Massachusetts Institute of Technology

Sloan School of Management

This is to acknowledge that

Roger P. G. Thijs

has completed the program

Understanding and Solving Complex Business Problems

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Richard L. Schmalensee, Dean

Understanding & Solving Complex Business Problems

Using MIT's unique, powerful, & integrative System Dynamics approach to assess the problems that won't go away & produce the results you want

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Seeing only individual actions and missing the structure underlying the actions . . . lies at the root of our powerlessness in complex situations.
Peter M. Senge, *The Fifth Discipline*

Whether you're growing quickly or growth is stagnant, management strategies and policies that have worked in the past may not be effective today. How should you change them? What are the most optimal steps you can take to improve or sustain growth, make internal capacities reflect demand, or resolve any number of difficult issues that are creating problems in the organization?

Understanding & Solving Complex Business Problems: *Using MIT's unique, powerful, and integrative System Dynamics approach to assess the problems that won't go away and produce the results you want,* provides a new way of thinking about and solving persistent problems that arise from change. Developed and refined over three decades at the MIT Sloan School of Management and popularized by author and Sloan lecturer, Peter Senge, **System Dynamics** is one of the most sought-after courses in our advanced degree curriculum. This management discipline offers an organizing framework for understanding complex situations and the dynamics they produce, so that you can design policies that lead to high performance.

At this two-day management program, you'll learn to recognize common business system archetypes – dynamic phenomena that occur repeatedly in diverse settings – that can be used as a springboard for diagnosing persistent long-term problems. You'll also

be exposed to a range of management tools that can be used to identify causal relationships, as well as high-leverage interventions that will allow you to create fundamental changes.

THE PROGRAM

Why do many business strategies fail? Why do others fail *to produce lasting results?* Why, periodically, does your organization suffer from unnecessary crises, fluctuating sales, vacillating earnings, and wavering morale?

Why do once-dominant firms lose their competitive edge?

Understanding & Solving Complex Business Problems introduces you to a new way of thinking about cause and effect in complex organizations – be they departments, divisions, operating units, profit centers, whole companies, or an entire industry – and about the dynamics of strategy.

Through exercises, simulation models, and management flight simulators that allow you to experience the long-term side effects and impacts of decisions, you will learn to visualize your business organization in terms of the structures and policies that create dynamics and regulate performance.

You also will improve your understanding of the ways in which your organization's performance is tied to its internal structure and operating policies, as well as to those of its customers, competitors, and suppliers.

I. Introduction to System Dynamics

A. Why Organizations Are Hard To Manage

One of the biggest mistakes managers make in trying to diagnose business problems is to blame individuals or factors outside the system for undesirable outcomes – the fundamental attribution error – when in fact the system itself may be at fault. Determining the cause of problems in complex organizations means first understanding the way earlier business decisions may be playing themselves out in complicated cause-and-effect loops.

In this session, you will learn about:

- problem articulation
- recognizing "reference modes" or common patterns of behavior
- identifying key feedback loops

B. Structure vs. Behavior

Using a supply chain example to demonstrate the differences between business system structure and behavior, you will participate in an exercise which

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requires solving problems in production/distribution cyclicality. This exercise will provide a common experience for talking about systems and will illustrate why it's difficult to make the right decision. It will also help you begin to see how, by identifying patterns of behavior, you can identify flawed systemic structures.

II. When the System Is The Problem

A. Diagnosing the Causes of Strategic Business Problems: Learning From Causal Loop Diagrams

Most organizational change and improvement efforts never get off the ground. They often generate initial success but ultimately are overcome by organizational resistance. In this section, you will learn to utilize causal loop diagramming, a powerful tool for analyzing complex organizational problems. Using a business case involving process improvement issues, you will learn to create pen-and-paper images that allow you to see the phenomena which are responsible for the organization's behavior and resistance to change.

B. Basic Archetypes of Business System Problems

Many failure modes recur often in organizations, leading to "fixes that fail" – fast fixes that may provide short-term relief but which ultimately turn out to be damaging. Over time, the problem, which may result from the temporary success of inferior products, the escalation of responses among competitors, or growth followed by stagnation, generally returns to its previous level or becomes worse. How you can identify the underlying structures which must be repaired in order to avoid and cure these failure modes.

C. Uses of Models: Insight vs. Forecasting

Managers frequently place too much emphasis on forecasts and not enough on the value of managing well. In this module, you will see how to use system dynamics models to manage persistent, dynamic, and important problems that cannot be predicted. Included is a demonstration of computer modeling software for analyzing causal loop diagrams.

III. Cutting Through Complexity:
Making Strategic Decisions

A. The System Dynamics Process

To develop more effective skills in strategic decision making, complex problem solving, and high performance policy design, you must begin to see interrelationships rather than linear cause-effect chains, and processes of change rather than snapshots.

The system dynamics approach differs from conventional management science. Using it, you may be able to pinpoint why problems you face today may result from "solutions" to other problems in the past.

B. Thinking Systemically, Not Linearly

How creating simulations can help you to understand, portray, and analyze complex sets of circumstances that exist in a given organization or market. Using a business exercise involving modest business growth, you'll develop simulations for understanding cause and effect in your organization; testing the logic of your understanding; identifying causes; testing out possible solutions; and anticipating alternative futures and implications of alternative strategies.

IV. Creating Better Business Outcomes

A. Generating New Options

A common problem senior managers traditionally face in selecting strategic solutions to systemic problems is how to choose among them. Typically, each option may have tradeoffs which may make any one no more desirable than the other. In this module, you will learn to use system dynamics techniques to create new strategic solutions that have a minimum of side effects.

B. Implementing System Dynamics in the Organization

How to deal with the difficulty of implementation and:

- get the organization to go along
- use system dynamics approaches throughout your company and throughout your career

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Program Faculty

John D. Sterman is Jay W. Forrester Professor of Management at the MIT Sloan School of Management and Director of MIT's System Dynamics Group. His research centers on improving managerial decision making in complex systems, and also includes systems thinking and organizational learning, computer simulation of corporate strategy, and the theory of nonlinear dynamics.

Professor Sterman is a leading expert on the long-term dynamics of the macroeconomy and the challenges the current transformation of the world poses for organizations.

Nelson Repenning is Associate Professor of Management at the MIT Sloan School of Management. His work focuses on understanding the factors that contribute to the successful implementation, execution, and design of business processes.

Professor Repenning's current research interests include organizational change, process improvement applied to new product design, and the development of cross-disciplinary management theory. His work draws on a number of modeling methods including simulation, non-linear dynamics, and game and contract theory.

BUSINESS DYNAMICS

Systems Thinking and Modeling for a Complex World

John D. Sterman