

Course Syllabus

Innovation Dynamics and Industrial Change

In this course, the student will develop in-depth understanding of innovation dynamics. In ten lectures, we will focus on basic concepts, theory, research questions and findings from recent empirical research. We start with basic facts and we will proceed with issues related to industrial dynamics, industrialization, corporate strategies and sectoral technological trends. This list of topics provides us with an opportunity to present a critical assessment of innovation studies research findings on these issues. Our aim is to enhance the ability of students to develop their own critical thinking, when it comes to innovation dynamics in the current context.

DETERMINATION OF COURSE GRADE: (a) Homework assignments 40 %; (b) Final Exam 50 %; and (c) Class Participation 10 %.

SCHEDULE OF LECTURES AND LIST OF READINGS

Lecture 1 (25/9): Knowledge, technological change and Innovation Studies

Readings:

Freeman (1994) The economics of technical change, *Cambridge Journal of Economics*, Vol. 18, pp. 463-514.

Richard Nelson (1995), Recent evolutionary theorising about technological change. *Journal of Economic Literature*, Vol. 33, No.1, pp. 48-90.

Vernon Ruttan (1997) Induced innovation, evolutionary theory and path dependence, *The Economic Journal*, Vol. 107, Issue 444, pp. 1520-1529.

Martin Bell (2006) Time and technological learning in industrialising countries, *International Journal of Technology Management*, Vol. 36, Nos 1/2/3/, pp. 25-39.

Lecture 2 (26/9): Sources of technological change

Readings:

Eric von Hippel (1988) *The Sources of Innovation*, Oxford University Press, Chapters 2, 3, 4.

Giovanni Dosi (1988) Sources, procedures and microeconomic effects of innovation, *Journal of Economic Literature*, Vol. 26, No. 3, pp. 1120-1171.

Edwin Mansfield, et al. (1977) Social and private returns from industrial innovations, *The Quarterly Journal of Economics*, Vol. 91, Issue 2, pp. 221-240

Zoltan Acs and David Audretsch (1988) Innovation in large and small firms, *American Economic Review*, Vol. 78, No.4 (Sept.), pp 678-690.

Daniele Archibugi and Alberto Coco (2005) Measuring technological capabilities at the country level, *Research Policy*, Vol. 34, pp. 175-194.
Background Document: The OECD Oslo Manual

Lecture 3 (27/9): Innovation dynamics and the evolution of industries

Readings:

- A. Smith, On the division of labour
 - J. Schumpeter, The process of creative destruction.
 - Nathan Rosenberg (1974) Karl Marx on the economic role of science, *The Journal of Political Economy*, Vol. 82, No. 4, pp. 713-728.
 - Kraft, Jackie, Industrial dynamics, chapter in the *IEBM Handbook on Economics* (edited by William Lazonick)
 - Franco Malerba and Luigi Orsenigo (1996) The dynamics and evolution of industries, *Industrial and Corporate Change*, Vol. 5, No.1, pp. 51-87.
 - Steven Klepper (1997) Industry Life Cycles, *Industrial and Corporate Change*, Volume 6, Number 1, Pp. 145-182.
 - Anita McGahan and Brian Silverman (2001) How does innovative activity change as industries mature? *International Journal of Industrial Organisation*, Vol. 19, pp. 1141-1160.
- Background Document: Nizar Becheikh, et al. (2006) Lessons from innovation empirical studies, Technovation, Vol. 26, pp. 644-664.*

Lecture 4(28/9): Technological change and industrialisation

Readings:

- Pavitt and Bell (1993) Accumulating technological capability, proceedings of the World Bank Annual Conference on Development Economics.
- Sanjaya Lall (1992) Technological capabilities and industrialization, *World Development*, Volume 20, Issue 2, February 1992, Pages 165-186.
- James Tybout (2000) Manufacturing firms in developing countries: how well they do and why? *Journal of Economic Literature*, Vol. 38, No. 1, pp. 11-44.
- David Felix (1974) Technological dualism in late industrializers, *The Journal of Economic History*, Vol. 34, March, No.1 pp. 194-238.

Background Documents:

- ✓ *UNIDO report on catching up*
- ✓ *DESA report on structural change and economic growth*

Lecture 5 (29/9): Technology diffusion and technology transfer

Readings:

- Bronwyn Hall (2004) Innovation and Diffusion, in Jan Fagerberg, David C. Mowery and Richard R. Nelson (eds) *The Oxford Handbook of Innovation*, Oxford University Press.
- Michael Cort and Steven Klepper (1982) Time paths in the diffusion of product innovations, *The Economic Journal*, Vol. 92, issue 367, pp. 630-653.

Lee Branstetter and Jong-Rong Chen (2006) The impact of technology transfer and R&D on productivity growth in Taiwanese industry, *The Journal of the Japanese and International Economies*, Vol. 20, pp. 177-192.

Kamal Saggi (2000) Trade, FDI and international technology transfer, *World Bank Policy Research Paper*, no. 2349.

Everett Rogers (1976), New product adoption and diffusion, *The Journal of Consumer Research*, Vol. 2, No. 4, pp. 290-301.

Lecture 6 (2/10): Incentives, firms and innovation

Readings:

B. Zorina Khan and Kenneth Sokoloff (2004) Institutions and technological innovation during early economic growth: evidence from the great inventors of the US, 1790-1930, *NBER Working paper No. 10966*.

Jesus Galente (2006) Analysis of technological innovation from business economics and management, *Technovation*, Vol. 26, pp. 300-311.

Richard Nelson (1991) Why firms differ, and how does it matter? *Strategic Management Journal*, Vol. 12, pp. 61-74.

David Teece, et al. (1997) Dynamic capabilities and strategic management, *Strategic Management Journal*, Vol. 18, pp. 509-533.

Naushad Forbes and David Wield (2000) Managing R&D in technology followers, *Research Policy*, Vol. 29, pp. 1095-1109.

Wesley Cohen, et al. (2002) R&D spillovers, patents and the incentives to innovate, *Research Policy*, Vol. 31, pp. 1349-1367.

Pari Patel and Keith Pavitt (1997) The technological competencies of the world's largest firms, *Research Policy*, Vol. 26, pp. 141-156.

Mike Hobday (1994), East Asian latecomer firms, *World Development*, Vol. 23, No. 7, pp. 1171-1193.

Bengt-Ake Lundvall (2004) *National innovation systems- analytical concept and development tool*, paper presented at the 10th DRUID Conference.

Lecture 7 (3/10): Sectoral characteristics of technological change

Readings:

Giovanni Dosi (1988) Sources, procedures and microeconomic effects of innovation, *Journal of Economic Literature*, Vol. 26, No. 3, pp. 1120-1171.

Nathan Rosenberg and Claudio Frischtak (1983) Long waves and economic growth: a critical appraisal, *American Economic Review*, vol. 73, No.2, pp. 146-151.

Felicia Fai and Nicholas von Tunzelmann (2001) Industry-specific competencies and converging technological systems, *Structural Change and Economic Dynamics*, Vol. 12, pp. 141-170.

Keum lee and Chaisung Lim (2001) Technological regimes, catching up and leapfrogging, *Research Policy*, Vol. 30, pp. 459-483.

Michael Peneder (2003), Industrial structure and aggregate growth, *Structural Change and Economic Dynamics*, Vol. 14, pp. 427-448.

Background documents:

- ✓ Chapters on sectoral trends from the *IEBM Handbook on Economics* (edited by William Lazonick)

Lecture 8 (4/10): Innovation dynamics in the World Economy

Readings:

S. N. Broadberry (1994) Technological leadership and productivity leadership in manufacturing since the industrial revolution, *The Economic Journal*, Vol. 104, Issue 423, pp. 291-302.

Jan Fagerberg and Bart Verspagen (2002), Technology gaps, innovation-diffusion and transformation, *Research Policy*, Vol. 31, pp. 1291-1304.

John Dunning (2000) Regions, globalisation and the knowledge economy, in John Dunning (ed.) *Regions, Globalisation and the Knowledge based Economy*, Oxford University Press.

Michael Storper (2000) Globalisation and knowledge flows, in John Dunning (ed.) *Regions, Globalisation and the Knowledge based Economy*, Oxford University Press.

Jeffrey Furman and Richard Hayes (2004) Catching up or standing still? *Research Policy*, Vol. 33, pp. 1329-1354.

Lecture 9 (11/10) A debate on IT and the “new economy”

- In this session, students will participate in a debate on the “new economy”. In two different groups, they will draw on recent contributions in favour and against the concept of the “new economy” and they will consider implications for developing countries.

Lecture 10 (12/10) Innovation studies and technology policy

Readings:

Stephen Martin and John Scott (2000) The nature of innovation market failure and the design of public support for private innovation, *Research Policy*, Vol. 29, pp. 437-447.

J. S. Metcalfe (1994) Evolutionary economics and technology policy, *The Economic Journal*, Vol. 104, Issue 425, pp. 931-944.

Larry Westphal (2002) Technological strategies for economic development, *EINT*, Vol. 11, pp. 275-320.

Philippe Aghion, Paul David and Dominique Foray (2006) *Linking policy research and practise in “STIG Systems”*: many obstacles, but some ways forward, mimeo.