

APPENDIX:

READINGS FOR YOUR FURTHER BACKGROUND, NOT REQUIRED:

RE: CLASS ONE –INNOVATION DRIVERS- These Readings, again, are not required, and are included for your future follow-up:

Growth Economics:

NSF, 2010 Science and Engineering Indicators

(<http://www.nsf.gov/statistics/seind10>) read highlights for Chapters with data on R&D levels and science and engineering workforce and education]

Innovation Systems and Indirect Innovation Factors:

World Economic Forum, 2010-11 Global Competitiveness Report

<http://www.weforum.org/en/initiatives/gcp/Global%20Competitiveness%20Report/index.htm> (2010) [review of elements that make up national competitiveness]

Robert W. Rycroft (Assoc. Prof., George Washington Univ.) and Don E. Kash (Prof., George Mason Univ.), Innovation Policy for Complex Technologies, Issues in Science and Technologies (NAS publication, Wash., D.C., Fall 1999 issue) [innovation as complex, networked process]

National Innovation Initiative (E. Milburgs), Valuing Long Term Innovation Strategies (v.1.2) (October 12, 2004 draft), pp.1-12 [valuation of innovation economy]

Charles L. Schultze, Industrial Policy: A Dissent, The Brookings Review, Vol. 2, No. 1 (Fall 1983) pp. 3-12 [debate over the governmental role in innovation]

Accounting Treatment of Intangible Innovation-Related Assets:

Baruch Lev (Prof. of Accounting, NYU), Remarks on the Measurement, Valuation, and Reporting of Intangible Assets, Fed. Res. Bd. Of N.Y, Economic Policy Review (Sept. 2003), pp.17-22

Alan Webber, New Math for a New Economy, Fast Company, Issue 31 (Jan.-Feb. 2000) pp. 214-224 [valuing intangible assets]

European Commission Information Societies Technologies Programme (PRISM Project), Report of Research Findings and Policy Recommendations (Preliminary Draft May 2003) [project for valuation of innovation economy]

Venture Capital Role:

Paul A. Gompers and Josh Lerner, The Venture Capital Cycle (MIT Press 1999) pp. 4-11

Udayan Gupta (Ed.), Done Deals, Venture Capitalists Tell Their Stories (Harvard Business School Press 2000), pp. 1-11 [development and role of U.S. venture capital system]

The “Valley of Death” Problem:

Peter Fiske (CEO, RAPT Industries), “Uncle Sam; The Most Important High-Tech Venture Investor in America – The RAPT Story” (draft report 2004)

National Research Council, Science, Technology, and Economic Policy Board, SBIR, Challenges and Opportunities (National Academy Press, Wash., D.C. 1999) pp. 15-27 (Introduction), 37-40 (Comments of Duncan Moore, OSTP), 41-51 (Comments of Roland Tibbetts, NSF), 52-61 (Comments of Prof. Josh Lerner), 129-135 (paper by Tibbetts) [SBIR program issues]

National Research Council, Board on Science, Technology and Economic Policy, The Advanced Technology Program, Challenges and Opportunities (National Academies Press, Wash., D.C. 1999) pp. 11-25 (Introduction) [ATP’s historical context]

Christopher T. Hill (Vice Provost for Research and Prof., George Mason Univ.), The Advanced Technology Program: Opportunities for Enhancement, in, Investing in Innovation – Creating a Research and Innovation Policy that Works, edited by Lewis M. Branscomb and James H. Keller (MIT Press, Cambridge, Mass. 1998) pp. 144-173 [ATP program issues and debate]

National Academy of Public Administration, The Manufacturing Extension Partnership Program, Report 2 on Alternative Business Models, Report for NIST (May 2004)[MEP program issues]

Rick E. Yanuzzi , In-Q-Tel: A New Partnership Between the CIA and the Private Sector, Defense Intelligence Journal, Vol. 9, No. 1 (2000)[CIA's In-Q-Tel program]

Josh Lerner (Prof., Harvard Business Sch.), The Design of Effective Public Venture Capital Programs, paper in NIST, Managing Technical Risk, NIST GCR 00-787 (April 2000) pp. 80-93 [rationale for public role in funding development]

Glenn R. Fong (Prof. American Sch. Of Int'l Man.-Thunderbird), Repositioning the Advanced Technology Program, Issues in Science and Technology (Fall 2001) (8 pages)[critique of ATP program]

Lewis M. Branscomb (Prof. Emeritus, Harvard, Kennedy School) and Philip E. Auerswald (Prof., George Mason Univ.), Taking Technical Risks, How Innovators, Executives, and Investors Manage High-Tech Risks (MIT Press, Cambridge, Mass. 2001) (Intro. and Chapt. 1)

RE: CLASS TWO – THE SCI/TECH ORGANIZATIONAL FRAMEWORK –These Readings, again, are not required, and are included for your future follow-up:

The Organization of U.S. Science Mission Agencies:

Jennet Conant, Tuxedo Park (Simon and Shuster 2002) (biography of Alfred L. Loomis founder of MIT's Rad Lab) pp. 178-289 [MIT's Rad Lab emerges in WWII as model for federally funded but not controlled R&D centers]

Jennet Conant, 109 East Palace (Simon and Shuster 2005)(the Los Alamos organizational model)

Vannevar Bush, Science: The Endless Frontier (Government Printing Office, Wash., D.C. 1945) p. 1-11) (FDR and Bush letters, Summary, Introduction) (on nsf.gov website - <http://www.nsf.gov/od/lpa/nsf50/vbush1945.htm> [Bush's proposal for federal support for basic research through NSF]

Harvey M. Sapolsky, Science and the Navy – the History of the Office of Naval Research (Princeton Univ. Press 1990), pp. 9-81 (Chapts. 2-4) [ONR as mission-based basic science agency – model for agencies that follow]

William A. Blanpied, inventing U.S. Science Policy, Physics Today, 51 (2) (Feb. 1998), pp. 34-40 [post-WWII evolution of U.S. science organization]

George Mazuzan, NSF, A Brief History (1950-1985) (NSF 88-16) (nsf.gov website - <http://www.nsf.gov/pubs/stis1994/nsf8816/nsf8816.txt>), pp. 1-25 [history of NSF in the context of post-WWII science]

William T. Golden, Impacts of the Early Cold War on the Formulation of U.S. Science Policy (Selected Memoranda, October 1950-April 1951)(edited by

William A. Blanpied) (American Assoc. for the Advancement of Science, Wash., D.C. 1995) pp. xiv-xliv (Introduction by the Editor), selected memos, including pp.8-13 (interview with V. Bush) [proposal for Presidential Science Advisor]

G. Pascal Zachary, *Endless Frontier, Vannevar Bush, Engineer of the American Century* (MIT Press 1999)[biography of Vannevar Bush]

Mitchell Waldrop (at NSF), *The Dream Machine, J.C.R. Licklider and the Revolution that Made Computing Personal* (Sloan Foundation Technology Series)(Viking 2001) (pp.456-466) [section on NSF role in NSFnet]

National Research Council, Board on Science, Technology and Economic Policy, *Government-Industry Partnerships for the Development of New Technologies* (National Academies Press, Wash., D.C. 2003) pp. 7-20, 35-108 (Introduction, Chaps. III-IV) [history of government-industry collaboration programs]

Glenn R. Fong (Prof., Amer. Sch. of Int'l Management at Thunderbird), *The U.S. High-Performance Computing and Communications Initiative; A Case Study in U.S. Technology Policy* (draft April 2004) pp. 1-34 [agency collaboration on computing]

The DARPA Model:

Mitchell Waldrop (at NSF), *The Dream Machine, J.C.R. Licklider and the Revolution that Made Computing Personal* (Sloan Foundation Technology Series)(Viking 2001) (Chaps.2, 5-7, & pp.466-471)

DARPA, *DARPA Over the Years* (Oct. 27, 2003)[darpa.mil/overtheyears.html] pp. 1-3 [brief intro to DARPA organization]

Glenn R. Fong (Prof., American Graduate Sch. of Int'l Man., Thunderbird), *ARPA Does Windows; The Defense Underpinning of the PC Revolution, Business and Politics, Vol. 3, No. 3* (2001), pp.213-237 [DARPA's IT role]

National Research Council (NAS), Science and Telecommunications Board, *Funding a Revolution, Government Support for Computing Research* (National Academy Press, Wash. D.C. 1999) pp. 85-157 (Chapt. 4, The Organization of Federal Support, A Historical Review, Chapt. 5, Lessons from History)

RE: CLASS FOUR – THE COMPETITIVENESS CHALLENGE–These Readings are, again, not required, and are included for your future follow-up:

The Competitive Challenge to U.S. Manufacturing:

Barry C. Lynn (Fellow, New America Foundation), *End of the Line* (Doubleday 2005) pp. 1-18 [complex globalization of manufacturing; the anti-global view]

Office of Sen. Lieberman, Making America Stronger: A Report with Legislative Recommendations on Restoring U.S. Manufacturing (Sept. 2003) pp. 1-20 (lieberman.senate.gov website)[current U.S. manufacturing challenge]

Carl J. Dahlman and Jean Eric Aubert, China and the Knowledge Economy, Seizing the 21st Century (Overview) (World Bank Institute 2001) pp.1-27 (worldbank.org website - http://www-wds.worldbank.org/servlet/WDSContentServer/WDS/IB/2002/09/07/000094946_02082104031265/Rendered/PDF/multi0page.pdf)

Office of Sen. Lieberman, White Paper: National Security Aspects of the Global Migration of the U.S. Semiconductor Industry (June 2003) pp. 1-10 (lieberman.senate.gov website - http://www.fas.org/irp/congress/2003_cr/s060503.html) [competitive pressure on U.S. advanced manufacturing sector]

Michael Dertouzos, Richard Lester, Robert Solow (MIT Commission), Made in America, Keeping the Productive Edge (MIT 1990) [classic on the mfg. productivity challenge of the 80's-90's]

Stephen S. Cohen and John Zysman, Manufacturing Matters: The Myth of the Post Industrial Economy (Basic Books 1987) (excerpts) [classic on role of manufacturing in modern economy]

National Research Council (NAS), Board on Science, Technology and Economic Policy, Securing the Future, Regional and National Programs to Support the Semiconductor Industry (Charles Wessner, Ed.) (The National Academies Press 2003) pp. 1-5, 9-62, (Summary and Introduction), 189-253(Chapt. IV, Competing Programs, paper by Thomas Howell) [material on efforts to gain advanced technology manufacturing leadership by China]

The New Services Challenge from Globalization:

Office of Sen. Lieberman, Offshore Outsourcing and America's Competitive Edge: Losing Out in the High Technology R&D and Services Sectors (May 11, 2004) pp. 5-24 (lieberman.senate.gov website - http://lieberman.senate.gov/assets/pdf/off_shoring.pdf)

Ronald Hira (Rochester Institute of Technology), Implications of Offshore Outsourcing (White Paper, IEEE, Jan. 23, 2004) [disadvantages of offshore outsourcing]

Catherine L. Mann, Institute for International Economics, International Economics Policy Briefs, N. PB03-11 (Dec. 2003) [advantages of offshore outsourcing]

Carl J. Dahlman (Georgetown Univ.) and Anuja Utz (World Bank), India and the Knowledge Economy: Leveraging Strengths and Opportunities (World Bank Institute Learning Resources Series) Chapt. I, pp. 1-20 [India's emerging knowledge service economy]

Office of Senator Lieberman, Data Dearth In Offshore Outsourcing: Policymaking Requires the Facts (Dec. 2004) (lieberman.senate.gov website - http://lieberman.senate.gov/assets/pdf/off_shore_data.pdf)

Robert D. Atkinson, Understanding the Offshoring Challenge, PPI Policy Report (May 2004)

NASSCOM (India), Advantage India (2004) [elements of India's competitive services strategy]

Shri Rajeeva Ratna Shah, Sec., Dept. of Industrial Policy and Promotion, India, "Information Technology Key Technology Economic Driver of 21st Century [India]" (2004) (presentation) [India's services strategy]

RE CLASS FIVE: THE ENERGY TECHNOLOGY CHALLENGE –These Readings, again, are not required, and are included for your future follow-up:

Charles Weiss (Distinguished Prof., Georgetown Univ.) and William B. Bonvillian, Structuring an Energy Technology Revolution (MIT Press 2009)

William B. Bonvillian, Will the Search for New Energy Technologies Require a New R&D Mission Agency? *Bridges* (2007)
http://www.ostina.org/index.php?option=com_content&task=view&id=2297&Itemid=721

RE: OTHER ISSUES – THE SCIENCE TALENT CHALLENGE, AND THE SCIENCE ADVOCACY SYSTEM –These Readings, again, are not required, and are included for your future follow-up:

The Science Talent Challenge:

Paul M. Romer (Prof. of Economics, Stamford) Should the Government Subsidize Supply or Demand in the Market for Scientists and Engineers?, National Bureau of Economic Research, Working Paper 7723 (June 2000)

William J. Bamol (Prof. of Economics, NYU), Education for Innovation: Entrepreneurial Breakthroughs vs. Corporate Incremental Improvements, National Bureau of Economic Research (working paper, April 30, 2004)

Federation of American Scientists, The Learning Federation, Roadmap on Instructional Design, pp. 1-6, Roadmap on Building Simulations and Exploration

Environments, pp. 1-14 (2003)[fas.org, search for “Learning Science and Technology R&D Roadmaps”]

National Science Board, The Science and Engineering Workforce – Realizing America’s Potential (Aug. 14, 2003) pp. 7-43

National Science Board, An Emerging and Critical problem of the Science and Engineering labor Force (NSB 04-07) (Jan. 2004) pp. 1-4

S.1549, Technology Talent bill, introduced Oct. 15, 2001 by Senators Lieberman, Mikulski, Bond and Frist, passed Nov. 27, 2002 as title in HR 4664, NSF Authorization bill (P.L. 107-305)

The Science Advocacy System:

Lisa Anderson (Dean, School of International and Public Policy, Columbia Univ.), Pursuing Truth, Exercising Power, Social Science and Public Policy in the 21st Century (Columbia Univ. Press 2003), pp. 7-40 (Chapt. 2, the American History of Scientific Policy and Policy-Making [organizing the academy for public policy])

Genevieve J. Knezo, Technology Assessment in Congress: History and Legislative Options, CRS Report RS21586, July 9, 2004
<http://www.fas.org/sgp/crs/misc/RS21586.pdf>

Federation of American Scientists (Henry Kelly, President), Science Advice to Congress and the Executive Branch (FAS, Wash., D.C.) (draft report of July 28, 2004; final report Nov. 2004) <http://www.fas.org/resource/12022004142618.pdf>

National Academy of Sciences, Science and Technology in the Public Interest: Ensuring the Best Presidential and Federal Advisory Committee Science and Technology Appointments (RO397-FM) (Nov. 17, 2004) pp. 1-11 (Summary) <http://www.nap.edu/books/0309092973/html/1.html> [executive branch science advice system]

Dr. Henry Kelly, President of the Federation of American Scientists, power point slide presentation on Reforming the Science Advice to Government process - <http://www.cspinet.org/integrity/cf/visualkelly.pdf>

The Life Science Innovation Challenge:

Robert Cook-Deegan, Does NIH Need a DARPA? Issues in Science and Technology (National Academy of Sciences publication, Winter 1996)
<<http://www.issues.org/13.2/cookde.htm>>

National Institute of Medicine (NAS), Enhancing the Vitality of the National Institutes of Health: Organizational Changes to Meet New Challenges (National

Academies Press, Wash., D.C. 2003), portions of pp. 1-101
<<http://www.nap.edu/catalog/10779.html>>

Infectious Diseases Society of America, Report on Bad Bugs, No Drugs – As Antibiotic Discovery Stagnates A Public Health Crisis Brews (July 2004), pp. 3-28<<http://www.idsociety.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=5554>>

FDA, Innovation/Stagnation - Challenge and Opportunity on the Critical Path to New Medical Products (March 2004)
<<http://www.fda.gov/oc/initiatives/criticalpath/whitepaper.html>>

Testimony, October 6, 2004 Joint Hearings of the Senate Judiciary and Health, Education, Labor and Pensions Committees on S.666, (bipartisan biothreat R&D legislation) pp. 1-40

MIT OpenCourseWare
<http://ocw.mit.edu>

Resource: Science Policy Bootcamp
William Bonvillian

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