Two Questions That You Must Deal With Every Day In Business

• Do your employees have a suitable background to make the best decisions for the organization?

• What new events and technology will the future bring?
What is a Model?

• A simple representation of characteristics of the real world that the modeler feels important
• Highlights facts and interests at hand
• Depicts only part of reality
• J. Forester - Massachusetts Inst. of Tech.
Advantages of Modeling

• Help simplify and clarify thinking
• Identify important issues
• An aid to communication
• Suggested explanations for events
• The Henry Ford of Modeling
What is an “Optimal” Solution?

- Hard to visualize the concept of optimal without doing the mathematics
- Spreadsheet models play an important role in education of planners
- A spreadsheet “sifter” provides a simple example for discussion
Low productivity in Model Implementation:

1. Models require three representations:
   a. natural representation (communication)
   b. mathematical representation (notation)
   c. computer-executable representation (code)

2. Choice of a solver

3. Difficulty dealing with multiple models

4. Phases of the modeling cycle

Packaged software solves 1, 2, and 4; spreadsheets for 3.
The Power of Spreadsheet Modeling for LP
Multi-dimensional indexing
New Methods of Computation

• Parallel versus serial
• Brain versus integrated circuit
• Biological computing
• Virtual web based computing
The Modeling Life Cycle for Finite Planning Systems:

1. Model development
2. Algorithm development
3. Solution analysis
4. Results presentation
5. Implementation

Software Companies

Practitioners
CHARACTERISTICS OF A “GOOD” SOLUTION

• Use costs of set-ups and inventories as a criterion
• When a set of demands is infeasible:
  - Indicates which periods require additional capacity
  - Provides a schedule for the revised capacity
• Accessible
  - Can be implemented and understood
  - Does not require specialized math programming software of knowledge
• Permits “what-if” analysis in terms of cost consequences
• Provides schedules without excessive computer time
Implications for the Practice of Model Building

• Role of model building increases as an aid to rational decision making

• Traditional university training for logistics and operations management will change

• More applied research emphasis

• Broad education needed to train the model builders of the future
IMPLICATIONS FOR CTL

- The role of model building in the supply chain is increasing as capacity utilization becomes the driving force in industry
- Traditional logistics education is shifting toward quantitative analysis combined with teamwork
- An urgent need exists for applied research
- MIT must play a role in providing the broad education needed to train the model builders of the next century – MLog, MST, Operations Research Center…
The Future Industrial Structure for Food Manufacturing

Networks of specialized co-packers, plus third party logistics = virtual companies

Traditional mfg. plants, with wide product line, dispersed through the US.

A 5 Year Transition?

A new generation of highly “focused” plants, with improved efficiency, centrally located in the US.

CAPACITY MANAGEMENT
Value Creation Through Restructuring

Low Risk

C - Maintain All Plts.

High Risk

A - Focused Mfg.

B - Co-Packing

Small, Incremental Change in ROIC