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

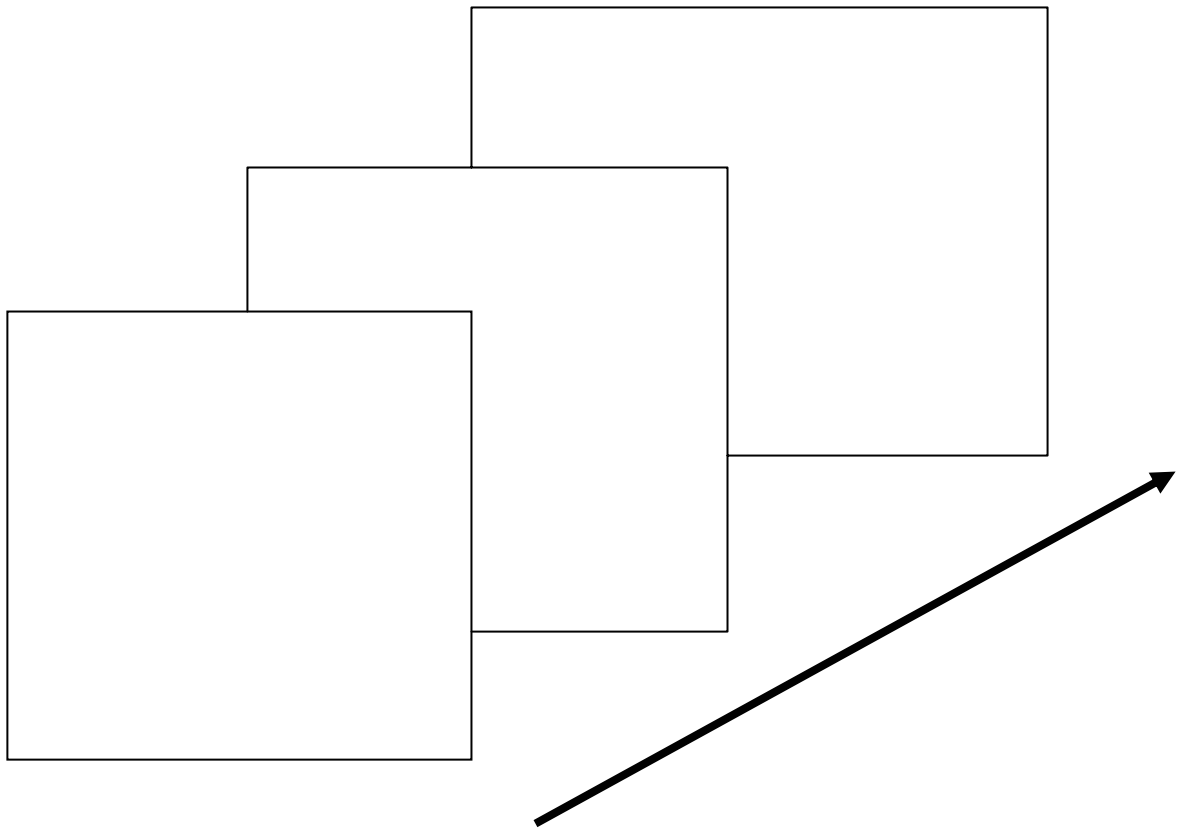
Low productivity in Model Implementation:

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

CHARACTORISTICS 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**

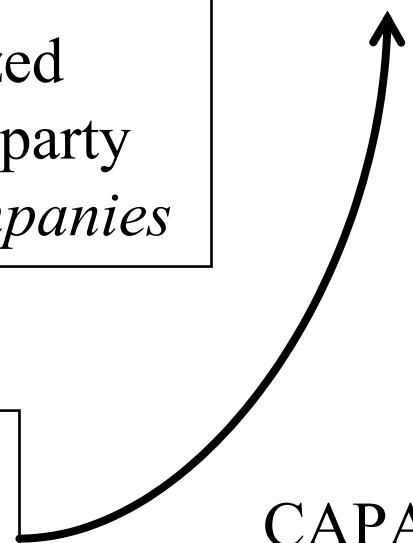
IMPLICATIONS FOR CTL

- 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

A new generation of highly **"<u>focused</u>"** plants, with improved efficiency, centrally located in the US

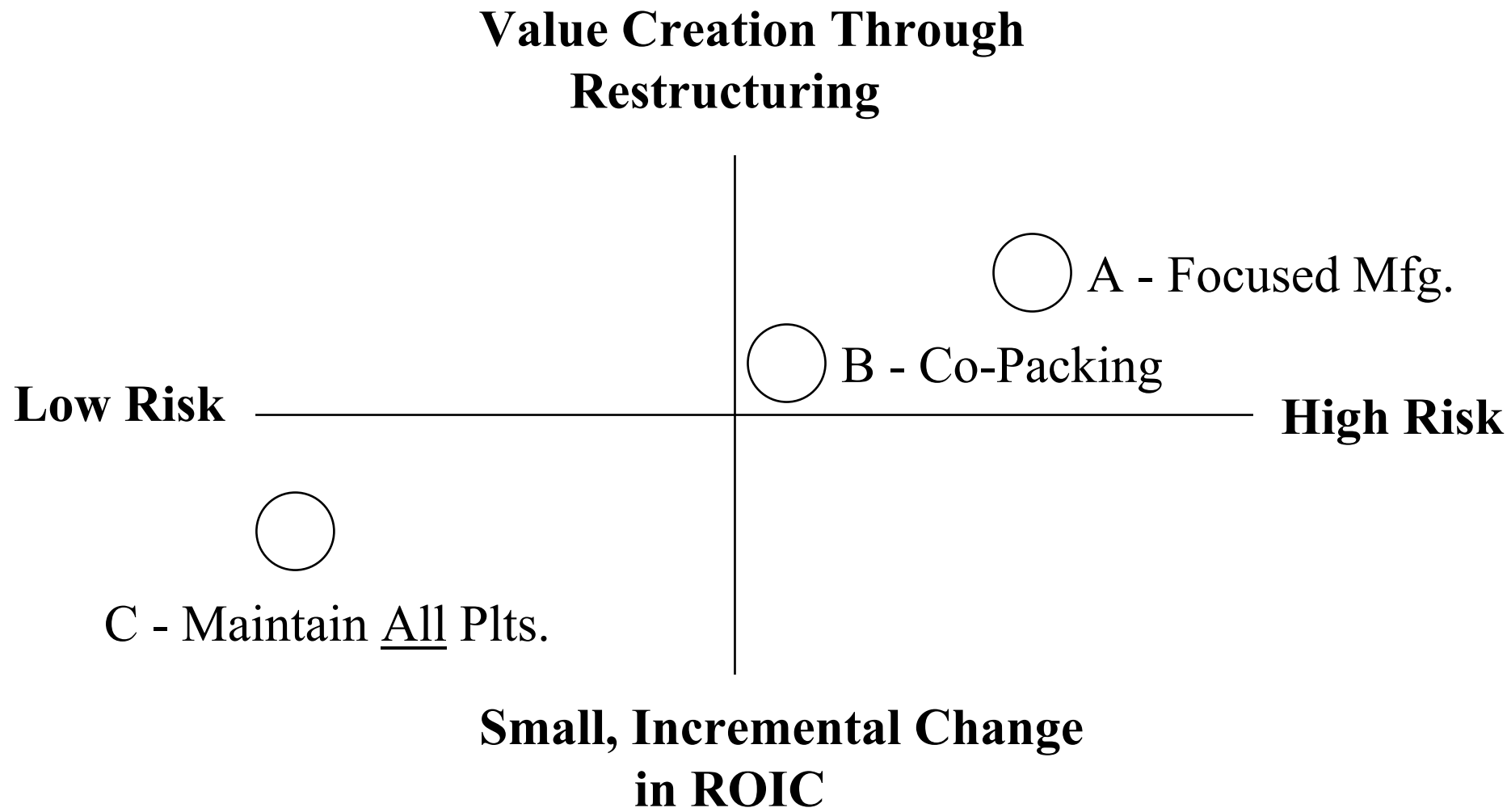
<u>Networks</u> of specialized co-packers, plus third party logistics = *virtual companies*



A 5 Year Transition?

<u>Traditional</u> mfg. plants, with wide product line, dispersed through the US.

CAPACITY MANAGEMENT


Value Creation Through
Restructuring
A - Focused Mfg.
B - Co-Packing
Low Risk
High Risk
C - Maintain All Plts.
Small, Incremental Change
in ROIC