3.1 The Purpose of Modeling: Managers as Organization Designers

• The important of purpose in modeling

• Top management should act more as designers of organization and less as operator to operate the organization.

• Modeling should focus on important problems.

3.2 The Client and the Modeler

• Before modeling process starts, modeler should identify the client of the problem and related model.

• The clients are people who should be influenced for the modeling efforts to have impact.

• Modeling should focus on the clients’ needs.

• The clients for modeling projects are busy, embroiled in organizational politics, looking out for their careers.

• They care little for the elegance of your theory or cleverness.

Steps of the Modeling Process

• Modeling is a creative process.

• The first step is to find out what the problem is and who the real client is.

• Although modeling is inherently creative but there are some iterative steps that most modelers follow.

• Modeling is a feedback process
The modeling process is iterative.

- Modeling is embodied in the larger cycle of learning and action constantly take place in organizations.

Figure 3-2

Overview of the Modeling Process

Problem Articulation: The Importance of Purpose

- A clear purpose is the most important ingredient for a successful modeling study.
- Modeler should identify the real problem and not just the symptom of the difficulty.
- Model is a simplified version of the reality. Simplification is made based on purpose.

Reference Modes

Time Horizon

- The time horizon should extend far enough back in history to show how the problem emerged and describe its symptoms.
- It should extend far enough into the future to capture the delayed and indirect effects of potential policies.
- The choice of time horizon dramatically influences your perception of the problem.

Figures 3-3 and 3-4 and 3-5
The fossil fuel era shown with a time horizon of 15,000 years

Formulating a Dynamic Hypothesis

- A dynamic hypothesis is a working theory of how the problem arose.
  - Endogenous Explanation
  - Mapping System Structure
    - Model Boundary Chart
      - It identifies the scope of the model by listing which key variables are included endogenously, which are exogenous, and which are excluded from the model.

Formulating a Dynamic Hypothesis (Continued)

- Subsystem Diagram
  - Forrester’s corporate model (background).
  - Reference mode
    - Figure 3-6
    - Subsystem diagram for Forrester’s corporate model.
      - Figure 3-7
      - Subsystem diagram for model of a semiconductor firm and its quality improvement program.
        - Figure 3-8
Formulating a Dynamic Hypothesis (Continued)

Subsystem diagram for Forrester’s corporate growth model

Figure 3-7
Source: Adapted from Forrester (1964).

Formulating a Dynamic Hypothesis (Continued)

- Causal Loop Diagrams
- Stock and Flow Maps
- Policy Structure Diagrams

Formulating a Simulation Model

Testing

Policy Design and Evaluation

Formulating a Dynamic Hypothesis (Continued)

Subsystem diagram for model of a semiconductor firm and its quality improvement program

Source: Adapted from Sterman, Repenning, and Kofman (1997).