

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
SLOAN SCHOOL OF MANAGEMENT

15.565 Integrating Information Systems:

Technology, Strategy, and Organizational Factors

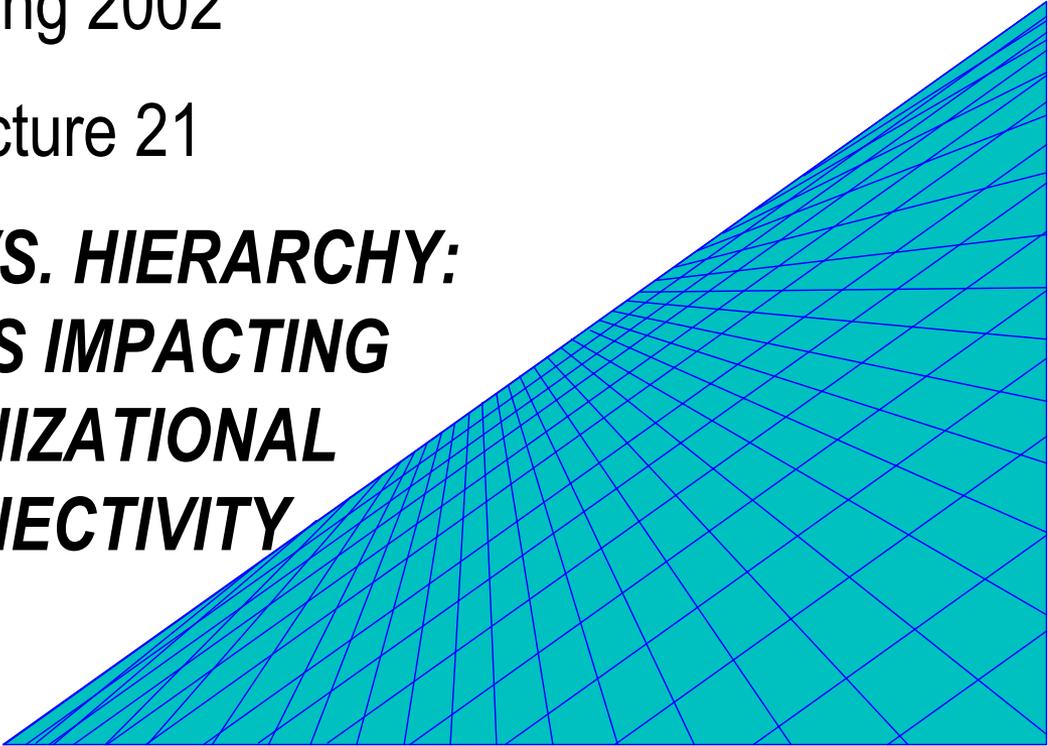
15.578 Global Information Systems:

Communications & Connectivity Among Information Systems

Spring 2002

Lecture 21

***MARKET VS. HIERARCHY:
FACTORS IMPACTING
ORGANIZATIONAL
CONNECTIVITY***



GOALS

- UNDERSTAND WHY ORGANIZATIONS DO THINGS THAT APPEAR “IRRATIONAL”
- ORGANIZATIONAL CONNECTIVITY STRUCTURES
 - MARKETS
 - HIERARCHIES (INTERNAL ORGANIZATIONS)
 - THE FUTURE?

RELATED RESEARCHERS

- **MARCH OBSERVED:**

- COGNITIVE LIMITS ON RATIONALITY
- LIMITS TO HUMAN INFORMATION PROCESSING
- BOUNDED RATIONALITY

- **SALANCIK SUGGESTED:**

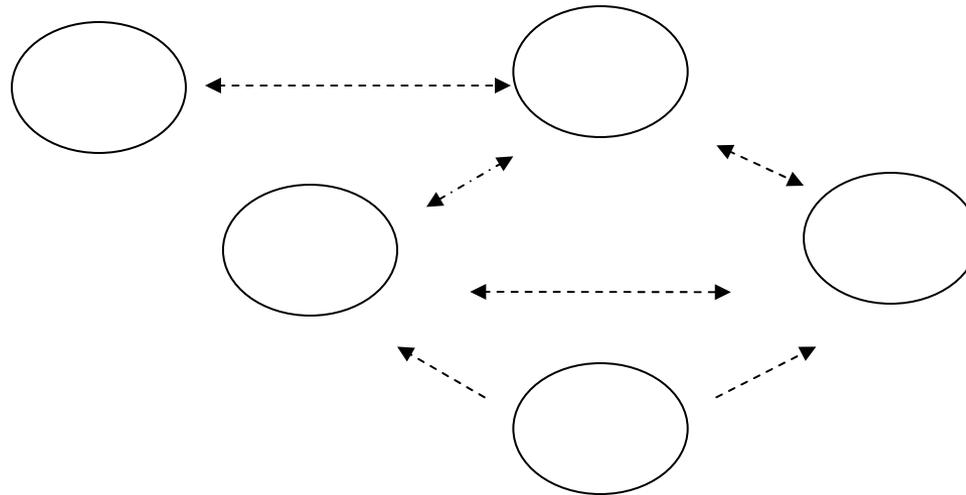
- ACTIONS TO FULFILL INTENTIONS WILL BE IMPERFECT IF:

1. INTENTIONS NOT CLEAR
2. CONSEQUENCES OF ACTIONS NOT CLEAR
3. MEANS TO TRANSFORM INTENT TO ACTION UNCLEAR
4. INTENTIONS NOT KNOWN TO PERSON SELECTING ACTION
5. MULTIPLE INTENTIONS

MARKET VS. HIERARCHY

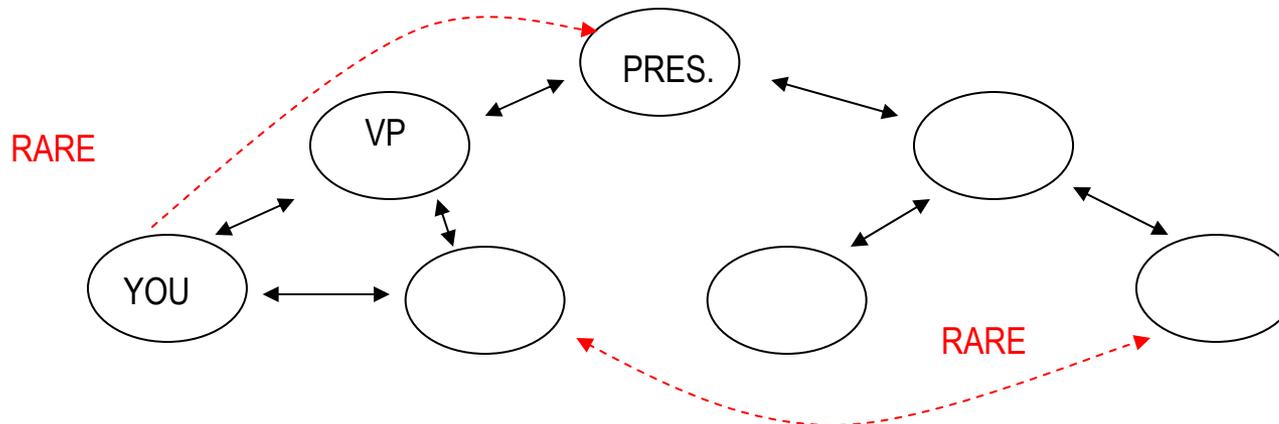
- MARKET

--SEPARATE BI-LATERAL AGREEMENTS (E.G., INDEPENDENT CORPS)



- HIERARCHY

--HIERARCHICALLY STRUCTURED AUTHORITY RELATIONSHIPS (E.G., DIVISION OF CORP.)



CONNECTIVITY IMPORTANT IN BOTH MARKET AND HIERARCHY

RONALD COASE (1937): **TRANSACTIONAL VIEW**

- VERTICAL INTEGRATION ECONOMIZES ON “COST OF NEGOTIATING AND CONCLUDING” MANY SEPARATE CONTRACTS BY USING FLEXIBLE EMPLOYMENT AGREEMENT.

RONALD COASE (1972)

- 1937 ARTICLE “MUCH CITED AND LITTLE USED”
 - FAILURE TO MAKE ISSUES OPERATIONAL
 - FAILURE TO DIFFERENTIATE SITUATIONS (MARKET VS. VERTICAL INTEGRATION)

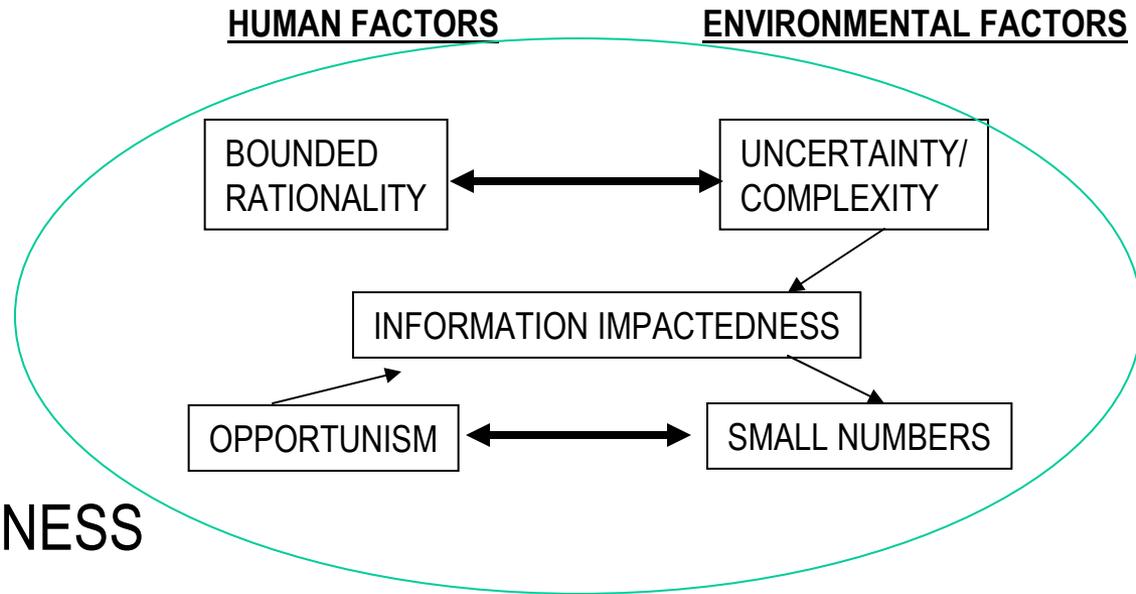
WILLIAMSON (1971) CONTRIBUTION:

- MAKE “**TRANSACTION**” UNIT OF ANALYSIS
- IDENTIFY ALTERNATE MARKET AND “CONTRACTING” MODES
- IDENTIFY CRITICAL DIMENSIONS IN WHICH TRANSACTIONS DIFFERED
- TRACE OUT ECONOMIC RAMIFICATIONS
- MATCH MODES TO TRANSACTIONS

TOM MALONE (late 1990s) ... MORE LATER ...

KEY ISSUES

- TRANSACTION COSTS
 - BOUNDED RATIONALITY
 - OPPORTUNISM
 - INFORMATION IMPACTEDNESS
 - ASSET SPECIFICITY
 - COMPLEXITY OF PRODUCT DESCRIPTION
-
- EVOLUTION OF ELECTRONIC MARKETS AND ELECTRONIC HIERARCHIES



BOUNDED RATIONALITY

- **HUMAN BEHAVIOR THAT IS “INTENDLY RATIONAL, BUT ONLY LIMITED SO” [SIMON, 1961]**
 - PHYSICAL LIMITS: PROCESSING RATE (CPU) & STORAGE LIMITS (RAM)
 - LANGUAGE LIMITS (I/O): DIFFICULTY IN ARTICULATING KNOWLEDGE BY USE OF WORDS
- **LIMITS OF RATIONALITY REACHED UNDER CONDITIONS OF:**
 - UNCERTAINTY --COMPLEXITY
- **COMPLEXITY / UNCERTAINTY FACTORS:**
 - SIZE OF DECISION TREE
 - NOT ALL ALTERNATIVE PATHS KNOWN
 - NOT ALL CONSEQUENCES KNOWN
- **HIERARCHY HELPS:**
 - REDUCES SOME UNCERTAINTY THROUGH LONG-TERM PLANS

OPPORTUNISM

• **DISTINCTIONS:**

- STEWARDSHIP: TRUST, RELATION
- INSTRUMENTAL: NEUTRAL, NO SELF-INTEREST
- OPPORTUNISTIC: SELF-INTEREST WITH GUILF

• **TYPES OF INFORMATION ADVANTAGES:**

- NORMAL: PRE-EXISTING AND FULLY DISCLOSED
- OPPORTUNISTIC: SELECTIVE OR DISTORTED INFORMATION DISCLOSURE (E.G., AIRLINE “ON-TIME” RECORDS)
- SELF-DISBELIEVED PROMISES
(CANNOT DISTINGUISH FROM SINCERE SITUATION, E.G., “TRUST ME”)

• **SMALL NUMBER OF PLAYERS & INTERACTIONS**

- DECREASED COMPETITION & INCREASED DIFFICULTIES

• **HIERARCHY HELPS:**

- LESS ABLE TO GAIN AT EXPENSE OF ORGANIZATION (MONOPOLY)
- MORE EFFICIENT & EFFECTIVE AUDIT
- EASIER TO RESOLVE DISPUTES

INFORMATION IMPACTEDNESS (ASYMMETRIC INFO)

- **MAIN ISSUE: TRUE UNDERLYING CIRCUMSTANCES**
 - KNOWN TO SOME PARTIES
 - NOT KNOWN TO OTHERS (HARD TO DISCERN)
- **EVEN IF IDENTICAL INFORMATION KNOWN, BUT INCOMPLETE:**
 - EACH PARTY HAS DIFFERENT ASSUMPTIONS
 - COSTLY HAGGERING LATER
- **EXAMPLES:**
 - INSURANCE
 - INSUREDS KNOW RISK BETTER THAN INSURERS
 - FIRST-MOVER ADVANTAGE (INITIAL CONTRACT)
 - GAIN “LEARNING BY DOING”
 - MAY NOT WANT (OR ABLE TO) SHARE KNOWLEDGE LEARNED
- **HIERARCHY HELPS:**
 - HINDERS EXPLOITATION
 - ALLOWS AUDIT
 - SHARED LANGUAGE (CODING)
 - SUPERIOR ABILITY TO DO “EXPERIENCE RATING”

ASSET SPECIFICITY

- **INVESTMENTS THAT ARE TRANSACTION SPECIFIC**

- UNABLE TO PUT ASSETS TO ALTERNATIVE USE

- EXAMPLES:

- SITE SPECIFIC (NATURAL RESOURCE, FACTORY LOCATION)

- PHYSICAL ASSET SPECIFIC (SPECIAL MACHINE)

- HUMAN ASSET SPECIFIC (TRAINING, HIRING)

- TIME SPECIFIC (PERISHABLE GOOD: FOOD, MOVIE SEAT)

MORE SPECIFIC --> MORE EFFICIENT

- (FOR SPECIFIC PURPOSE)

- **PROBLEMS WITH ASSET SPECIFICITY**

- ADDITIONAL GOVERNANCE NEEDED

- UNCERTAINTY INCREASED CONCERN

- **HIERARCHY HELPS:**

- LONG-RANGE PLAN

COMPLEXITY OF PRODUCT DESCRIPTION

- **INFORMATION TO SPECIFY ATTRIBUTES OF A PRODUCT**
 - NEEDED TO MAKE SELECTION
- **SIMPLE DESCRIPTIONS** (STANDARDIZED, INTERCHANGEABLE)
 - STOCKS, COMMODITIES
- **COMPLEX DESCRIPTIONS** (NOT INTERCHANGEABLE)
 - BUSINESS INSURANCE
 - COMPLEX MACHINERY
 - SOFTWARE PACKAGE
- **HIERARCHY HELPS:**
 - COST OF COMMUNICATION LAYER (SHARED LANGUAGE)
 - LESS COORDINATION NECESSARY

APPROPRIATE CIRCUMSTANCES FOR HIERARCHY

- **NEED TO ECONOMIZE ON BOUNDED RATIONALITY**
 - COMPLEX UNCERTAIN SITUATION
- **NEED TO REDUCE OPPORTUNISM**
 - ESPECIALLY IF SMALL NUMBERS
- **NEED TO REDUCE UNCERTAINTY**
 - BY CONVERGENT EXPECTATIONS
- **NEED TO REDUCE TRANSACTION COSTS**
- **NEED TO OVERCOME INFORMATION IMPACTEDNESS**
- **NEED TO DEAL WITH**
 - HIGH ASSET SPECIFICITY
 - COMPLEX PRODUCT DESCRIPTION

ELECTRONIC MARKETS AND ELECTRONIC HIERARCHIES

- **HIERARCHIES**

- CONTROLLED THROUGH HIGHER LEVEL HIERARCHY
- MANAGERIAL DECISIONS (NOT MARKET FORCES)
- PREDETERMINED BUYER AND SELLER

- **MARKETS**

- SUPPLY AND DEMAND FORCES
- BUYER SELECTS FROM CHOICES
- EXTERNAL TRANSACTIONS BETWEEN PARTICIPANTS

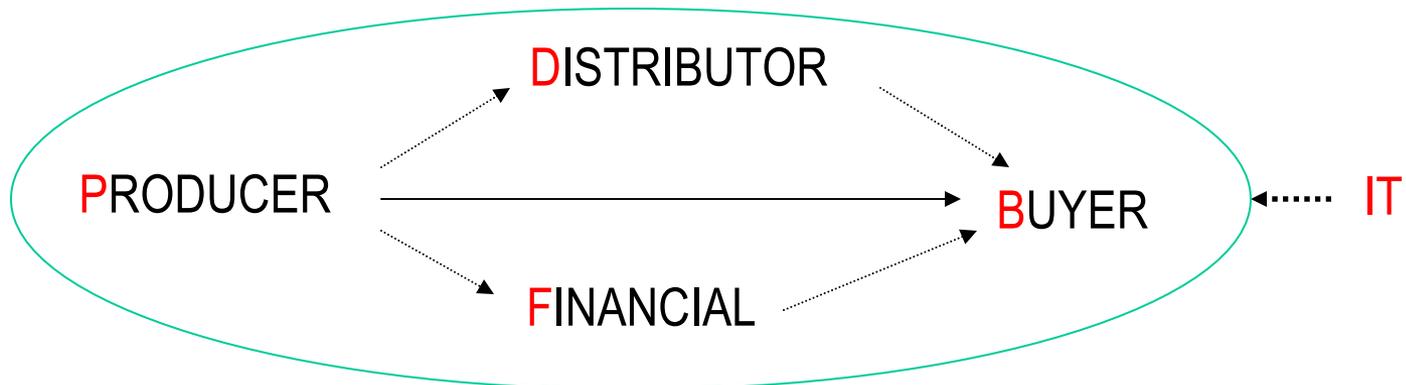
SHIFT FROM HIERARCHIES TOWARDS MARKETS

- TECHNOLOGY REDUCES COORDINATION AND COMMUNICATION COSTS (MAKES MARKETS MORE FAVORABLE)
- TECHNOLOGY FACILITATE COMPLEX PRODUCT DESCRIPTIONS (TRANSMISSION AND MANIPULATION)
 - E.G., AIRLINE RESERVATIONS (?)
- TECHNOLOGY REDUCES ASSET SPECIFICITY (FLEXIBLE MANUFACTURING)
 - CAN SERVE SMALL MARKETS USING HIGH-VOLUME EQUIPMENT (REDUCE RETOOLING COSTS)
- IMPACT OF COMPLEXITY AND SPECIFICITY



POTENTIAL ELECTRONIC MARKET MAKERS

- **PRODUCERS**
 - FACILITATE PURCHASING BY BUYER (E.G., AA, AHS/BAXTER)
- **BUYERS**
 - FACILITATE SELECTION, CONTROL INVENTORY (E.G., GE SUPPLY NETWORK)
- **DISTRIBUTORS**
 - SIMILAR MOTIVATION TO PRODUCERS & BUYERS (E.G., MCKESSON)
- **FINANCIAL SERVICES PROVIDERS**
 - FINANCIAL INVOLVEMENT (CREDIT) IN MOST TRANSACTIONS ALREADY
 - EXTEND INVOLVEMENT (E.G., CITICORP & MCGRAW-HILL CRUDE OIL?)
- **INFORMATION TECHNOLOGY VENDORS**
 - ALREADY PROVIDING THE TECHNOLOGY (E.G., INTERNET)



STAGES IN EVOLUTION OF ELECTRONIC MARKETS

0. EXCLUSIVE NON-MARKET ENVIRONMENT (AA)

1. BIASED MARKET

-- INITIAL PROVIDER SEEKS ADVANTAGE

E.G., AIRLINE RESERVATIONS

(UNITED: ONLY, AMERICAN: ALL BUT BIASED)

2. BIASED --> UNBIASED

(CAB/FAA REQUIRED UNBIASED AIRLINE
RESERVATIONS)

3. UNBIASED --> PERSONALIZED

-- OVERWHELMED WITH ALTERNATIVES

E.G., AIRLINE SELECTION CRITERIA (FARES, TIMES)

WHAT'S NEXT?

SUMMARY

- NEED TO UNDERSTAND WHY ORGANIZATIONS DO THINGS THAT APPEAR “IRRATIONAL”
 - MANY REAL REASONS
- ORGANIZATIONAL CONNECTIVITY STRUCTURES
 - MARKETS
 - HIERARCHIES (INTERNAL ORGANIZATIONS)
 - THE FUTURE?