

MASSACHUSETTS INSTITUTE OF TECHNOLOGY  
SLOAN SCHOOL OF MANAGEMENT

**15.565 Integrating Information Systems:**

Technology, Strategy, and Organizational Factors

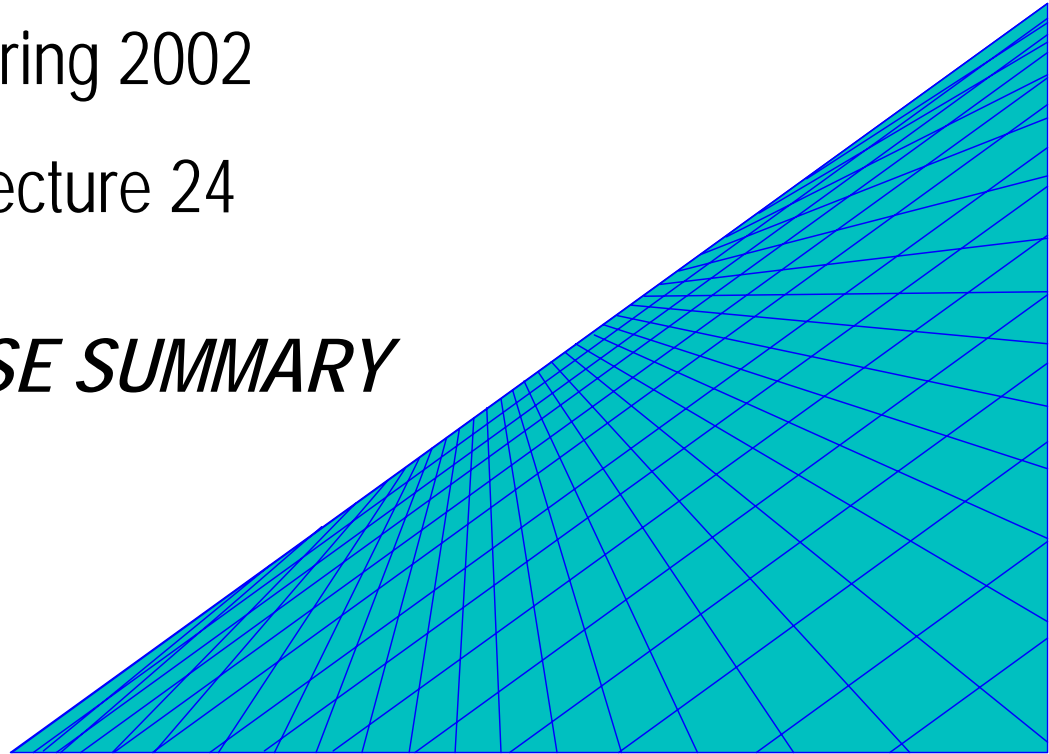
**15.578 Global Information Systems:**

Communications & Connectivity Among Information Systems

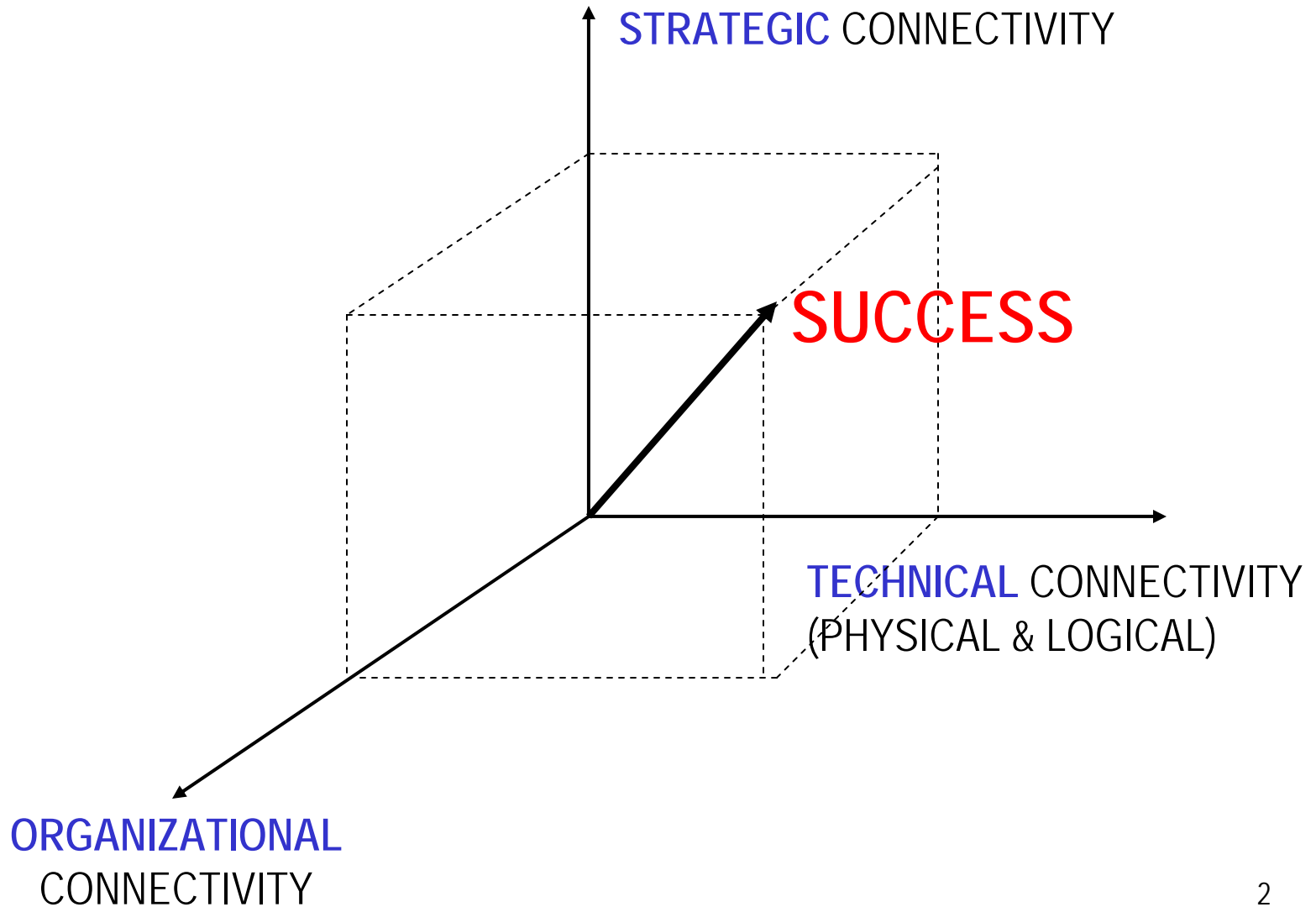
Spring 2002

Lecture 24

***COURSE SUMMARY***



# INTEGRATING INFORMATION SYSTEMS and GLOBAL INFORMATION SYSTEMS



# STRATEGIC CONNECTIVITY

- IDENTIFY OPPORTUNITIES
  - COMPETITIVE FORCES
  - VALUE CHAIN
  - INTERLINKED VALUE CHAINS
- “INCREASE METABOLISM OF THE ORGANIZATION”
- NATURE OF INTER- AND INTRA-ORGANIZATIONAL SYSTEMS
  - MULTIPLE BENEFITS
    - COST REDUCTION, CONSOLIDATION, INCREASE VALUE
    - DIFFERENTIATE, NEW BUSINESS, NEW INDUSTRY
- EXAMPLES
  - JOHNSON & JOHNSON, McKESSON
  - GLOBAL FOREIGN EXCHANGE (FXX)
  - ABBOTT NORTHWESTERN HOSPITAL
- EMERGENCE AND EVOLUTION OF AGGREGATORS

# TECHNICAL CONNECTIVITY -- PHYSICAL -- COMMUNICATIONS

- **TRANSMISSION FACTORS**
  - LIMITATIONS OF DIRECT LINKS -- NEED NETWORKS
  - ANALOG / DIGITAL, PRIVATE / PUBLIC, ETC.
- **TELEPHONE SYSTEM (ORIGINAL WIDE AREA NETWORK)**
  - EVOLUTION TOWARD ISDN
- **NETWORK PROTOCOLS**
  - CONCEPT OF LAYERS (LOCALIZED CHANGES), ISO OSI MODEL
  - EXAMPLE ISSUES
    - CHANNEL SHARING/COLLISION (ETHERNET)
    - STORE & FORWARD (TOKEN RING, PACKET NETWORKS)
- **LOCAL AREA NETWORKS**
  - TOPOLOGIES (STAR, BUS, RING)
  - LOGICAL VS PHYSICAL
- **WIDE AREA NETWORKS / INTERNET TECHNOLOGIES**
- **EMERGING TECHNOLOGIES**
  - ATM, DSL, CABLE MODEM

# TECHNICAL CONNECTIVITY -- LOGICAL -- DATABASES & SEMANTICS

- **DISTRIBUTED DATABASES**
  - HOMOGENOUS VS HETEROGENOUS
  - TRANSPARENCY
    - RETRIEVAL, UPDATE, SCHEMA, PERFORMANCE, TRANSACTION, COPY
  - QUERY PROCESSING AND OPTIMIZATION
  - TRANSACTION MANAGEMENT
  - ACCESS CONTROL: AUTHENTICATION & AUTHORIZATION
- **SCHEMA INTEGRATION**
  - SEMANTICALLY RICH DATA MODELS & INTEGRATION PROCESS
- **OBJECT-ORIENTED DATABASES**
  - OBJECT CONCEPT (PROPERTIES & OPERATIONS)
  - ENCAPSULATION & INHERITANCE HIERARCHY
  - USE FOR DATABASE INTEGRATION AND WEB SERVICES
- **SEMANTIC RECONCILIATION AMONG DATABASES**
  - IDENTIFY SAME/EQUIVALENT OBJECT, CONVERSION OF CONTEXT
- **EMERGING TECHNOLOGIES:** XML, DTD, etc.

# ORGANIZATIONAL CONNECTIVITY

- FUNDAMENTAL ISSUE: **WHY NOT ONE BIG ORGANIZATION**
  - HOW ORGANIZATION LIMITS / RESTRICTS TECHNOLOGY
  - HOW TECHNOLOGY IMPACTS / ENABLES NEW ORGANIZATION
- **LOOSLEY-COUPLED ORGANIZATIONS ADVANTAGES**
  - TECHNOLOGIES TO PROVIDE INTEGRATION WITHOUT LOSING AUTONOMY
- MARKET VS HIERARCHY ORGANIZATION
  - **BOUNDED RATIONALITY**, OPPORTUNISM, ASSET SPECIFICITY, PRODUCT DESCRIPTION, **TRANSACTION COST**
- **STANDARDIZATION**
  - ECONOMY OF SCALE VS. VARIETY REDUCTION
  - FACTOR: (BUYER / SELLER) x (CENTRALIZED / DECENTRALIZED)
- **MOTIVATING ORGANIZATIONAL CHANGE & STRATEGIC ALLIANCES**
  - MOTIVATING CHANGE: OPPORTUNITY VS. CRISIS
  - EXTERNAL VS. INTERNAL MOTIVATION
  - INTERNAL MOTIVATION: BI-DIRECTIONAL BENEFITS, CO-OPERATIVE PAYOFF, ASYMMETRICAL CONTROL
- **ELECTRONIC MARKETPLACES**

## EXAMPLE: Dell-ocity STRATEGY

- Internet Web orders (\$M's/day) - general public and corporate accounts
- Payments via credit card or electronic payment
- Build to order
- Supplier warehouses within 15 minutes of factory (Asset Specificity)
- Dell billed when parts leave warehouse
- Monitor separately shipped directly to buyer
- "Shape demand" via telephone sales agents and Web offers

	Dell	Compaq
Inventory (in days)		
III	37	76
IV	13	25
From Order to Cash (days)	1	35
Profitability (return on invested capital)	50%	20%

## EXAMPLE: AUCNET - Japanese Used Car Auctions

- Used car auctions in Japan
- Among dealers only
- Problems in past:
  - Seller: take car to and from marketplace
  - Buyer: not always find car desired
- AUCNET (addresses Asymmetric Information & Trust)
  - Provides professional evaluation of all cars
  - Buyers can preview cars online
- Impact on average car price?



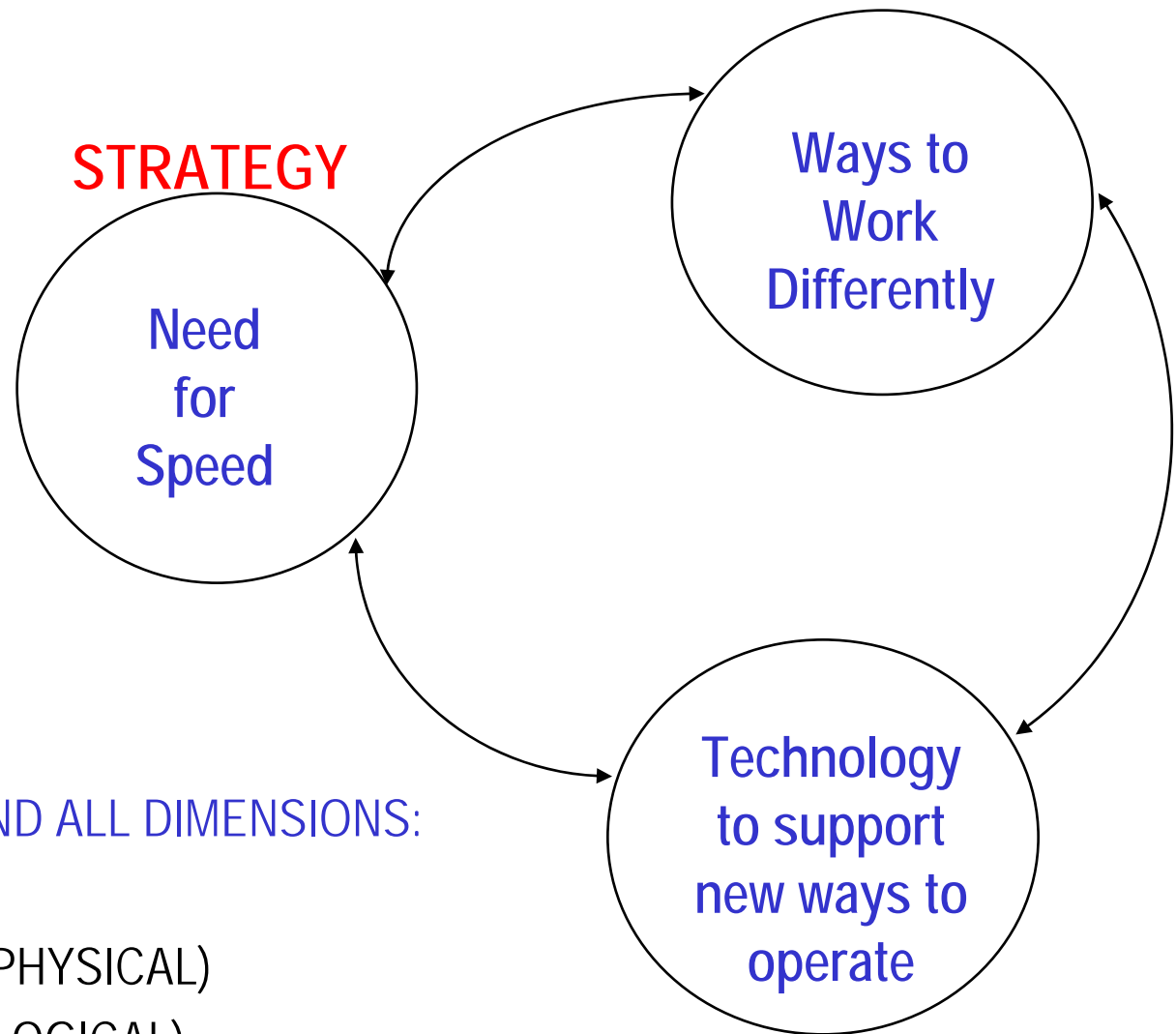
## EXAMPLE: Microsoft “Bill Bets the Company on Web Services”

- Ronald Coase: “Transaction costs”
  - impact on Web businesses
- Microsoft’s “Religious Conversion”
- Next Generation Windows Services -> .NET
  - based on Integration and Aggregation
  - heavily uses XML
- Example: Integrate banker, broker, and insurance sites

For the article relating to this discussion, please see: Gerlach, Charles. “Bill Bets the Company on Web Services.” Mainspring Communications, Inc, May 3, 2000.

## RECAP

## ORGANIZATION



## TECHNOLOGY

TO BE EFFECTIVE

-- NEED TO UNDERSTAND ALL DIMENSIONS:

- STRATEGIC
- TECHNICAL (PHYSICAL)
- TECHNICAL (LOGICAL)
- ORGANIZATIONAL