

LUISS
Master in General Management

Course
ECONOMICS AND MANAGEMENT OF INNOVATION

Convenor Andrea Prencipe
Address a.prencipe@unich.it
Office hours after each class and/or by appointment

Tutor Francesca Masciarelli
Address f.masciarelli@unich.it
Office hours after each class and/or by appointment

Tutor Federica Ceci
Address f.ceci@unich.it
Office hours after each class and/or by appointment

Aim of the course

The aim of this course is to provide students with theoretical and applied knowledge on the economics and management of innovation. Combining case studies and traditional lectures, the course addresses the economic, strategic, organizational, and operational dimensions of innovation with particular emphasis on innovative activities in technology-intensive firms. The course also examines the challenge to building and maintaining an innovative organization, and how individuals can successfully innovate in organizations.

The key learning objectives are:

- understanding the role and challenges of innovation across sectors and countries;
- acquire tools to manage technology and innovation in dynamic markets;
- identifying core problems that may impede innovative performance;
- knowing how to manage groups that are innovating and how to develop and use firm's capabilities to exploit innovative activities.

Rules of the game

During each class, I will provide an overview of the topic using traditional lectures, mini case studies, and short movies. This is going to last for about half of the overall session. The rest of the session is going to be dedicated to group discussion. The discussion is going to be guided by the inputs provided by students through their active involvement, by which I mean that for each session (but the first one), students are expected to:

1. Before each session, study the material – usually 1 paper and / or a case study – suggested in the reading list;
2. During the session, actively discuss other students' presentations and papers.

This is due to two related factors: (a) it is hard to teach an applied subject – such as Innovation – since it requires a certain amount of contextualization to specific organizations, sectors, or countries; (b) I believe in the old saying “tell me and I will forget, show me and I will remember, involve me and I will understand” (Confucius).

Grading

Active involvement in each class – e.g. attendance, participation to discussion, short and long presentations – will add up to 40% of your final grade. Your grade will be further based on an oral exam (60%).

Attendance

Since the material in this course builds session by session, attendance at each session is important. Please notify me *before class* via email if you are unable to attend a session due to illness, family emergency, or an unavoidable conflict. No compensatory work will be given for an absence. Excused absences will not directly influence your grade. Unexcused absences will influence your grade. More than three unexcused absences will result in a failing grade for the course.

Those students who are unable to attend the entire course for substantial reasons should contact me before the start of the course.

Laptop and Mobile Phone Policy

All laptops and mobiles should be down unless instructed otherwise by the convenor.

Topics

- Innovation sources and processes
- Taxonomy of innovation
- Sectoral patterns of innovation
- Geography of innovation
- Social capital and innovation
- Marketing innovation
- Organizing innovation process
- Implementation processes
- Managing innovation in complex product industries
- Building ambidextrous organizations

Scheduling

Session I	Fundamentals of Economics of Innovation
September 20 th	This session illustrates the aims of the course and the learning approach adopted throughout. It then (a) introduces the basic concepts of the course – i.e. types of innovation (b) starts exploring the economic interpretations of innovation; (c) analyses patterns of industrial innovation.
September 21 st	

Required readings

- Dosi, G. (1988) Sources, Procedures, and Microeconomic Effects of Innovation, *Journal of Economic Literature*, 26, 3, 1120-71.

Optional readings

- Breschi, S, Malerba, F, and Orsenigo, L (2000) Technological regimes and Schumpeterian Patterns of Innovation, *Economic Journal*, 110, 388-410.
- Fagerberg, J. "Innovation – A guide to the literature." In: Fagerberg, J., Mowery, D. and Nelson, R. (Eds). *The Oxford Handbook of Innovation*. 2005, Oxford University Press, ch. 1, 4-9.
- Abernathy, W and Clark, K (1985) Innovation: Map the Wind of Creative

Destruction, *Research Policy*, 14, 3-22.

- Pavitt, K (1984) Sectoral Patterns of Technical Change: Towards a Taxonomy and a Theory, *Research Policy*, 13, 343-743.

Session II	Geography of Innovation
September 27 th	<ul style="list-style-type: none">• This session focuses on the geographical dimensions of innovation. It analyzes the concepts of (a) knowledge spill-over, knowledge externalities, and geographical agglomeration of innovation activities; (b) the main actors and relationships of local and global innovation systems; (c) social capital and innovation processes.
September 28 th	

Required readings

- Audretsch, D. B. and Feldman, M. P. "R&D Spillovers and the Geography of Innovation and Production." *American Economic Review*, 1996, 86(3), pp. 630-40.
- Nelson, R. (1992) National Innovation Systems: A Retrospective on a Study Industrial and Corporate Change, 1, 2, pp. 347-374.
- Laursen, K. Masciarelli, F., Prencipe A. (2011) Regions Matter: how social capital affects external knowledge acquisition and innovation, *Organization Science*, forthcoming

Optional readings

- Jaffe, Adam B. "Technological Opportunity and Spillovers of R&D: Evidence from Firms' Patents, Profits, and Market Value." *American Economic Review* 76, no. 5 (1986): 984-1001.
- Cooke P; Gomez U; Etxebarria G. (1997) Regional innovation systems: Institutional and organisational dimensions, *Research Policy*, pp. 475-491.
- Feldman, M. P. and Audretsch, D. B. "Innovation in Cities: Science-Based Diversity, Specialization and Localized Competition." *European Economic Review*, 1999, 43(2), pp. 409-29.
- Gertler, M. S. "Being There - Proximity, Organization, and Culture in the Development and Adoption of Advanced Manufacturing Technologies." *Economic Geography*, 1995, 71(1), pp. 1-26.

Session III	Innovation and Industrial Evolution
October 4 th October 5 th	This session aims to investigate the relationships between innovation and industrial dynamics. It lays the foundations to understand the forces that drive industry evolution and industry life cycles. It then delves into the relationships between market structure and innovation.

Required readings

- Malerba, F. and Orsenigo, L (1996) The Dynamics and Evolution of Industries, *Industrial and Corporate Change*, 5, 1, 51-87.

Optional readings

- Audretsch D (1997) Technological Regimes, Industrial Demography, and the Evolution of Industrial Structures, *Industrial and Corporate Change*, 6, 1, 49-81.
- Klepper, S (1997) Industry Life Cycles, *Industrial and Corporate Change*, 6, 1, 145-181.
- Acs, Z. J. and Audretsch, D. B. "Innovation in Large and Small Firms - an Empirical-Analysis." *American Economic Review*, 1988, 78(4), pp. 678-90.
- Aghion, P.; Bloom, N.; Blundell, R.; Griffith, R. and Howitt, P. "Competition and Innovation: An Inverted U-Relationship." *Quarterly Journal of Economics*, 2005,

120(2), pp. 701-728.

Session IV	The Management of Innovation Processes:
October 11 th October 12 th	Interpretative models of innovation and their evolution. The discussion session is centred on the open innovation paradigm as adopted across sectors.
	Required readings <ul style="list-style-type: none">• Dodgson, M, Gann, D, Salter, A, (2008) <i>Managing Technological Innovation</i>, Oxford University Press, ch. 3• Chesbrough, H., (2003) The Era of Open Innovation, <i>MIT Sloan Management Review</i>, 44, 3, 35–41• Case: <i>easyCar</i>• Case discussion: Connect & Develop Optional readings <ul style="list-style-type: none">• Aghion, P. and Tirole, J. "The Management of Innovation." <i>Quarterly Journal of Economics</i>, 1994, 109(4), pp. 1185-209.• Tennenhouse, D. (2004) 'Intel's Open Collaborative Model of Industry-University Research', <i>Research-Technology Management</i>, 47, 4, 19-26• Huston, L. and Sakkab, N. (2006), 'Connect and Develop' <i>Harvard Business Review</i>, 84, 3, 58-66.• Chesbrough, H. and Prencipe, A. (2008) Networks of Innovation and Modularity: a Dynamic Perspective, <i>International Journal of Technology Management</i>, 42, 4, 414-425.

Session V	Market & Innovation
October 18 th October 19 th	This session analyzes the market/innovation interfaces. It deals with the types of market research that can be useful or misleading for different types of innovations. The class discussion focuses on two cases wherein the interface marketing/innovation was differently in totally different ways and led to different outcomes. It underlines the contingent nature of the innovation process in relation to the market dimension.
	Required reading <ul style="list-style-type: none">• Learning from the market, ch. 7, Leonard-Burton, D. (1998), <i>Wellsprings of Knowledge</i>, Harvard Business School Press.• Case: Prestel & Minitel (abridged) Optional reading <ul style="list-style-type: none">• Leonard-Burton, D. and J. Rayport (1997), Spark innovation through empathic design, <i>Harvard Business Review</i>, 102-113.

Session VI	Market & Innovation: a rejoinder
October 25 th October 26 th	The session deepens the market/innovation interface to highlight the limits of customer involvement. It illustrates the concept of disruptive technology – where the pace of technological progress easily exceeds the rate of performance improvement that customers in a market demand. The case discussion highlights the implications of such innovation on the firms' strategy.
	Required reading <ul style="list-style-type: none">• Bower, J. and Christensen, C. (1995) 'Disruptive Technology: Catching the Wave', <i>Harvard Business Review</i>, 43-53

- Case: Eli Lilly and Company (abridged)

Optional reading

- Christensen, C. and Rosenbloom, R. (1995) 'Explaining the Attacker's Advantage: Technological Paradigms, Organizational Dynamics, and the Value Network', *Research Policy*, 24, 233-257

Session VII	Organizing Innovation I
November 2 nd	This session introduces the concept of ambidextrous organization – as an ideal type of an organizational form that may help firms introduce both incremental and radical innovations.

- Video/case: Bug's Life

Required reading

- O'Reilly, Charles A., III, and Michael L. Tushman (2004) 'The Ambidextrous Organization' *Harvard Business Review*, 82, 4, pp. 74-81

Session VIII	Organizing Innovation II
November 8 th November 9 th	This section covers the key aspects and stages of the organization of the innovation process. It introduces and analyzes the organizational forms that may improve or hinder a firm's likelihood of innovating.

Required reading

- Managing the Innovation Process, chapter 8 (abridged), Conway S & Steward F (2009) *Managing and Shaping Innovation*, Oxford University Press.
- Case: TBC

Optional readings

- Wheelwright, S. and Clark K. (1992) 'Creating Project Plans to Focus Product Development' *Harvard Business Review*, 70-82
- Clark K. and Fujimoto, T (1990) 'The Power of Product Integrity' *Harvard Business Review*, 107-118

Session IX	Organizing Innovation III
November 15 th November 16 th	This session deals with the management of new product development teams in terms of its composition and structure in order to identify the range of factors that impact the creative and innovative performance of teams.

Required reading

- Managing New Product Development Teams, chapter 12 (abridged), Schilling M (2005) *Strategic Management of Technological Innovation*, McGraw-Hill.
- Video/Case: IDEO Product Development

Required readings – use games: 30 circles, collaboration, portrait

- Hargadon, A. and Sutton, R (2000) 'Building the Innovation Factory' *Harvard Business Review*, 157-166

Session X	Organizing Innovation IV
November 22 nd November 23 rd	The first part of this session identifies innovative ways to manage new product development projects. Specifically it singles out (a) the role of information and communication technology tools for innovation and (b) the importance of project-based

learning tools. The second part focuses on the origin and relevance of social networks – or informal organization – in innovative activity. It also and its overlay with formal organization.

Required reading

- Thomke, S and Fujimoto, T (2000) ‘The Effect of Front Loading Problem Solving on Product Development Performance’, *Journal of Product Innovation Management*, 17, pp. 128-142.

Required readings

- Casciaro, T, Lobo, M. (2005) ‘Competent Jerks, lovable fools, and the formation of social networks’, *Harvard Business Review*, 83, 6, pp. 92-99
- Case: Sun Microsystems – organizational culture and working environment – in Conway & Steward
- Case: Gore & Associates – organizational culture - in Conway & Steward

Optional readings

- Prencipe, A and Tell, F (2001), ‘Inter-Project Learning: Processes and Outcomes of Knowledge Codification in Project-Based Firms’, *Research Policy*, 2001, 30, pp. 1373-1394
- Thomke, S, (2006) ‘Capturing the Real Value of Innovation Tools’, *Sloan Management Review*, 47, 2.

Session XI	Platform Innovations
November 29 th November 30 th	This session illustrates the concept of product architecture to highlight the relevance of product design approach for firm’s innovation strategy. Building on literature on architecture, it also introduces the concept of platform innovation to illustrate how firms may leverage their product knowledge to shape and govern the industrial sector wherein they operate.
	<p>Required reading</p> <ul style="list-style-type: none"> • Ulrich, K. (1995) ‘The Role of Product Architecture in the Manufacturing Firm’, <i>Research Policy</i>, 24, 419-440 • Case: Intel • To be edited from Cusumano, M.A. and A. Gawer (2002) “The Elements of Platform Leadership”, <i>Sloan Management Review</i>, 43, 3, pp. 51-58
Session XII	Managing Innovation in Complex Systems Industries
December 6 th December 7 th	Complex, high-technology capital goods play a vital role in the modern economy and are increasingly fundamental to the competitive advantage of firms, industries, and countries. This session aims to introduce students to issues concerned with how innovation is managed in the supply of complex products and systems (CoPS). CoPS are high-cost, engineering and software-intensive products, systems, networks, infrastructure, constructs and services. Examples include aircraft, aero-engines, IT systems, telecommunication networks, flight simulators, high-speed trains, air traffic control systems, and intelligent buildings.
	<p>Required reading</p> <ul style="list-style-type: none"> • Hobday, M., Davies, A, Prencipe, A (2005) ‘Systems Integration: A Core Capability of the Modern Corporation’, <i>Industrial and Corporate Change</i>, 14, 6, 1109-1143 • Case: Rolls-Royce <p>Optional reading</p> <ul style="list-style-type: none"> • Hobday, M. (1998) Product Complexity, Innovation, and Industrial Organizations,

Session XIII	From Products to Solutions
December 13 th December 14 th	This session focuses on a recent and important trend occurring in many CoPS sectors: the shift from product-based to service-based offerings, i.e. integrated solutions. It discusses the strategies, capabilities, and organizational structures that firms need to achieve success in this major new type of project-based, systems integration activity.

Required reading

- Davies, A, Brady, T, and Hobday, M. (2006) 'Charting a Path Toward Integrated Solutions', *Sloan Management Review*, 47, 3.
- Case: Rolls-Royce and IBM

Optional reading

- Ceci, F. and Prencipe, A. (2008) Configuring Capabilities for Integrated Solutions, *Industry & Innovation*, 15, 3.
