Technology and Innovation Management

Instructor: Francesco Zirpoli

Course description
The course addresses the main technology and innovation management challenges that firms face in a dynamic and turbulent environment. The objective of the course is to analyze the contribution of the strategic organization of innovation in explaining firms' performance differentials, i.e. what mechanisms related to technology and innovation management can explain why persistent differences in economic performance between industries, and even between firms within the same industry persist. In what follows an outline of the course is provided:

- Value creation and the sources of innovation
- The dynamics of technological innovation and diffusion
- Analysis of a firm's technology and innovation strategy
- The creation and capture of value and the formulation of a technological innovation strategy
- The operational implementation of a technological innovation strategy

Course format:
The course is interactive and based on the discussion of seminal papers. To prepare for discussion, student must read all the articles listed in the section "Seminars and mandatory readings". The students are supposed to be completely familiar with the articles and think critically about their content. The instructor will guide the discussion and introduce the theme of the seminar but will not be the main contributor to the discussion.

Seminars and mandatory readings:
The articles listed in the reading list will be discussed in each seminar (*pdf* files can be provided upon request). During classes, students will be asked to report on each article following the structure of the paper, step by step (students will rotate during the paper presentation, so each student is supposed to read all the papers and contribute to the discussion on each paper). The aim of such a procedure is not only to analyse the main contribution of the article to the field of technology and innovation management but also the article's structure, how the authors develop their argument and what can be learnt on how to write a successful academic paper in the field. No power point presentation is expected, but students can use this format if they wish.

Grading

Participation	% 60%	This part of the grading will be evaluated based on the demonstration of having done the readings, willingness to answer questions, and attention and response to classmates.
Final Examination	% 40%	Paper

Policies and procedures
Students must attend all lessons and be prepared to contribute.

Office location, contact information, tutorial time: Department of Management, Room 3, fzirpoli@unive.it, Wednesday 11-13 am.

Seminars and mandatory readings (<u>to be confirmed – please check the SSE web site one week before the start of the course</u>):

Lesson	Title and Description
1 (16-4)	**Introduction to TIM**
Readings	**Sutton R., Staw B.,** (1995), "What theory is not", *Administrative Science Quarterly*, Vol. 40 N. 3, pp. 371-384.
2 (23-4)	**Innovation and Technological Change**
Readings	**Philip Anderson and Michael L. Tushman,** (1990), "Technological Discontinuities and Dominant Designs: A Cyclical Model of Technological Change", *Administrative Science Quarterly* , Vol. 35, No. 4, pp. 604-633. **Vincenti, W.G.,** (1994), "The retractable Airplane Gear and the Northrop "Anomaly": Variation-Selection and the Shaping of Technology", *Technology and Culture*, 35 (1): 1-33. **Fernando F. Suarez,** (2004), "Battles for technological dominance: an integrative frame work", *Research Policy*, Volume 33, Issue 2: 271–286.
3 (7-5)	**Value creation and value appropriation**
Readings	**David Teece,** (1986), "Profiting from Technological Innovation: Implications for Integration Collaboration, Licensing and Public Policy", *Research Policy*, 15:285-305. **Cusumano M. and Gawer A.,** (2002), "The elements of platform leadership", *MIT Sloan Management Review*, Spring, pp. 51-58. **Jacobides M., Knudsen T., M. Augier.** (2006). "Benefiting from innovation: value creation, value appropriation and the role of industry architectures", *Research Policy*, 35(8) 1200-1221.
4 (14-5)	**Networks of innovation**
Readings	**Cohen, W. M., D.A. Levinthal**, (1990), "Absorptive Capacity: A New Perspective on Learning and Innovation". *Admin. Sci. Quart.* **35**(1) 128-152. **Powell, Walter, Kenneth Koput, and Laurel Smith-Doerr**, (1996), "Interorganizational Collaboration and the Locus of Innovation: Networks of Learning in Biotechnology." *Administrative Science Quarterly* 41:116-145. **Timothy J. Sturgeon** (2002), "Modular production networks: a new American model of industrial organization", *Industrial and Corporate Change*, Volume 11, Number 3, pp. 451-496
5 (21-5)	**Managing Technology Integration**
Readings	**Rebecca Henderson and Kim Clark**, (1990), "Architectural Innovation: The Reconfiguration of Existing Product Technologies and the Failure of Established, *Administrative Science Quarterly*, 35:9-30. **Sanchez, R., J. T. Mahoney**, (1996). "Modularity, Flexibility, and Knowledge Management in Product and Organization Design", *Strat. Man. J.* **17**(Winter Special Issue) 63-76. **Brusoni, S., A. Prencipe, K. Pavitt.**, (2001), "Knowledge specialization, organization coupling, and the boundaries of the firm: Why do firms know more than they make?", *Admin. Sci. Quart.* **46**(4) 597-625.
6 (21-5)	**Boundary adaptation in innovation**

Readings	**Takeishi, Akira** (2001), "Bridging inter- and intra-firm boundaries: Management of supplier involvement in automobile product development", Strategic Management Journal, Vol. 22, 403-433 **Jacobides, M.G., S.G. Winter** (2005), "The Co-Evolution of Capabilities and Transaction Costs: Explaining the Institutional Structure of Production", *Strat. Man. J.*, **26(5)**: 395-413. **Becker, Markus and Zirpoli, Francesco**, (2012), "Adapting firm boundaries in innovation networks: learning, vertical integration and the management of new product development", MIMEO.
7 (28-5)	**Exploration/exploitation**
Readings	**March, J.**, (1991), "Exploration and exploitation in organizational learning", *Organization Science*, Vol. 1, N°2, pp. 71-87. **Levinthal D. A. and J. G. March**, (1993), "The Myopia of Learning," *Strategic Management Journal*, 14, pp. 95-112. **Farjoun, M.,** (2010), "Beyond dualism: stability and chance as a duality", *Academy of Management Review*, Vol. 35 Issue 2, p202-225.
8 (28-5)	**New product development organization**
Readings	**Clayton M. Christensen and Joseph L. Bower**, (1996), "Customer Power, Strategic Investment, and the Failure of Leading Firms", *Strategic Management Journal*, Vol. 17, No. 3 (Mar., 1996), pp. 197-218. **Griffin, Abbie and John R. Hauser** (1996), "Integrating R&D and Marketing: A Review and Analysis of the Literature", *Journal of Product Innovation Management*, Vol. 13, 191-215. **Wheelwright, Steven C. & Clark, Kim B.** (1997): "Organizing and Leading 'Heavyweight' Development Teams", in Tushman, Michael L. & Philip Anderson (eds.): Managing Strategic Innovation and Change, pp. 419-432.
9 (31-5)	**Technology and organization**
Readings	**Barley, S. R.** (1986), "Technology as an Occasion for Structuring: Evidence from Observations of CT Scanners and the Social Order of Radiology Departments", *Administrative Science Quarterly* vol. 31, n. 1, pp. 78-108. **Orlikowski, W.J.,** (2000), "Using Technology and Constituting Structures; A Practice Lens for Studying Technology in Organizations". *Organization Science* 11(4): 404-428. **Amy C. Edmondson, Richard M. Bohmer and Gary P. Pisano**, (2001), "Disrupted Routines: Team Learning and New Technology Implementation in Hospitals", *Administrative Science Quarterly* , Vol. 46, No. 4 (Dec., 2001), pp. 685-716.
10 (4-6)	**Open Source Software Innovation**
Readings	**Von Hippel, E. and von Krogh, G.,** (2003). Open source software development and the private-collective innovation model: Issues for organization science, Organization Science, Vol. 14, No. 2, , pp. 208-223 **Gwendolyn K. Lee and Robert E. Cole,** (2003), "From a Firm-Based to a Community-Based Model of Knowledge Creation: The Case of the Linux Kernel Development", *Organization Science* , Vol. 14, No. 6, pp. 633-649. **MacCormack, A., Rusnak, J., Baldwin, C. Y.**, (2006), Exploring the structure of complex software designs: an empirical study of open source and proprietary code. Management Science, 52(7)

Suggested textbooks

Schilling, M. (2010), Strategic Management of Technological Innovation, McGraw-Hill, ISBN: 9780071289573.
Hayes, R., Pisano, G., Upton, D. &Wheelwright, S. (2004). Operations, Strategy, and Technology: Pursuing the Competitive Edge. John Wiley & Sons.
Mark Dodgson, David M. Gann, and Ammon Salter, (2008). The Management of Technological Innovation. Strategy and Practice, 978-0-19-920852-4, Oxford University Press.
Tidd, J., Bessant, J. & Pavitt, K. (2009). Managing Innovation: Integrating Technological, Organizational & Market Change. John Wiley & Sons.
Tushman, M. & Anderson, P. (Eds.). (2004). Managing strategic innovation and change : a collection of readings (2nd ed.). New York: Oxford University Press.