

## *15.760: Dell/Quanta/Inventory*

- 1. Admin: SloanSpace, Namecards, CourseIntro**
- 2. Explain the logic of the EOQ model. How useful do you think it is?**
- 3. Dellpaq problem**
- 4. Explain the logic of the newsvendor model. How useful do you think it is?**
- 5. *Fruitfly*<sup>TM</sup> problem**
- 6. How would you characterize Dell's approach to inventory management? Are the math models relevant or informative?**

# Inventory Problems: Dellpaq Computers

## Relevant costs

**Fixed Costs:** shipments \$100,000  
placing order 5hrs \* \$10/hr = \$50  
**S = \$100,050**

**Variable Costs:** complete systems \$3000  
loading plus shipping \$25  
unloading employee .1 hr \* \$10/hr = \$1  
unloading equipment .1 hr \* \$50/hr = \$5  
arranging in storage .05 hr \* \$10/hr = \$.50  
**C = \$3031.50**

## Irrelevant costs

**Removing sets from storage,  
cost of processor and motherboard,  
surveillance/security equipment**

# Inventory Problems: Dellpaq Computers

**Annual demands: R=300,000**  
**Carrying charge: K=20%**

$$\text{EOQ} = \sqrt{\frac{2(300,000)(100,050)}{.20 (3031.50)}} = 9950$$

# Inventory Problems: *Fruitfly*<sup>TM</sup>

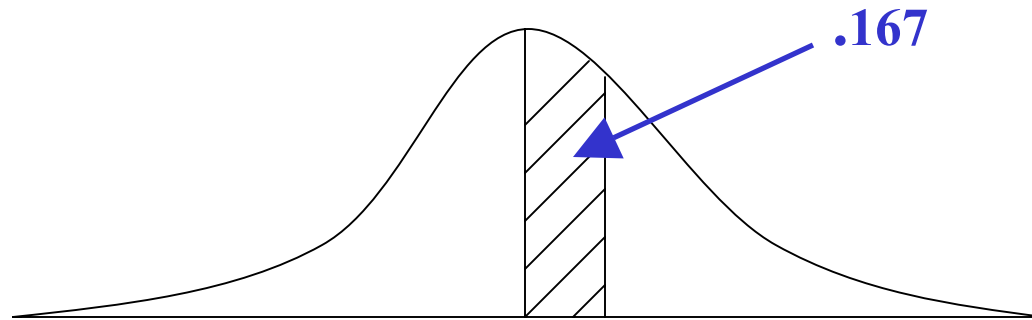
**Decision: D**

**Demand:  $d \sim \text{Normal}(150000, 45000)$**

**Price:  $p = 150$**

**Cost:  $c = 50$**

# Inventory Problems: *Fruitfly*<sup>TM</sup>



$$P(d \leq Q) = \frac{r-c}{r} = \frac{150-50}{150} = \frac{2}{3}$$

$$Z(.167) = .431$$

$$Q = 150,000 + .431 * 45,000 = 169,395$$

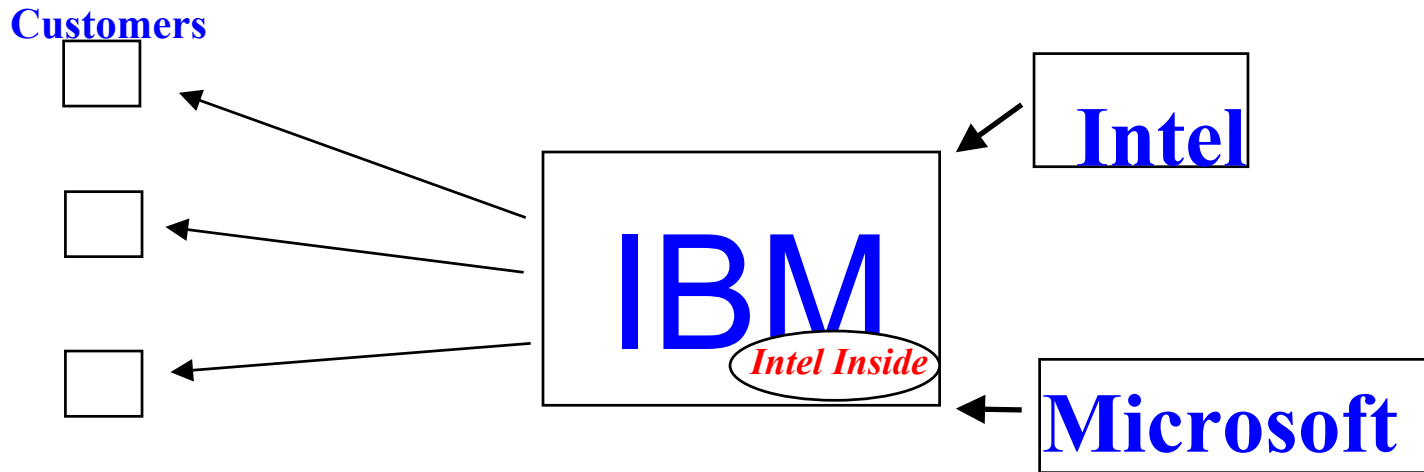
# *Dell Operations Management*

1. **What are the key DESIGN parameters for Dell?**
  - A. Product
  - B. Process Technology
  - C. Facility
  - D. Work System/HR System
2. **What are the key PLANNING tasks for Dell?**
  - A. Supply
  - B. Demand
  - C. Capacity/Workload
3. **What are the key CONTROL processes for Dell?**
  - A. Production Control
  - B. Quality Control
  - C. Process Control
4. **What are the key IMPROVEMENT processes for Dell?**
  - A. Quality Improvement
  - B. Productivity Improvement
  - C. Technological Improvement
  - D. Systems Improvement

# The Strategic Impact of Development Partnership Design:

## *Who let Intel Inside?*

1980: IBM designed a new product and created a new set of development partners



**The Outcome:**

**A phenomenally successful product design**

**A disastrous market value impact (for IBM)**

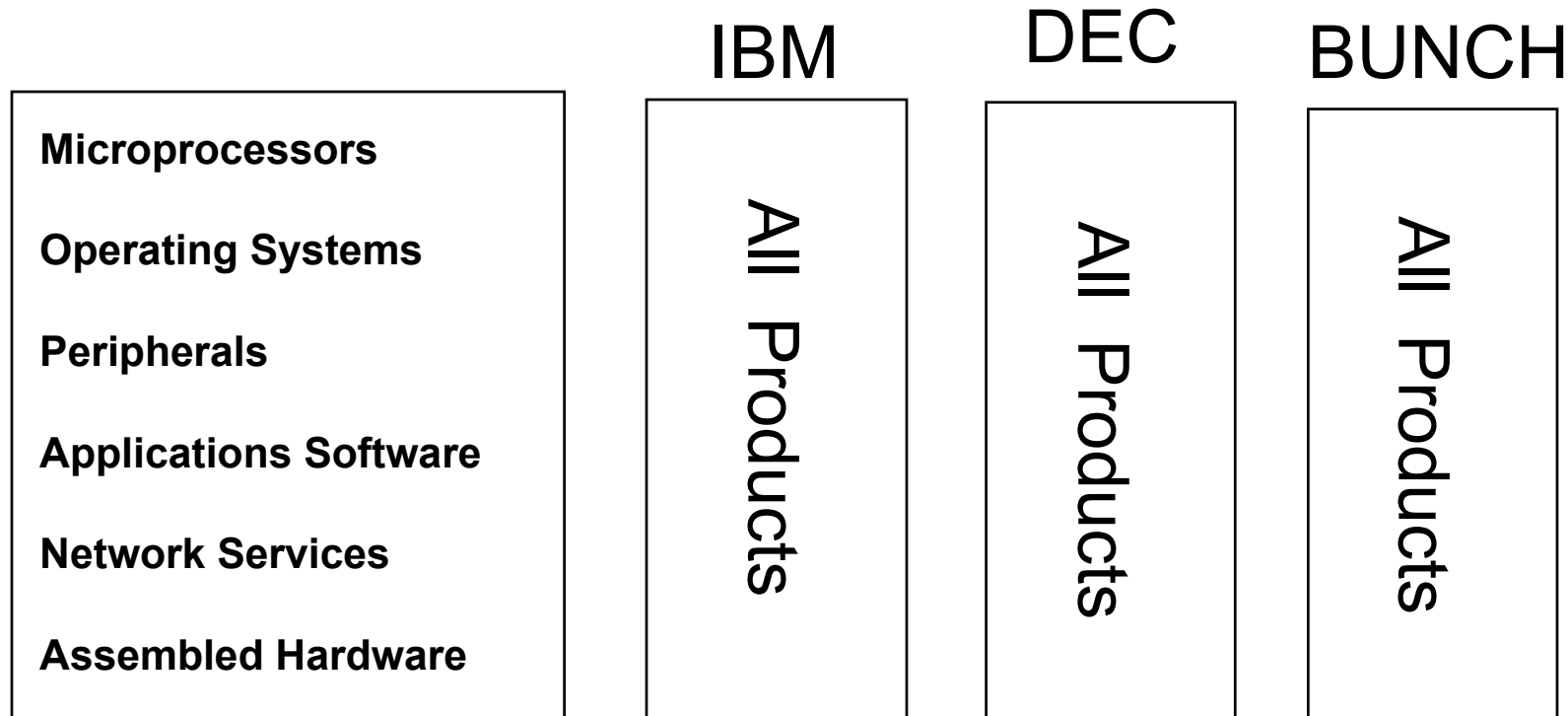
# LESSONS FROM A FRUIT FLY: *THE PERSONAL COMPUTER*

1. BEWARE OF *INTEL INSIDE*  
(Regardless of your industry)
2. MAKE/BUY IS **NOT** ABOUT WHETHER IT IS TWO CENTS CHEAPER OR TWO DAYS FASTER TO OUTSOURCE VERSUS INSOURCE.
3. DEVELOPMENT PARTNERSHIP DESIGN CAN DETERMINE THE FATE OF **COMPANIES** AND **INDUSTRIES**, AND OF **PROFIT** AND **POWER**
4. THE LOCUS OF VALUE CHAIN CONTROL CAN SHIFT IN **UNPREDICTABLE** WAYS



# Vertical Industry Structure with *Integral* Product Architecture

Computer Industry Structure, 1975-85



(Adapted from A. Grove, Intel; and Farrell, Hunter & Saloner, Stanford)

# Horizontal Industry Structure with *Modular* Product Architecture

## Computer Industry Structure, 1985-95

<b>Microprocessors</b>	Intel	Moto	AMD	etc
<b>Operating Systems</b>	Microsoft	Mac	Unix	
<b>Peripherals</b>	HP	Epson	Seagate	etc etc
<b>Applications Software</b>	Microsoft	Lotus	Novell	etc
<b>Network Services</b>	AOL/Netscape	Microsoft	EDS	etc
<b>Assembled Hardware</b>	HP	Compaq	IBM	Dell etc

(Adapted from A. Grove, Intel; and Farrell, Hunter & Saloner, Stanford)

# THE DYNAMICS OF PRODUCT ARCHITECTURE AND VALUE CHAIN STRUCTURE: **THE DOUBLE HELIX**

See Fine & Whitney, “Is the Make/Buy Decision Process a Core Competence?”

# Product

# Process

# Supply Chain

Design  
Detailed  
Perform.  
Specs  
& Funct.

Architect.  
Modular  
vs.  
Integral

Unit  
Processes  
Tech.  
& Equip.

Mfg.Syst  
Functnl  
Cellular.

S.C.  
Architect  
Orgs Set  
& Alloc.  
of Tasks

Logistics  
& Coord  
System  
Auton vs.  
Integrated



- Focus
- Architecture
- Technology

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