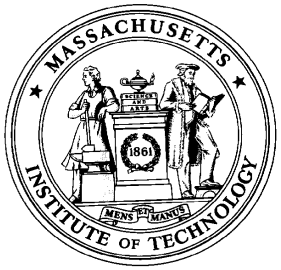
Introduction to Operations Management



Introduction to Operations Management

1. Introductions
2. Housekeeping
   a. SloanSpace
   b. Course Introduction
   c. Professional Standards
3. Concepts & Nokia
4. Course Outline
5. Next Time
   a. Sega
   b. CPM

"Housekeeping" for Operations Management

1. **Course Materials**:

   Course packet

   E.M. Goldratt and J. Cox, *The Goal: A Process of Ongoing Improvement*, North River Press, 2nd Rev. Ed., 1992.
   The Memory Jogger, Goal/QPC, 1988.

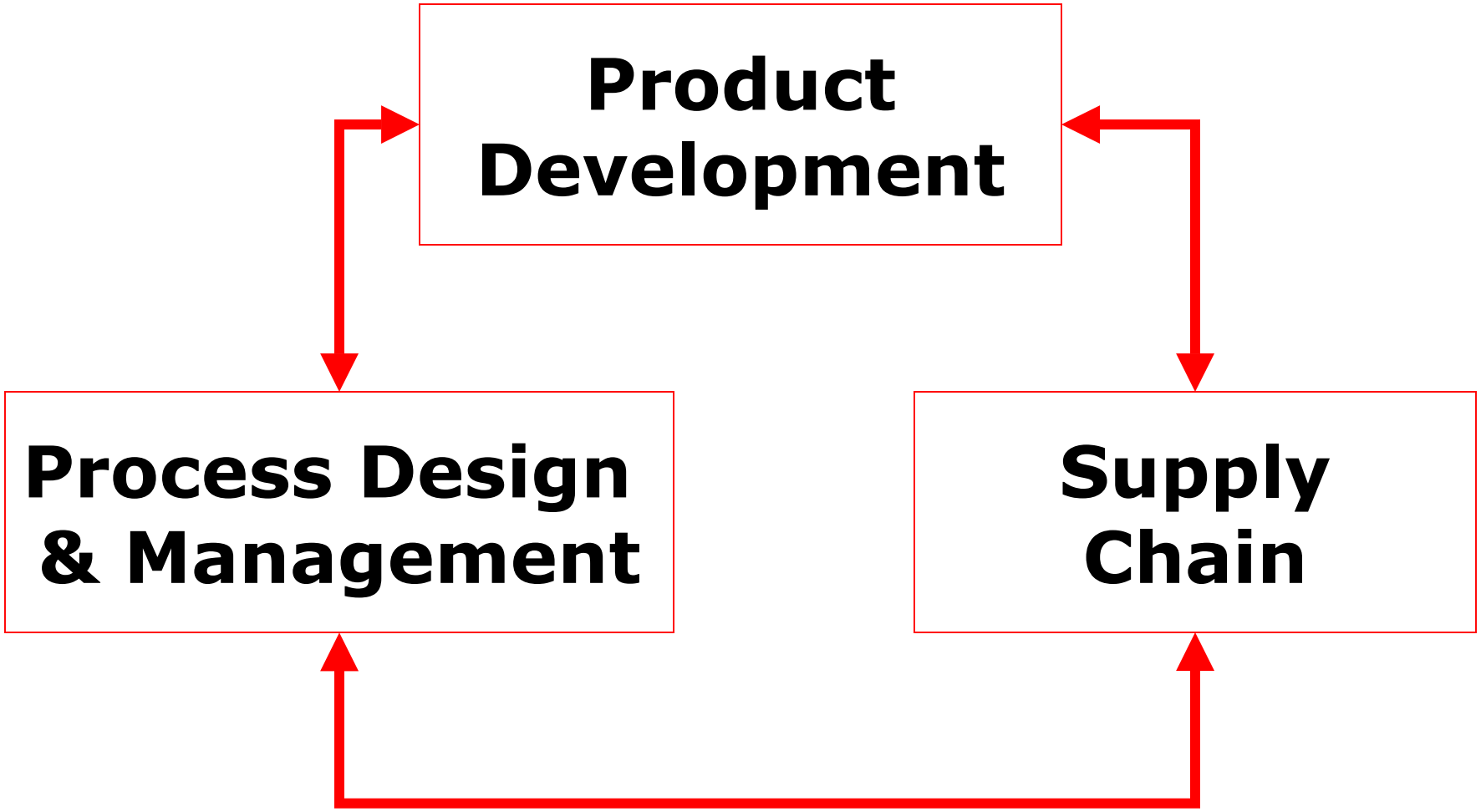
2. **Grading**

Class participation:	**30%**
First case write-up	**20%**
Second case write-up	**25%**
Third case write-up	**25%**

3. **Professional Standards**

   Academic Integrity--"Do your own work"
   Behavioral Integrity -- "Do unto others . . . "

Three Foundational Components of Operations Management



Product Development

- **Product Design**
  - **-Voice of the Customer**

    What is the role of product design in the demand and supply issues faced by Nokia and Ericsson?
  - **-Product/System Architecture**

    Were problem chips integral or modular?
- **Product Development**
  - **-Project management & Cost**
  - **-Design for Manufacturing**

    How important was" "Nokia quickly redesigned some of its chips so they could be produced elsewhere?"
- **Technology Strategy**

  Did product technology play a role in the differential performance of N & E?

Process Design & Management

- **Process Design: Options & Assessment**
  - **-Queueing Analysis**
  - **-Capacity Analysis**
    How did Nokia assess capacity in the crunch? How did they change capacity?
  - **-Uncertainty Analysis**
    How did each company prepare for difficult-to-anticipate events?

- **Inventory Systems**

•Did N&E operate Just-in-Time, or did they hold big stores of chips waiting just in case?

- **Production Control**

Was Nokia's software the principal instrument of control?
How did they monitor the situation?

ERP/Software/Internet

•Was Nokia's software the principal instrument of communication?

- **Operations Excellence**
  - **- Continuous Improvement**
  - **- Just-in-Time**
  - **- Quality Management (SPC, 6σ)**

Supply Chain

- **Strategic Supply Chain Design**
  - **-Make Vs. Buy**
    - **Did sourcing strategy play a role in the differential performance of N & E?**
  - **-Supplier Selection , Sourcing**
    - **Single vs. Dual sourcing**
- **Supply Chain Management**
  - **-End-to-end coordination**
    - **Do we see here examples of integrated enterprise?**
  - **-Supplier Relations**
    - **hard-nosed, polite, hostile, collaborative?**
- **Delayed Differentiation**

Companies and Industries we will cover

Product	
Electronics & SW	Sega
Process	
Autos:	Toyota
Electronics:	Dell, Cisco, Quanta
Financial	Bank of America
Food Retailing	Burger King
Food Processing	National Cranberry
Air Transport	Alaska Air
Health Care:	University Health
Software:	Sega, SAP (Vandelay), Oracle (Cisco)
Supply Chain	
Electronics:	Nokia, HP
Fashion Apparel	Sport Obermeyer
Food Distribution	Barilla Pasta
eSupply	Webvan

Course Outline

1	*Introduction*	Course Introduction	Trial by Fire, powerpoint on Ops Strat
2	*Product Dev*	Dreamcast/Sega	*Chap 8 in Clkspd on 3-DCE, ABC's of CPM*
3	*Operations*	Burger King	Types of Processes, EOQ, Newsvendor
4	*Strategy*	Inventory Mgmt	Inven probs, Relevant costs, Whirlwind/Web, Dell/Conqueror, Laptop King
5	*Process*	Alaska Airlines	Levitt
6	*Technology*	*Webvan*	They've got mail.
7		Cisco	MRP note, ERP Technology Note
8	*Process*	Process Flow Models	Queueing Note & Inventory Buildup
9	*Analysis*	National Cranberry	
10		*Univ Health Service*	
11	*Process*	Quality Mgmt	Deming, Juran, Crosby; 6sig, Berwick, Memory Jogger
12	*Quality*	Toyota	Lean Production, Karmarkar
13		*The Goal*	
14		Bank of America	Hammer & Cole Articles
15	*Supply*	Hewlett-Packard	SMR paper
16	*Chain*	*Barilla SPA*	
17		Sport Obermeyer	
18	*Wrap-Up*	Wrap-up	

Clockspeed:

The Dimension of Time on Operations Management

Study the Industry Fruitflies

Evolution in the natural world:

FRUITFLIES
evolve faster than
MAMMALS
evolve faster than
REPTILES

THE KEY TOOL:

Cross-SPECIES Benchmarking of Dynamic Forces

Evolution in the industrial world:

INFOTAINMENT is faster than
MICROCHIPS is faster than
AUTOS evolve faster than
AIRCRAFT evolve faster than
MINERAL EXTRACTION

THE KEY TOOL:

Cross-INDUSTRY Benchmarking of Dynamic Forces

INDUSTRY CLOCKSPEED IS A COMPOSITE:
OF PRODUCT, PROCESS, AND ORGANIZATIONAL CLOCKSPEEDS

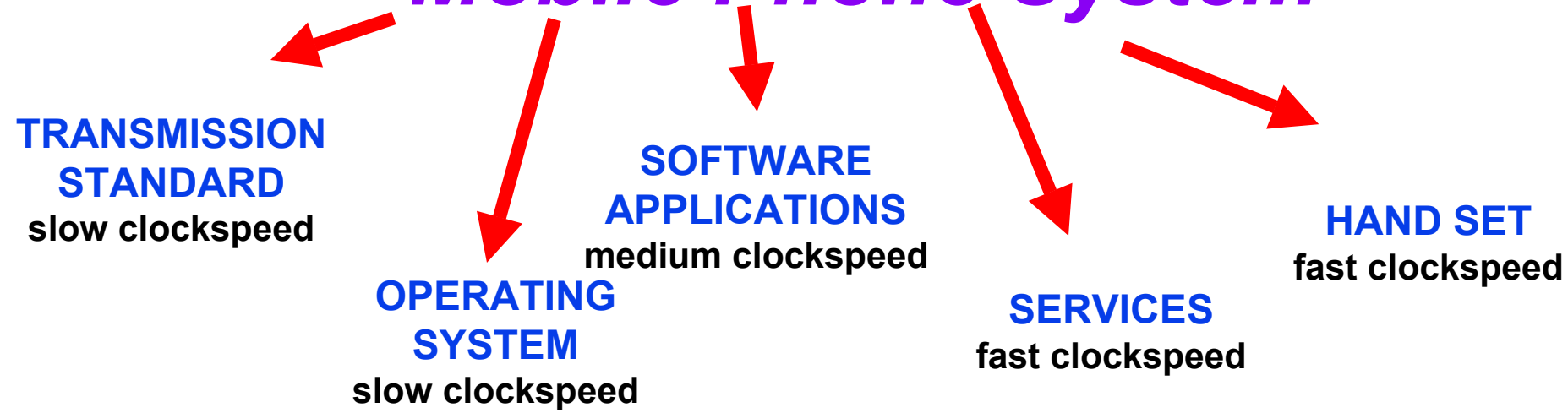
Mobile Phone **INDUSTRY CLOCKSPEED**

THE *Mobile Phone*
product technology

THE *Mobile Phone* PRODUCTION PROCESS
process technology

THE *Mobile Phone* MANUFACTURING COMPANY
organization

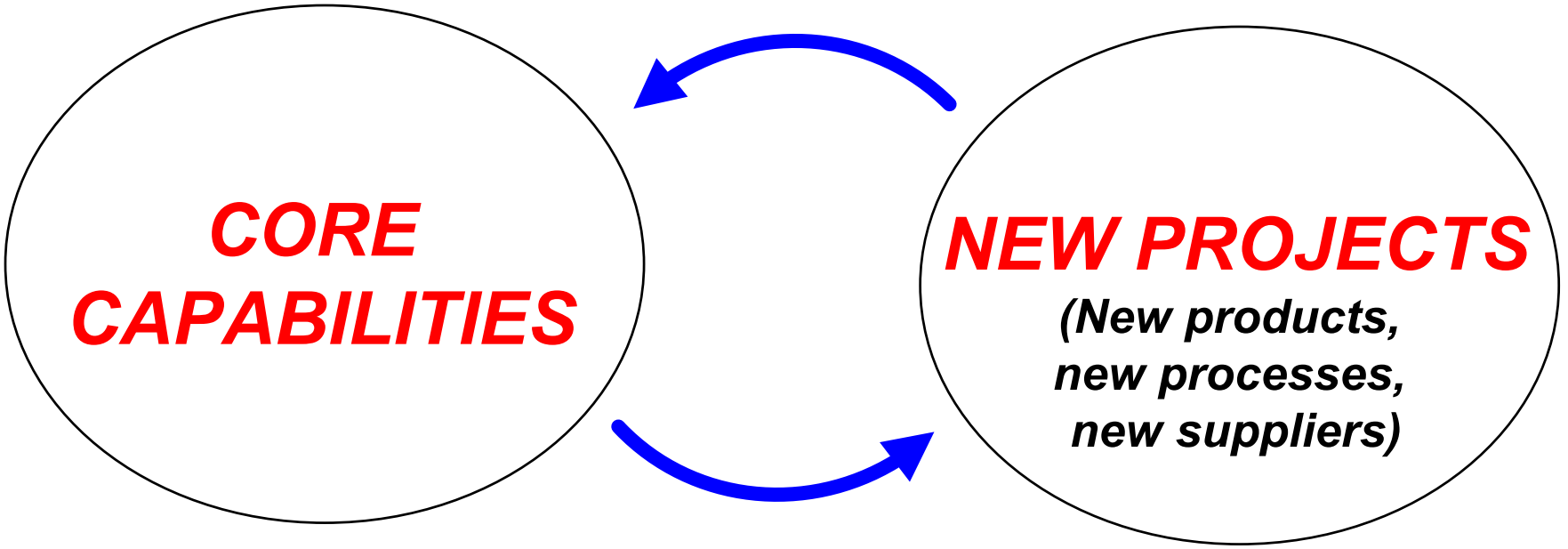
Mobile Phone System CLOCKSPEED is a mix of Transmission Standards, Software and Handsets



ISSUE: THE FIRMS THAT ARE FORCED TO RUN AT THE FASTEST CLOCKSPEED ARE THE MOST LIKELY TO STAY AHEAD OF THE GAME.

Clockspeed drives *Business Strategy Cadence*

Dynamics between New Projects and Core Capability Development: PROJECTS MUST MAKE MONEY AND BUILD CAPABILITIES



See Leonard-Barton, D. *Wellsprings of Knowledge*

ALL COMPETITIVE ADVANTAGE IS TEMPORARY

Autos:

Ford **in 1920,** ***GM*** **in 1955,** ***Toyota*** **in 1990**

Computing:

IBM **in 1970,** ***DEC*** **in 1980,** ***Wintel*** **in 1990**

World Dominion:

Greece **in 500 BC,** ***Rome*** **in 100AD,** ***G.B.*** **in 1800**

Sports:

Bruins **in 1971,** ***Celtics*** **in 1986,** ***Yankees*** **no end**

The faster the clockspeed, the shorter the reign

ARCHITECTURES IN 3-D

INTEGRALITY VS. *MODULARITY*

Integral product architectures **feature close coupling among the elements**

- Elements perform many functions
- Elements are in close spacial proximity
- Elements are tightly synchronized

- Ex: jet engine, airplane wing, microprocessor

Modular product architectures **feature separation among the elements**

- Elements are interchangeable
- Elements are individually upgradeable
- Element interfaces are standardized
- System failures can be localized

- Ex: stereo system, desktop PC, bicycle

SUPPLY CHAIN ARCHITECTURE

Integral supply-chain architecture
features close proximity among its elements
- **Proximity metrics: Geographic, Organizational Cultural, Electronic**
  - **Example: Toyota city**
  - **Example: Ma Bell (AT&T in New Jersey)**
  - **Example: IBM mainframes & Hudson River Valley**

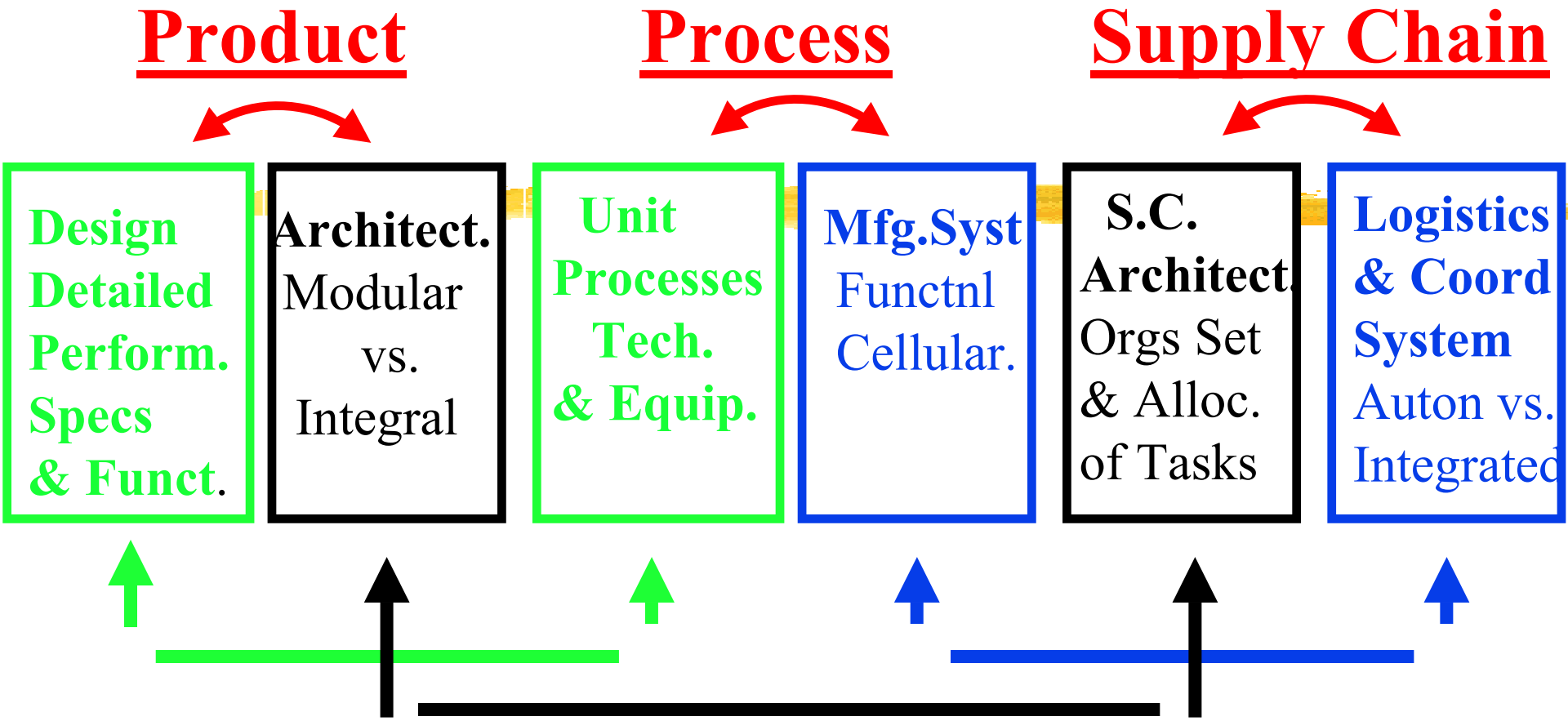
Modular supply -chain architecture features multiple, interchangeable supplier and standard interfaces
- **Example: Garment industry**
- **Example: PC industry**
- **Example: General Motors' global sourcing**
- **Example: Telephones and telephone service**

DESIGNING ARCHITECTURES FOR PRODUCTS & VALUE CHAINS: THE NEED FOR ALIGNMENT

VALUE CHAIN ARCHITECTURE

(Geog., Organ., Cultural, Elec.)

PRODUCT ARCHITECTURE	INTEGRAL	MODULAR
INTEGRAL	Jet engines Microprocessors Mercedes vehicles	Polaroid Nortel, Lucent
MODULAR	Automotive Supplier Parks	Personal Computers Bicycles Chrysler Vehicles Cisco



- Focus
- Architecture
- Technology

A 3-D CE decision model illustrating the *imperative* of concurrency

DESIGNING ARCHITECTURES FOR PRODUCTS & VALUE CHAINS: MODULARITY VS. OPENNESS

ARCHITECTURAL STRUCTURE \ ARCHITECTURAL PROPRIETARINESS	CLOSED	OPEN
INTEGRAL	Pentium Chip Mercedes Vehicles SAP ERP	Linux
MODULAR	IBM Mainframes Microsoft *Windows* Chrysler Vehicles	Palm Pilot software & accessories Phones & service Web-based ERP

INFORMATION ARCHITECTURE MUST REFLECT BUSINESS MODEL

All Conclusions are *Temporary*

Clockspeeds are increasing almost everywhere

3-D Concurrent Engineering must anticipate Industry and Value Chain Dynamics

3-D Concurrent Engineering is a key organizational competency

Study of Fruit Flies can help with crafting strategy