have a reputation for making effective use of leading-edge technology application.