



Scuola Superiore
Sant'Anna



PhD in Management

Course: Economics and management of innovation

Lecturer:

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Course description:

The objective of this course is to introduce students to current research on relevant aspects of the economics of innovation, and to help students refine their own ability to promote independent research. The topics covered by the course are relevant to a variety of fields, ranging from innovation policy to firms' internationalization strategies.

Specifically, the course focuses on the following topics:

- 1) Innovation dynamics;
- 2) The economics of science and knowledge production;
- 3) National, regional and sectoral systems of innovation.

Classes are typically organized with an initial and broad introduction of the topic to be analyzed and a further in-depth discussion of one (or a few) paper(s) related to the topic and listed on the syllabus. The latter discussion will be led by students who are expected to prepare a 45-minutes presentation on a research paper.

A particular emphasis is devoted to the methodological aspects that have been used to address the papers' research questions. The type of data used, the measures developed, the estimation strategy employed are aspects that differ according to the level of analysis (micro vs. macro) and the focus of research. By paying attention to such aspects the course thus aims at providing students with the ability to develop an independent research proposal on the field covered by the course.

Course Requirements:

Active class participation is strongly encouraged. In order to have a productive class discussion, students are expected to have read the papers listed in the syllabus, by focusing on the research question addressed by each of them, the empirical strategy employed, along with the contribution

offered by the papers and critical aspects that could be developed further (or differently). By doing this, at home preparation of class discussions becomes an excellent way to start thinking about research.

Students are then expected to prepare a 45-minutes class presentation of a paper (or a set of related papers). As a suggestion, a typical presentation usually covers the following aspects:

- a) Research question and motivation;
- b) Empirical strategy and data building;
- c) Main findings;
- d) Original contribution to the literature and managerial implications;
- e) Personal constructive suggestions for extensions or refining.

Finally, this course does not include a final written examination, but preparation of a research proposal on an aspect related to the topics covered by the course. The 2-page research proposal should identify a relevant research question, provide a motivation to it, briefly discuss the related literature, as well as propose an empirical approach to address the research question.

Syllabus and Reading List:

1. TECHNOLOGICAL CHANGE AND DYNAMICS

What determines the timing of technological revolutions? Can they be predicted? What is a dominant design? What is an “S-curve” and when is it helpful and should it be used? Is there any difference between an “S-curve” and the “Chasm”? How should firms face technological change?

Reading list:

- Anderson, P. and M. Tushman (1990). “Technological discontinuities and dominant designs: A cyclical model of technological change”, *Administrative Science Quarterly*, 35, 604-633.
- Henderson R.M. and K.B. Clark (1990). "Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms." *Administrative Science Quarterly*, 35(1),9-30.
- Suárez F.F. and J.M. Utterback (1995). "Dominant designs and the survival of firms." *Strategic Management Journal*, 16(6): 415-430.
- Bower J.L. and C.M. Christensen (1995), “Disruptive Technologies: Catching the Wave”, *Harvard Business Review*, 73(1), 43-54.
- David P. (1990). “The Dynamo and the Computer: An Historical Perspective on the Modern Productivity Paradox.” *American Economic Review*, 80(2), 355-361.
- Rogers E.M. (1976). "New Product Adoption and Diffusion." *The Journal of Consumer Research*, 2(4), 290-301.

2. UNIVERSITIES, BASIC RESEARCH AND THE ECONOMICS OF SCIENCE

How do universities influence firms’ innovative activity? Does scientific knowledge differ from technological knowledge? Is scientific knowledge related to basic research? What are the institutional limits to an effective interaction between university and industry?

Reading list:

- Nelson R. (1959). "The Simple Economics of Basic Scientific Research." *Journal of Political Economy*, 67(3), 297-306.
- Rosenberg, N. (1990). "Why Do Firms Do Basic Research (With Their Own Money)?" *Research Policy*, 19(2), 165-174.
- Dasgupta P. and P.A. David (1994). "Toward a new economics of science." *Research Policy*, 23(5), 487-521.
- Stephan P.E. (1996). "The economics of science." *Journal of Economic literature*, 34(3), 1199-1235.
- Aghion P., David P.A. and D. Foray (2009). "Science, technology and innovation for economic growth: Linking policy research and practice in 'STIG Systems'." *Research Policy*, 38(4), 681-693.

3. *THE GEOGRAPHY OF INNOVATION*

What are knowledge externalities? Why do innovations tend to agglomerate geographically? Can local and global innovation systems coexist?

Reading list:

- Feldman M.P. (1993). "An Examination of the Geography of Innovation." *Industrial and Corporate Change*, 2(3), 451-470.
- Jaffe A.B., Trajtenberg M. and R. Henderson (1993). "Geographic Localization and Knowledge Spillovers as Evidenced by Patents Citations." *Quarterly Journal of Economics*, 108, 557-598.
- Patel P. (1995). "The Localised Production of Global Technology." *Cambridge Journal of Economics*, 19, 141-153.

4. *NATIONAL SYSTEMS OF INNOVATION*

What are the main actors in innovation systems? What are the relationships existing among them? What is the role of universities? What are the boundaries of innovation systems?

Reading list:

- Nelson R.R. (1992). "National Innovation Systems: A Retrospective on a Study", *Industrial and Corporate Change*, vol. 1, no. 2, 1992, pp. 347-374.
- Sharif N. (2006). "Emergence and development of the National Innovation Systems concept." *Research Policy*, 35, 745-766.
- Lundvall BÅ. (2007). "National innovation systems-analytical concept and development tool." *Industry and Innovation*, 14(1), 95-119.

5. *TECHNOLOGICAL REGIMES AND SECTORAL SYSTEMS OF INNOVATION*

What is the notion of technological regime? And of industrial pattern of innovation? How can the Pavitt's taxonomy be used? How sectoral systems of innovations differ from both national systems of innovation and technological regimes? What does the concept of appropriability mean?

Reading list:

- Pavitt K. (1984). "Sectoral Patterns of Innovation: Towards a Taxonomy and a Theory." *Research Policy*, 13(6), 343-373.

- Levin R., Klevorick A., Nelson R. and S. Winter (1987). "Appropriating the returns from industrial research and development." *Brookings Papers on Economic Activity*, 3, 783-820.
- Klevorick A., Levin R.C., Nelson R. and S. Winter (1995). "On the sources and significance of interindustry differences in technological opportunities." *Research Policy*, 24(2), 185-205.
- Breschi S., Malerba F. and L. Orsenigo (2000). "Technological Regimes and Schumpeterian Patterns of Innovation." *Economic Journal*, 110(463), 388-410.
- Malerba F. (2005). "Sectoral systems of innovation: A framework for linking innovation to the knowledge base, structure and dynamics of sectors." *Economics of Innovation and New Technology*, 14(1-2), 63-82.

Course calendar (always check the Google calendar on the PhD Management web site)

- November 8, 15-17
- November 19, 15-17
- November 20, 15-17
- November 21, 15-17
- November 22, 9-11
- December 9, 15-17
- December 10, 15-17
- December 11, 15-17
- December 12: 15-17
- December 13, 9-11