Syllabus -- PUBP 6608

Management of Technology I (MOT-I): The External Environment

Tuesday, Thursday 12:00 - 1:30
Fall, 1999

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Course Description

MOT-I examines factors in the environment of the public agency or private firm that are essential to managing technology. Through an examination of technology policies in the federal government in which public agencies, universities, and private industry play a major role, it will teach both analytical concepts and practical skills.

Most examples will be case studies of *large technical systems*. These are technology development programs that involve multiple actors in both the public and private sectors in the creation and implementation of multi-component, socio-technical entities. Examples of large technical systems include: commercial aircraft, the space shuttle, railways, naval weapons, the superconducting supercollider, nuclear power, and automated ground transportation. We will also examine the design of bicycles.

The course is divided into two parts according to two conceptual themes: *agency* and *structure*. The first part on agency will employ a political science perspective, examining how development is shaped by participants' interests (e.g. firms' interest in profitability, federal agencies' interest in mission continuity, etc.) We will examine how individuals agents (or entrepreneurs) work with others in their environment to initiate and launch large technical systems. Analytical concepts include: veto points, coalitions, equity, distribution, effectiveness, and political rationality. Practical techniques include: stakeholder analysis, coalition-building, negotiation, lobbying, and budgetary strategies.

The second part on structure will employ a sociological perspective, examining how institutions in the environment both impede and force innovation. Here we examine organizational rigidities, regulatory frameworks, and constitutional institutions. Analytical concepts include: dynamic conservatism, quality-based competition in regulated markets, cancellation of programs, forcing mechanisms, and system structure. Practical techniques will include: project design, institutional design, and technology design.

Requirements and Assessment

Class participants will be required to read about 100 pages per week and to attend class regularly. The class will largely follow a seminar format in which everyone is expected to actively participate. There will be two in-class games, one on negotiation and the other on technology design. Two in-class tests will examine students' mastery of the readings. A final group project will give students the opportunity to apply analytical concepts to a development project of their choice.

Course assessment will be as follows:

Class participation	10%
Test 1	30%
Test 2	30%
Final project	30%

Office Hours

Tuesday and Thursday, 4-5:30 PM. It is strongly recommended to contact the instructor after class or by E-mail to make a confirmed appointment.

Readings

A reading pack will be available through the College of Management.

PART ONE: AGENCY

WEEK 1 Federal Technoscience / Large Technical Systems

1. Introduction

(no reading)

2. System Development Programs in the Federal Government

Lambright, W. Henry, *Governing Science and Technology* (New York: Oxford University Press, 1976), Chapter 1: "Science, Technology and the Policy Process: An Administrative Perspective."

Cohen, Linda, and Noll, Roger, *The Technology Pork Barrel* (Washington: Brookings, 1991), Chapter 1: "New Technology and National Economic Policy"

Logsdon, John, "The Space Shuttle Program: A Policy Failure?," *Science*, May 1986.

WEEK 2 Initiation of System Development

3. Launching Technology: The Bureaucrat's Perspective

Lambright, *Governing Science and Technology*, Chapter 2: "Launching Technology."

Davis, Vincent, *The Politics of Innovation: Patterns in Navy Cases* (Denver: The Social Science Foundation and Graduate School of International Studies Monograph Series in World Affairs, 1966-67), Chapters I, III, V.

4. Program Advocacy in the Political System: The Supplier's Perspective

Adams, Gordon, *The Politics of Defense Contracting: The Iron Triangle* (New Brunswick: Transaction, 1981), Chaps: 1, 2, 3, and 7.

WEEK 3 Working with Congress

5. Equity and Distribution: The Elected Official's Perspective

Sapolsky, Harvey, "Equipping the Armed Forces," *Armed Forces & Society*, Fall 1987.

Behn, Robert "Policy Analysis and Policy Politics," *Policy Analysis*, Spring 1981, pp. 199-226.

Kuntz, Phil, "Pie In the Sky: Big Science Is Ready for Blastoff" in *Congressional Quarterly Weekly Report*, 28 April 1990, pp. 1254-60.

6. Budgets and Strategy

Wildavsky, Aaron, *The New Politics of the Budgetary Process* (Boston: Scott, Foresman and Company, 1988), Chap. 3: "The Dance of the Dollars: Classical Budgeting."

WEEK 4 **Deployment**

7. Federalism

Lambright, *Governing Science and Technology*, Chaps. 3 and 4: "Deploying High Tech" and "Introducing Socio-Technology."

8. Stakeholders and Negotiation

Pfeffer, Jeffrey, and Salancik, Gerald, *The External Control of Organizations* (New York: Harper & Row, 1978), Chapter 1 and pp. 84-88 (stakeholder analysis).

Lax, David, and Sebenius, James, *The Manager as Negotiator* (New York: The Free Press, 1986), Chaps. 1 and 2.

WEEK 5 **Mid-Term Week**

9. Negotiation

In class: Harborco Game (no reading)

10. Test Number 1

(no reading)

PART II: STRUCTURE

WEEK 6 **Implementation and Its Discontents**

11. Resistance

Morrison, Elting, "Gunfire at Sea" in Tushman, Michael, and Moore, William, *Readings in the Management of Innovation* (Harper Business, 1988), pp. 165-179.

Schon, Donald, *Beyond the Stable State* (New York, Norton, 1973), Chapter 2: "Dynamic Conservatism."

12. Termination

Lambright, *Governing Science and Technology*, Chap 5: "Arresting Technology."

Taubes, Gary, "The Supercollider: How Big Science Lost Favor and Fell," *The New York Times*, 26 October 1993, pp. C1, C12.

WEEK 7 **Structural Forces for Innovation**

13. Regulatory Frameworks

Mowery, David, and Rosenberg, Nathan, "The Commercial Aircraft Industry," in Nelson, Richard, ed.,

Government and Technical Progress (New York: Pergamon Press, 1982), pp. 101-161.

14. Becoming by Doing

Hirschman, Albert O., *Development Projects Observed* (Washington: Brookings, 1967), Introduction, Chaps. 1 and 2.

WEEK 8 Design of Structures

15. Project Design

Hirschman, Albert O., *Development Projects Observed*, Chaps. 3 and 4.

16. Intransigent Technology

Perrow, Charles, *Normal Accidents: Living with High-Risk Technologies* (New York: Basic Books, 1984), pp. 1-100

WEEK 9 The Role of Technology

17. The Phenomenology of Design

Pinch Trevor, and Bijker, Wiebe, "The Social Construction of Facts and Artifacts" in Bijker, Wiebe, Hughes, Thomas, Pinch, Trevor, eds., *The Social Construction of Technological Systems* (Cambridge: MIT Press, 1990), pp. 17, 28-50.

In Class: Delta Design Game

18. Test No. 2

(no reading)

WEEK 10 Strategies for System Development

19. Group Presentation

(no reading)

20. Group Presentation

(no reading)