

VIRTUAL ORGANIZATION

The slide features a white background with abstract, overlapping green geometric shapes on the right side. These shapes include a dark green vertical bar, a light green triangle, and a medium green triangle, all pointing towards the center. The text 'VIRTUAL ORGANIZATION' is positioned in the upper left quadrant in a bold, red, sans-serif font.

A FIRST LOOK

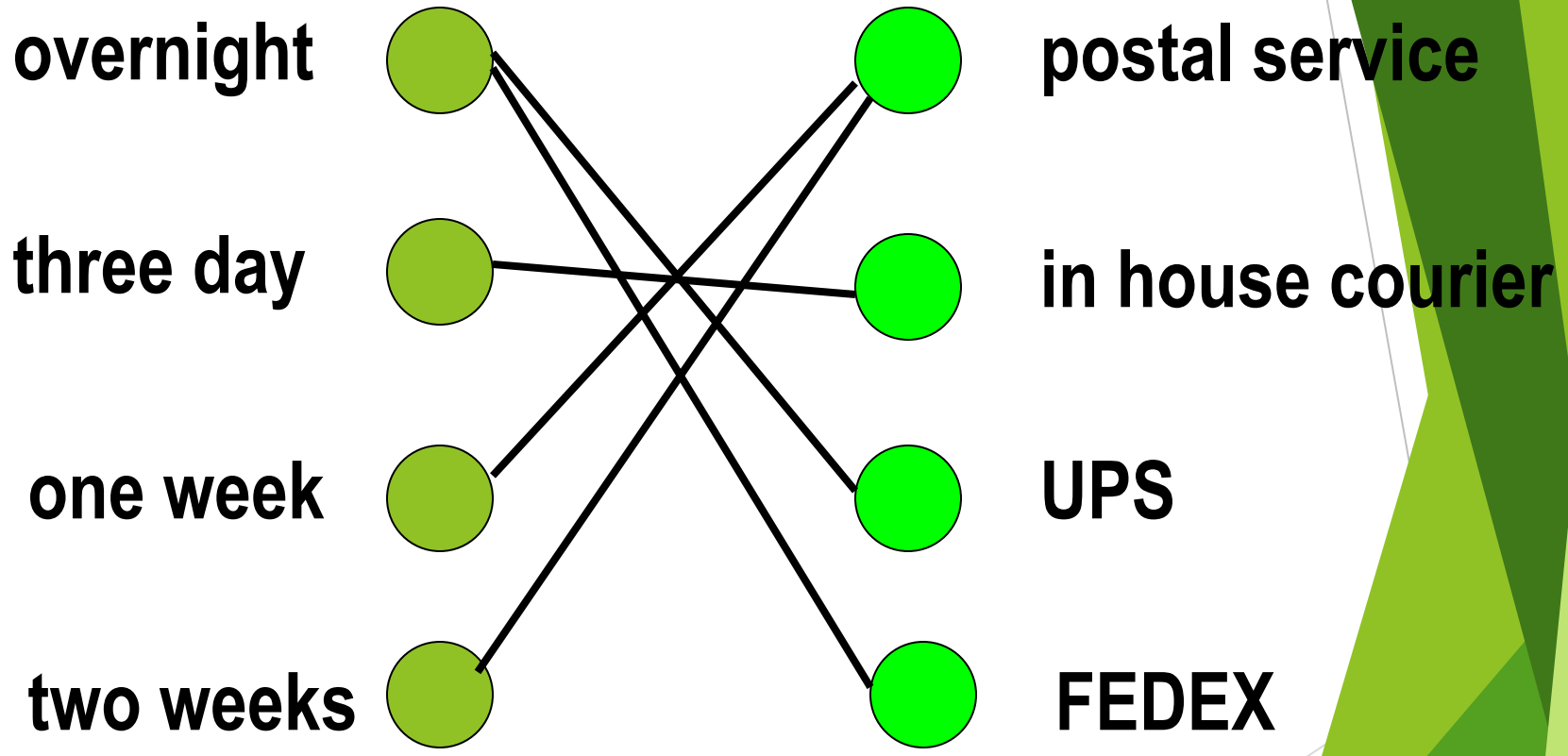
**Simple illustration of
virtual organization**

SHIPPING DEPARTMENT

- ▶ **overnight**
- ▶ **three days**
- ▶ **one week**
- ▶ **two weeks**

- ▶ **postal service**
- ▶ **inhouse courier**
- ▶ **UPS**
- ▶ **FEDEX**

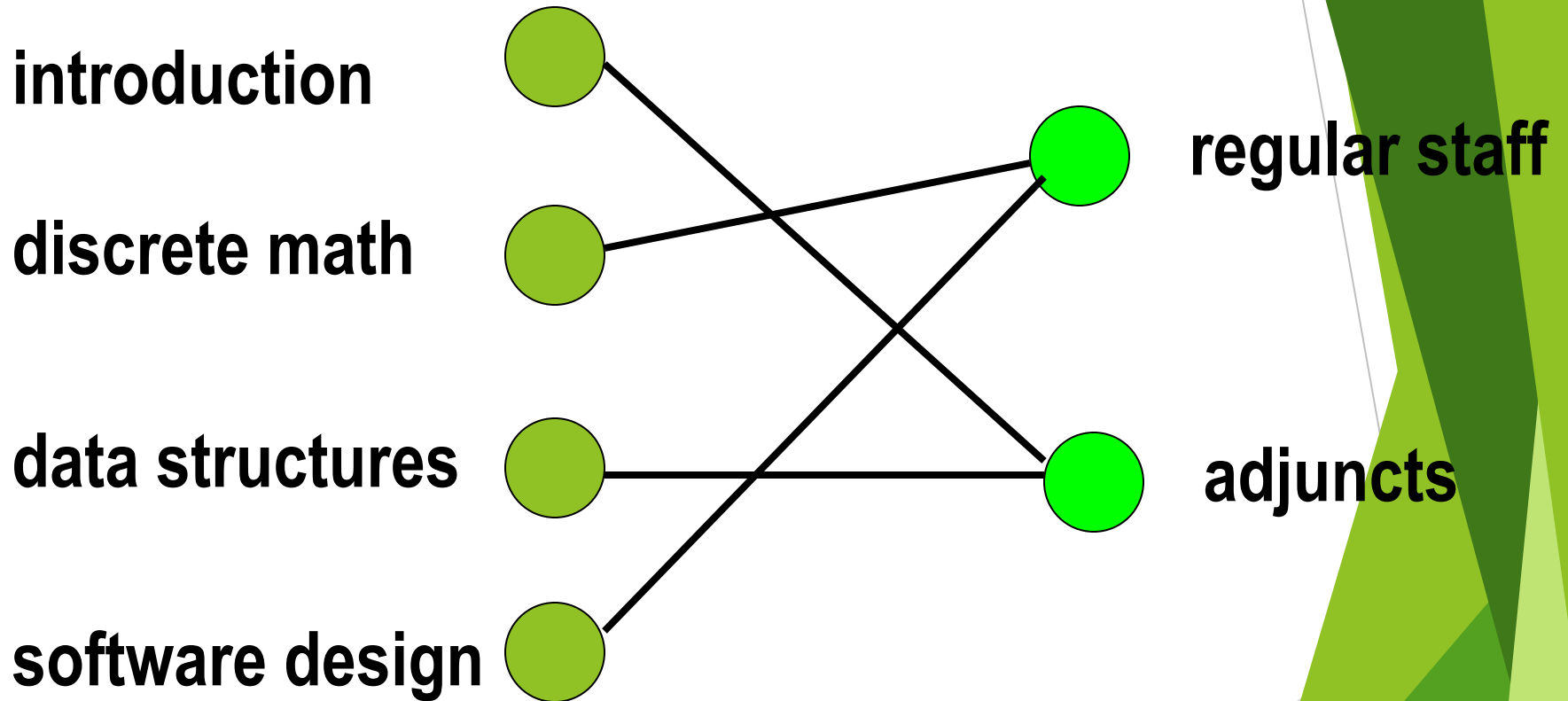
WAYS AND MEANS OF DELIVERY



UNIVERSITY DEPARTMENT

- ▶ **Intro (C++)**
- ▶ **Discrete Math**
- ▶ **Data Structures**
- ▶ **Software Design**
- ▶ **Regular Staff**
- ▶ **Adjuncts**

COURSES AND STAFF



ADVANTAGES?

- ▶ **Leveraged use of resources**
- ▶ **Cost savings**
- ▶ **Greater flexibility**

- ▶ **Grasping the Potentialities of Virtualizing Commercial Relations**
- ▶ **Planning for Change**

Key: Virtual Organization

TECHNOLOGICAL SUBSTRATE

Transport
Computing
Telecommunications

**GLOBAL NETWORKING
INFRASTRUCTURE**

OUTLINE OF TALK

- ▶ **Faces of virtuality**
- ▶ **A unifying definition**
- ▶ **Facilitators and impediments to virtual organization**
- ▶ **Illustrations and experience**
- ▶ **Long Term Business Implications**

FACES OF VIRTUALITY

- ▶ **Virtual Corporation or Enterprise**
- ▶ **Virtual Office**
- ▶ **Virtual Team**
- ▶ **Virtual Classroom**

FEATURES OF THESE FACES

- ▶ **Organizations without walls**
- ▶ **Effective use of computer communications**
- ▶ **Alliances and joint ventures**
- ▶ **Facilities moved at will over space**
- ▶ **Distributed organization of work**

ABSENCE OF WALLS



SCIENTIFIC METHOD

“Simplest model is best.”

UNDERLYING PRINCIPLE

RELATED CONSTRUCTS

- ▶ **Virtual Memory**
- ▶ **Virtual Circuit**
- ▶ **Virtual Reality**

COMMON TO ALL?

***SPLIT BETWEEN NEEDS AND
MODES OF SATISFACTION***

**motivating the following
three-part definition**

DEFINITION (PART 1)

A virtual organization is a goal-oriented social unit operating under metamanagement.

DEFINITION (PART 2)

Metamanagement is the management of a virtually organized task.

- ▶ Analyzing abstract requirements
- ▶ Determining concrete satisfiers
- ▶ Tracking allocations
- ▶ Maintaining/revising allocation procedure
- ▶ Reviewing satisficing criteria

DEFINITION (PART 3)

A *virtually organized task* consists of

(1) *abstract requirements*

(2) *concrete satisfiers*

(3) *(re)allocation procedure (switch)*

(4) *'satisficing' criteria*

SWITCH

**THE SWITCH ASSIGNS SATISFIERS TO
REQUIREMENTS
ACCORDING TO THE SATISFICING
CRITERIA**

SWITCHING COMPLEMENTS ESTABLISHED PRACTICES

Division of labor/specialization of function

- ▶ **task simplification**
- ▶ **combinational flexibility**

age)

CRITICAL MANAGEMENT ELEMENTS

- ▶ **Abstract requirements**
- ▶ **Concrete satisfiers**
- ▶ **Assignment of satisfiers to requirements**
- ▶ **Tracking assignments**
- ▶ **Switching**
- ▶ **Satisficing criteria**

LIMITATIONS OF SWITCHING

- ▶ **Excessive switching can nullify gains**
- ▶ **Advantages limited by analogue of thrashing in virtual memory systems**

CRITICAL INNOVATIONS

*INCORPORATION OF SWITCHING
IN MANAGEMENT PRACTICE*

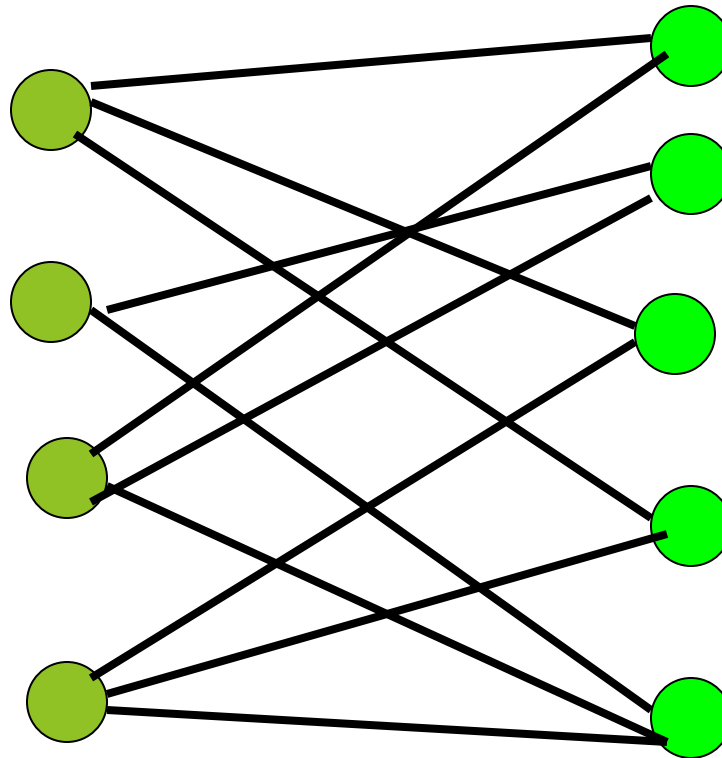
&

AUTOMATED DECISION SUPPORT

RELATION TO FAMILIAR MODELS

- ▶ **Generalizes classical matching methods such as personnel assignment and resource allocation**
- ▶ **Requirements and satisfiers are fixed in classical methods and little or no switching is involved**

CLASSICAL MATCHING METHOD



TASKS

WORKMEN

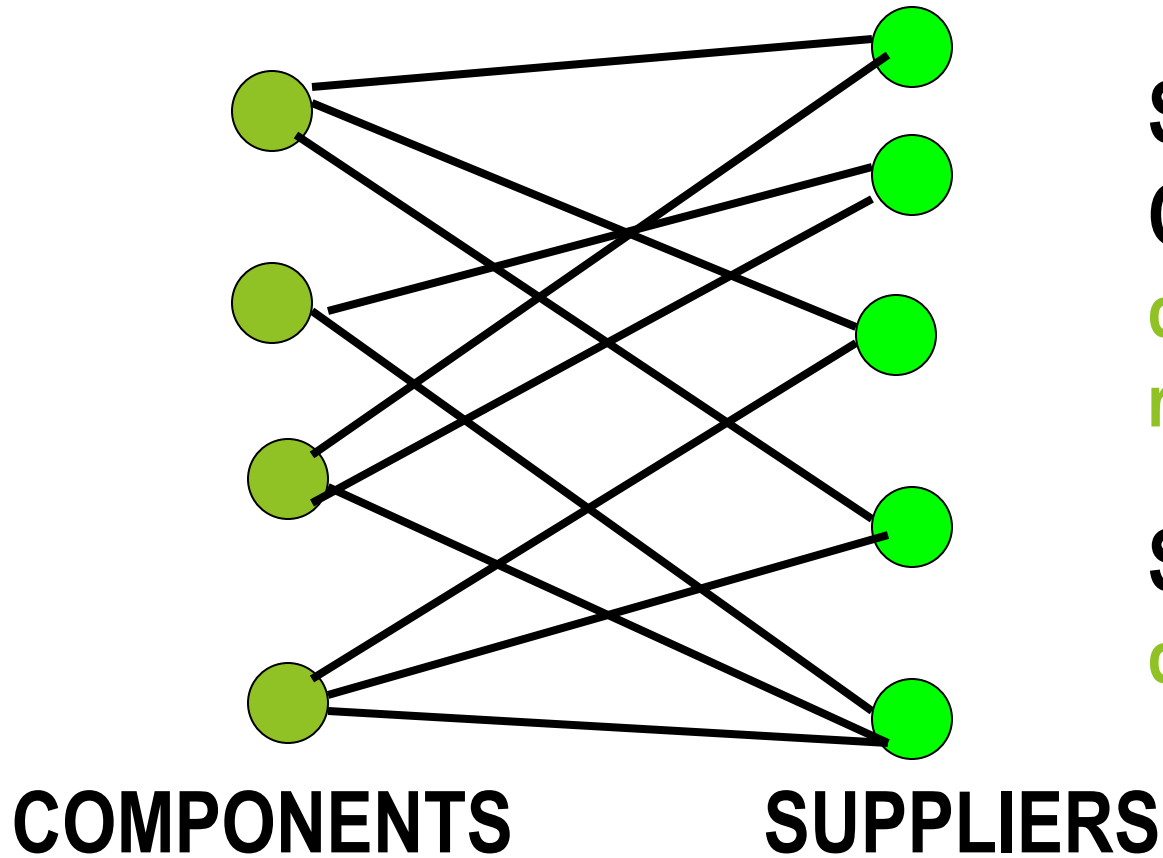
DYNAMIC FEATURES OF METAMANAGEMENT

- ▶ **Requirements can vary**
- ▶ **Satisfiers can vary**
- ▶ **Procedures can vary**
- ▶ **Systematic switching is supported**

GENERIC EXAMPLES

of virtual organization

AUTOMOBILE ASSEMBLY



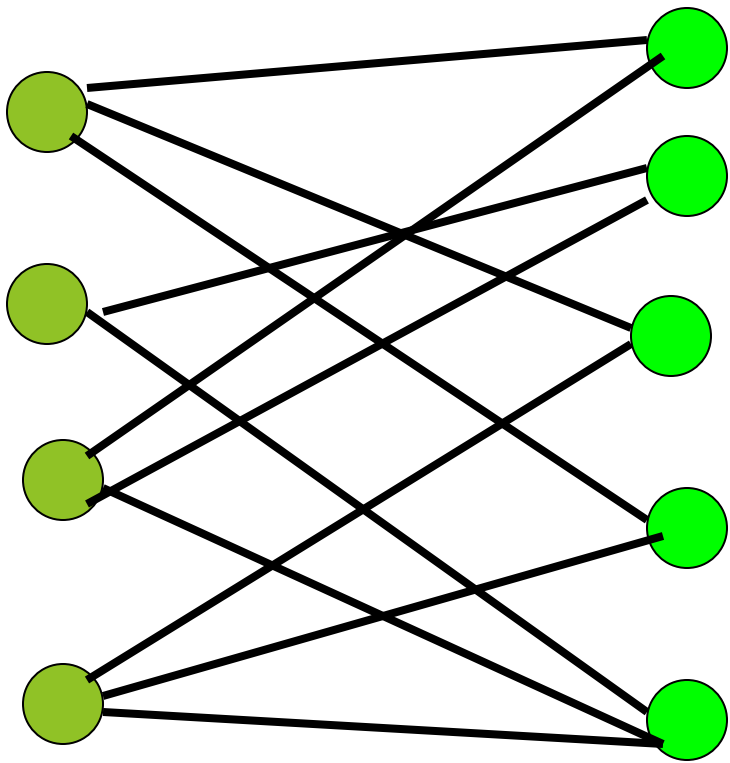
**SATISFICING
CRITERIA:**

cost-quality
relationship

SWITCHING:

change suppliers

TAX MANAGEMENT



TAX OBLIGATIONS

OBLIGATION PER PLANT

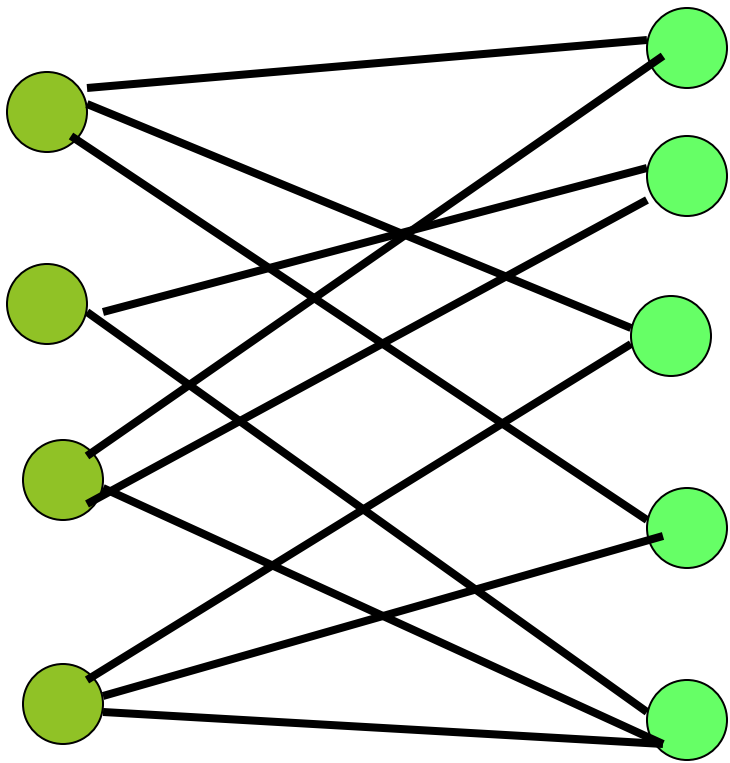
**SATISFICING
CRITERIA:**

minimize over
taxes

SWITCHING:

shift obligations
between plants

PORTFOLIO MANAGEMENT



INVESTMENT TYPES

SPECIFIC INVESTMENTS

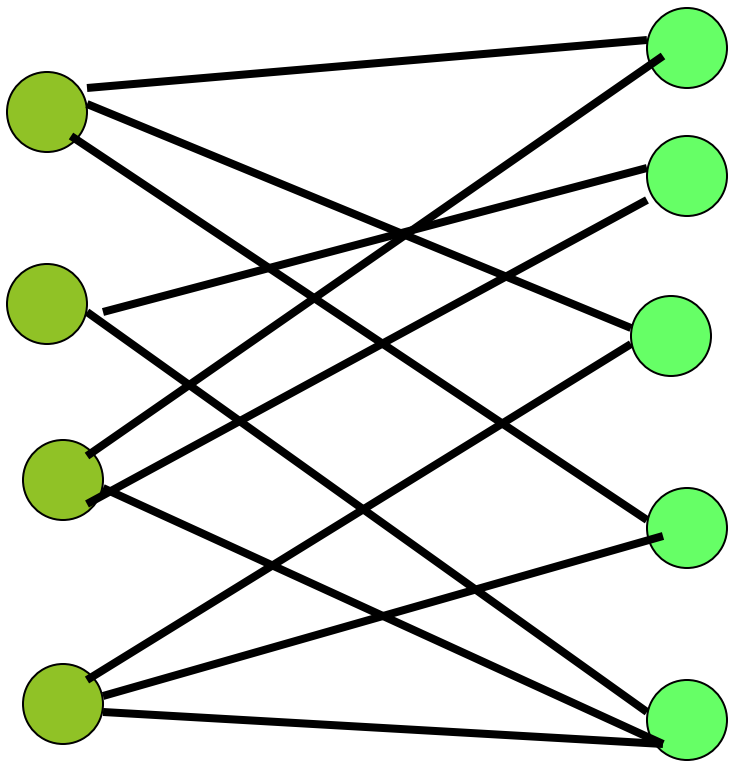
**SATISFICING
CRITERIA:**

maximize risk
return

SWITCHING:

substitut
investm

HIGH TECH HELP DESK



**SATISFICING
CRITERIA:**

maximize satisfaction
cost ratio

SWITCHING:

substitute service
provider

CLIENT SERVICES

SERVICE PROVIDERS

GENERAL OBSERVATIONS

- ▶ **Switching model is applicable to a wide range of management problems**
- ▶ **Major advantages in cost and flexibility can be achieved**

CASE STUDY OF DISTRIBUTED NETWORK: VIRTUAL FACTORY

- ▶ **Experience of Two Networks of Engineering Firms**
- ▶ **Bodensee Region of Switzerland**
- ▶ **Northwest & Central Switzerland**

BODENSEE

- ▶ **Thirty Member Firms (2002)**
- ▶ **Centralized Structure**
- ▶ **Limited Liability Corporation**
- ▶ **Assist in Acquiring New Business**
- ▶ **Configure Groups for Projects**
- ▶ **Fee Based Project Management**

NORTHWEST & CENTRAL

- ▶ **Forty Member Firms (2002)**
- ▶ **Decentralized Structure**
- ▶ **Association Charter under Swiss Law**
- ▶ **No Dedicated Representative**
- ▶ **Each Member Represents Association**
- ▶ **Reliance on Standing Committees**

ABSTRACT VIEW

▶ **project types**
(e.g., making machine, or component)

▶ **subsets of firms**
(e.g., member firms a, b and c form joint venture)

SUCCESS AND FAILURE

Bodensee

- ▶ ill-defined function of central office
- ▶ lack of trust among member firms
- ▶ individual interest
- ▶ membership deemed of marginal value

Northwest & Central

- ▶ members represent the network
- ▶ association promotes smooth interaction
- ▶ collective interest
- ▶ membership deemed worthwhile

SUCCESS FACTORS

- ▶ **Commitment of member firms to network**
- ▶ **Shared protocols for cooperation**
- ▶ **Willingness to share experience**
- ▶ **Global sensitivity to membership and markets**

PITFALLS

- ▶ **Insistence on centralized management functions**
- ▶ **Absence of shared protocols**
- ▶ **Too little attention paid to consensus building**

WHAT MAKES VIRTUAL ORGANIZATION WORK?

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PAST: ALL IN ONE



FUTURE: ONE IN ALL

**INFORMATION COMMODITIES
STANDARDIZATION
FINANCIAL INSTRUMENTS**

***FACILITATORS OF
VIRTUAL ORGANIZATION***

PAVING THE WAY TO VIRTUAL ORGANIZATION

- ▶ **Build information commodities**
- ▶ **Promote standardization**
- ▶ **Create appropriate financial instruments**

INFORMATION COMMODITIES

- ▶ Goods or services furnishing information
- ▶ Computer-based types: software, databases
- ▶ Elements of *information markets*

COMPUTER-BASED INFORMATION COMMODITIES

HAND/BRAIN TO COMPUTER



INFORMATION MARKETS ARE TO VIRTUAL ORGANIZATION

what
LABOR MARKETS WERE TO
THE FACTORY SYSTEM

INFORMATION MARKETS UNDERWRITE:

- **Computer-based alternatives to human-borne knowledge**
- **Lower costs**
- **Greater flexibility**

STANDARDIZATION

▶ Technical

▶ access

▶ information exchange

▶ interaction

*PROTOCOLS FOR
ELECTRONIC COMMERCE*

STANDARDIZATION

- ▶ **High level business protocols**

***INTERCHANGEABILITY OF
ORGANIZATIONAL PARTS***

(‘socioeconomics’ and ergonomics)

SOCIAL PROTOCOLS: COSTUME



Soldier, Farmer, Laborer, Merchant

FINANCIAL INSTRUMENTS

▶ Exchange

- ▶ online payments
- ▶ electronic wallets

▶ Financial management

- ▶ derivatives
- ▶ hedging strategies

▶ Tools for building new instruments e.g., securitization

BASIC SECURITIZATION

LAND

PLANT

EQUIPMENT

SHARES (in concrete assets)

HIGHER LEVEL SECURITIZATION

**LEASES/SHARES
MUTUAL FUNDS**

SHARES (in abstract assets)

CURRENT PRACTICES

▶ Outsourcing

- ▶ products and services
- ▶ labor

▶ Inventory Management

- ▶ just in time
- ▶ quick response

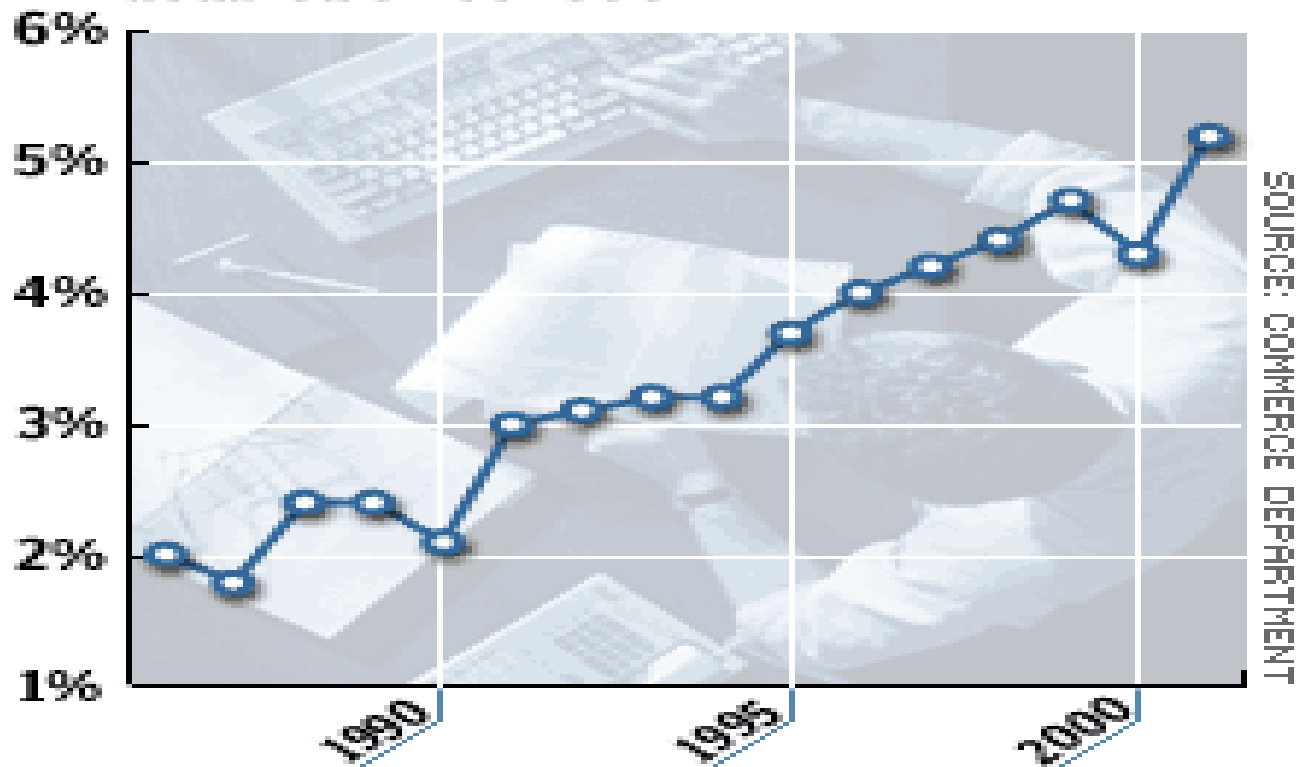
▶ Electronic brokerage

- ▶ customer order management
- ▶ logistics management

GLOBAL OUTSOURCING

Start of a trend?

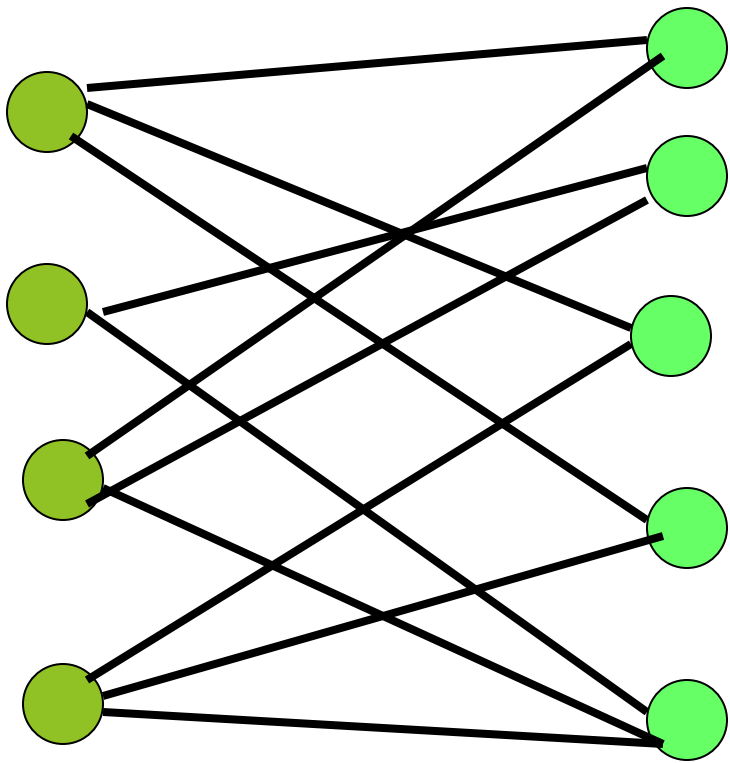
U.S. imports of business, professional and tech services, as a percentage of total private service imports, have more than doubled since 1990.



SWITCHING IN E-COMMERCE

- ▶ Profiles submitted by Vendors
- ▶ Vendor coverage: *equipment & services*
- ▶ Buyers submit Request for Proposal
- ▶ Vendors selected to receive RFP
- ▶ Client notified if vendor bids on RFP

E-BROKERAGE



REQUEST TYPES

SUBSETS OF VENDORS

**SATISFICING
CRITERIA:**

meet specs at
minimal cost

SWITCHING:

substitu
subset

COST-EFFECTIVE BROKERAGE

- ▶ Gather Information about vendors and potential buyers
- ▶ Update databases
- ▶ Maintain allocation procedure

**COMPONENTS OF
SWITCHING COSTS**

COSTS OF VIRTUAL ORGANIZATION

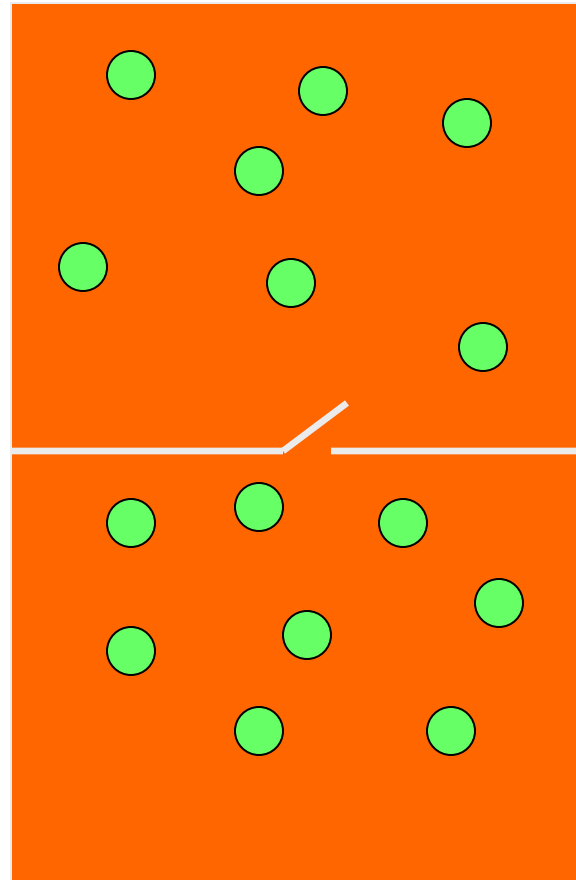
- ▶ **No free lunch**
- ▶ **Toward a taxonomy of costs**

NO FREE LUNCH

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MAXWELL'S DEMON

**DEMON
WORKS
TRAP
DOOR**



**HIGH
VELOCITY
CHAMBER**

**LOW
VELOCITY
CHAMBER**

DEMON COST

ENTROPY DECREASE

equals

DEMON INFORMATION

DIVISION OF LABOR

Adam Smith's pin factory

*INCREASE IN PRODUCTIVITY
THROUGH TASK
RESOLUTION AND REDUCTION OF
SKILL REQUIREMENTS*

DIVISION OF LABOR COST

PRODUCTIVITY GAINS

partially offset by

SUPERVISORY OVERHEAD

VIRTUAL ORGANIZATION

ADVANTAGES

limited by

SWITCHING AND HUMAN COSTS

SWITCHING COSTS

- ▶ **Assignment of new satisfier to requirement**
 - ▶ **transaction**
 - ▶ **legal**
 - ▶ **interfaces**
- ▶ **Requirements analysis and satisfier scanning**

ACCOUNTING

- ▶ **Switching benefits must exceed cost of re-assignment**
 - ▶ not trivial to determine
 - ▶ dedicated activity is needed
 - ▶ include in switching costs
- ▶ **Amortize costs over lifetime of need-satisfier pairing**

RESEARCH IN PROGRESS

- ▶ **Investigation of scientific methods for implementing the functions of metamanagement**
- ▶ **Empirical studies of costs and benefits of switching**
- ▶ **Development of guidelines to assist organizations in exploiting the potential of switching**

voSWITCH

File Action Options Help

0 Steps

Delay (sec)

Start

Stop

Reset All

Direct cost

1 Database change

1 Legal

1 Training

Indirect cost

1 Marketplace scan

1 Information acquisition

1 Staff

1 Switching overhead

SIMULATION ENDED: Simulation completed successfully

ADD

Requirement

Satisfier

Connection

DELETE

Requirement

Satisfier

Connection

NODES

Move

Attributes

MATRIX

LONG-TERM BUSINESS IMPLICATIONS

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CLAIM

**Virtual Organization Will Prove
Irresistible to Managers**

**People Act in What They Perceive to Be
Their Best Interests**

**The Competitive Advantage of Virtual
Organization Will Become Apparent**

BALANCE SHEET

▶ Advantages

- ▶ efficiency and effectiveness
- ▶ responsiveness and flexibility

▶ Disadvantages

- ▶ costs
- ▶ human relations

REQUIREMENTS OF SWITCHING

- ▶ **Ease of forming, modifying and terminating relationships**
 - ▶ person to person
 - ▶ person to organization
 - ▶ organization to organization
- ▶ **Mobility**

FACILITATING SWITCHING

TRANSFORMATION OF TRUST AND LOYALTY

ANONYMITY: FOCUS ON MUTUAL ADVANTAGE



"On the Internet, nobody knows you're a dog."

LOYALTY

Traditional: subjective
BASED ON AFFECT

Post-modern: objective
***BASED ON COMMON
INTEREST***

TRUST

Traditional: static

***LINKED TO SOCIAL STATUS AND
GROUP MEMBERSHIP***

Post-modern: dynamic

***LINKED TO JOB FUNCTION AND
ORGANIZATIONAL
AFFILIATION***

CONDITIONS OF INTERACTION

Homogeneity
(reliability ensured by
authority and custom)

Diversity
(reliability ensured by
standardization)

COEXISTENCE OF NEW AND OLD

**STANDARDIZATION NEED NOT
ELIMINATE RELIANCE ON
AUTHORITY AND CUSTOM**

***metamanagement can partition
its sphere of action***

VIRTUALITY REINFORCES FRAGMENTATION

- ▶ **Decline of nation state power**
- ▶ **Devolution of power and authority onto 'private' organizations**

EMERGING POLITICAL ECONOMY

- ▶ **Power and authority centered in virtual organizations**
- ▶ **Political power and authority exercised by private organizations**
- ▶ **Economic power based on globally distributed resources**

VIRTUAL FEUDALISM

CONCLUSION

- ▶ **Virtual organization offers competitive economic advantage**
- ▶ **Managers who ignore it do so at the peril of their companies**
- ▶ **A new world of business and government is in the making**