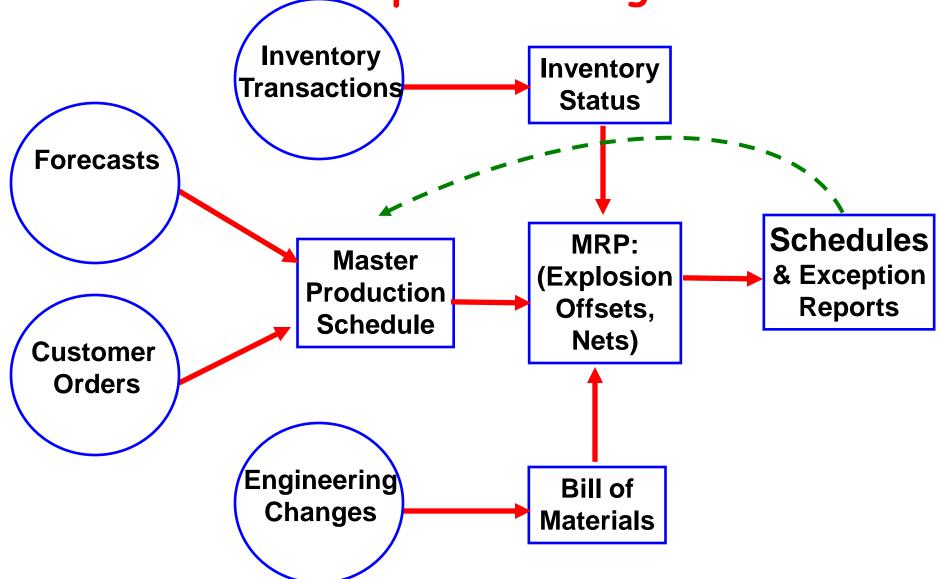
### 15.768: MRP/ERP

What is the Purpose and Logic of MRP?



# What is the Purpose and Logic of MRP?

- Coordination of Production and Inventory in large, multi-stage production systems
- Used for
  - Scheduling & re-scheduling
  - Capacity Planning
  - Supplier coordination (internal & external)
- Timely dissemination of information
- Time-phased production & procurement
  - with lead time offsets & BOM explosions
- Independent vs. Dependent demand
- Requires centralized information system; hence ERP
- Organizes large complex production and delivery coordination requirements

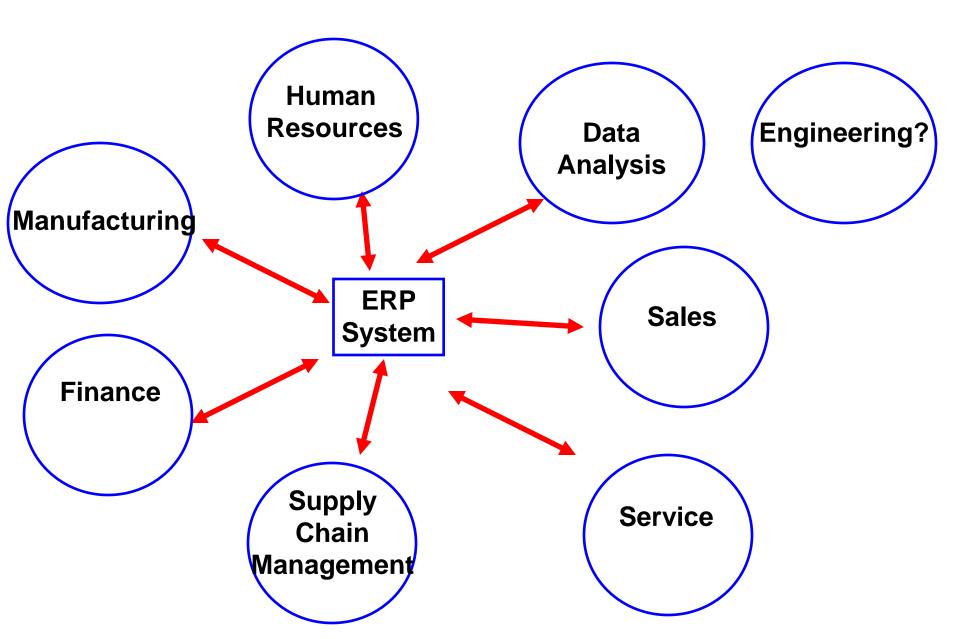
### Criticisms of MRP

- Deterministic Model
- Push system
- poor data ==> GIGO
- Self-fulfilling lead times
- Difficult/costly to install & maintain
- Centralized command & control mindset

# Three Principles of Forecasting

- 1. The Forecast is always wrong
- 2. The longer the forecast horizon, the worse the forecast
- 3. End item forecasts are less accurate than aggregate forecasts

# What is the Purpose and Logic of ERP?



# What is the Purpose and Logic of ERP?

- Financial & Operational Planning & Control -uniform business processes
- Integration of corporate data & systems
- Used for
  - Financial analysis & reports
  - Coordinating operations, sales, engineering
  - Supplier coordination (internal & external)
- Timely aggregation and dissemination of information
- Requires centralized information system;
- enables decentralized control?

# Criticisms of ERP systems

- Implementation nightmares
- Encourages centralized control
- Enforces uniformity; can stifle innovation
- Very expensive

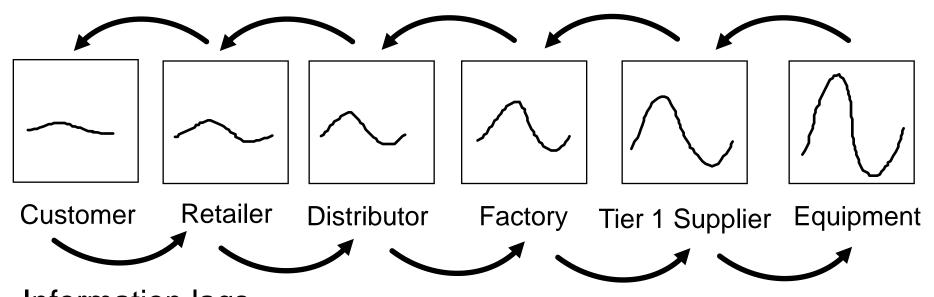
### Management issues:

- 1. Process redesign
- 2. Flexibility and internal capabilities
- 3. Implementation

# Lessons from Cisco's Implementation?

- make it a top priority; resource accordingly
- do it quickly
- rapid prototype iterations
- in-house capabilities (outsource capacity, not knowledge)
- need realistic-scale testing

# Volatility Amplification in the Supply Chain: "The Bullwhip Effect"

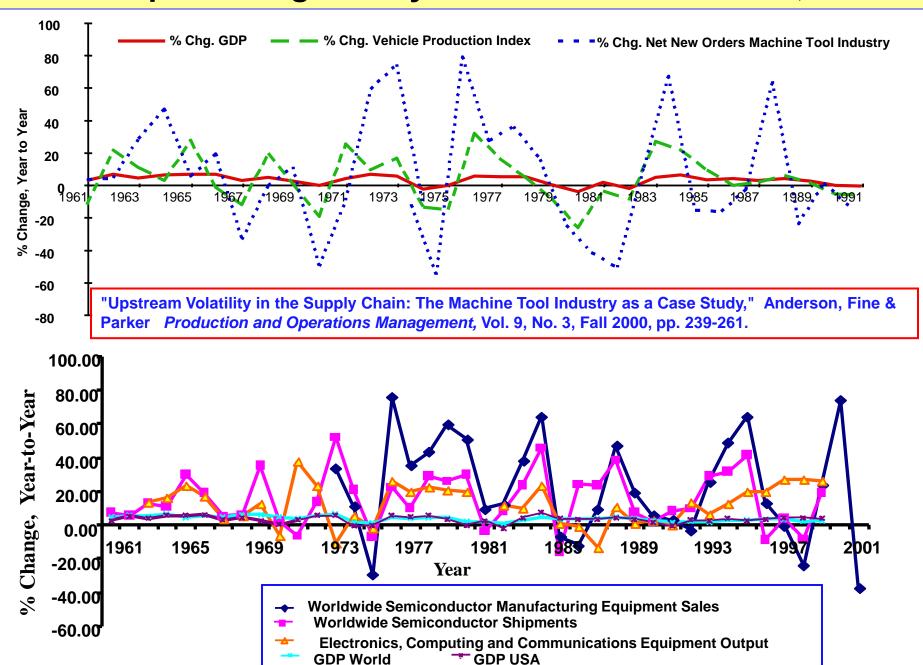


Information lags
Delivery lags
Over- and underordering
Misperceptions of feedback
Lumpiness in ordering
Chain accumulations

#### **SOLUTIONS:**

Countercyclical Markets
Countercyclical Technologies
Collaborative channel mgmt.
(Cincinnati Milacron & Boeing)

#### "We are experiencing a 100-year flood." J. Chambers, 4/16/01



## LESSONS FROM A FRUIT FLY: CISCO SYSTEMS

- 1. KNOW YOUR LOCATION IN THE VALUE CHAIN
- 2. UNDERSTAND THE DYNAMICS
  OF VALUE CHAIN FLUCTUATIONS
- 3. THINK CAREFULLY ABOUT THE ROLE
  OF VERTICAL COLLABORATIVE RELATIONSHIPS
- 4. INFORMATION AND LOGISTICS SPEED DO NOT REPEAL BUSINESS CYCLES OR THE BULLWHIP.

#### **Bonus Question:**

How does clockspeed impact volatility?

### Class 8 Wrap-Up

- MRP for production planning
- ERP Systems: Implementation & Process Design are key
- Bullwhip Dynamics

**Next Time: Southwest Air** 

# Beef Supply Chain

#### **Inputs**

- Millions of farmers provide feed and corn input
- Multiple companies provide genetics
- Genetics and feed have a dramatic impact on the animal's development and meat produced
  - Similar genetics and feed lead to little variation (5%)
  - Different feed and genetics lead to wide variation (40%)
- Additionally, animals are subject to animal health products and medications

#### Cow-Calf, **Dairy Cows**

#### **Feedlots**

#### **Packers**

### Grinder

- 900,000+ operations
- 62% of cow-calf operations have herd size of less than 50
- Numerous inputs affect
   Concentrated in 10 the product
- King Ranch, Lykes Brothers and Desert Cattle
- In addition, there are dairy operations which provide lean cows

- 2,000+ operations
- Top 5 control approximately 15% of the market
- states
- the product
- Cactus Feeders. ContiBeef and Caprock
- In addition, there are dairy operations and imports (AU-NZ)

- Largest 4 control dominant share (~75%)
- Various levels of integration into processing
- Large operations include
   Numerous inputs affect
   Largest players offer packing and processing
  - Large operations include
     Large operations include Excel, Tyson, Swift and Smithfield
    - Dairy cows are generally slaughtered by mid sized packers

### (Processors)

- Less than 50 companies
   ~100 companies
  - 800 packers and processor plants in the US
  - Midsized companies (\$50-500 MM) are generally more focused on processing
  - Kev suppliers are loval, highly focused suppliers (Keystone and OSI)

#### **Distribution** Center (e.g., McD)

- 40 company owned distribution centers across the US
- DCs consolidate products for individual stores
- Stores make one communication to restock the entire store

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