Economics of innovation

Offered by: Department of Industrial Engineering & Innovation Sciences
Language: English
Primarily interesting for: All students
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Content and composition

In an increasingly globalized world characterized by rapid technological change and intense competition, innovation becomes a major weapon in the arsenal of companies to remain competitive in global markets. Firms can pursue different strategies to be innovative. Among the strategies are R&D investment, strategic alliances with other companies, or collaboration with university. The extent to which such strategies are effective differs from industry to industry and from technology to technology, and from country to country. We recognize that some firms are particularly successful but also that some countries (thinking of upcoming Asian countries) stand out when it comes to innovation.

To understand innovation processes from an economic point of view, you will learn to study innovation as a complex and multifaceted phenomenon involving the interests of several economic actors (companies, public organizations, universities, etc).

Key issues examined in this elective package are:

- What are the characteristics of innovative firms: does firm size play a role? do sectoral contexts matter? How do firms protect their innovation through intellectual property rights?
- How can the firm be seen as a bridge between science and markets? What are the respective roles of university, industry and governments in stimulating innovation?
- What is the economic rationale behind government policy and regulation?
- What are the private and social economic returns that societies may gain from stimulating innovation and engaging in large infrastructural projects? What are challenges in quantifying societal gains and losses?

In the different courses, a variety of economic models and data will be covered, in order to analyze the innovative performance of firms, sectors and nations, and to quantify costs and benefits of government intervention.

Recommended order

It is strongly recommended to follow the courses in the order shown in the table below:
OSV30 is the introductory course and provides an initial basis by defining the key concepts and questions in the economics of innovation.

OSV60 focuses on the formal economic models and lays out in detail the cost-benefit approach of economics.

OSV70 is a project course where the tools of societal cost-benefit analysis are applied.

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For further deepening their knowledge and skills, students can participate in an additional fourth course: 0SV100 ‘Economics of Innovation: Advanced’.

**Course description**

**Economics of Innovation: Introduction (0SV30)**

This course is an introduction to the economic understanding of innovation. It offers an overview of the basic notions and models introduced to define different types of innovation, to capture how innovations are created and how they impact economic systems.

This course takes the perspective of the firm and deals with questions such as: why and how do firms innovate? We will introduce the view of the innovating firm as being the bridge between science/technology and market, translating scientific and technical advances into new products and services. Innovating involves a number of strategic challenges: why are certain firms more successful in innovation than other? How can firms use patents and other intellectual property rights to profit from innovation?

We will stress how firms do not operate in isolation, but are influenced by their external environment including suppliers, users, government, universities, and even more stakeholders.

We will move from the analysis of the firm to the analysis of the sector in which it operates, and further to the national system. We will tackle questions like: how do sectors/countries differ in terms of their innovation?

Finally, we will try to understand the process through which innovations diffuse over time.

**Economic Policy (0SV60)**

In the introductory part of the course, students get some knowledge about the basics of the formal microeconomic theory, with special emphasis on the part that justifies policy interventions to the –otherwise- free workings of market processes. Later on, students are
introduced to consequences of the welfare state, regulations and the boundaries of state intervention. Topics include:

• The basics of economic rationality and social welfare: The cost-benefit principle (to be further elaborated later in the OGO part of the course in the framework of social cost-benefit analysis.)

• The theory of perfect competition: Here we characterize the theoretically-necessary economic conditions to consider a market as an entity where not policy is required. Furthermore we discuss so called ‘market failures’ which are the ways in which reality can diverge from the theoretical ideal of a “free market”.

• Imperfect competition and firm strategies: Sources of market power, monopoly, oligopoly and cartels and tacit collusion (with game theory), horizontal mergers, product differentiation, price discrimination, asymmetric information, experience goods, network goods, incentives to innovate, R&D cooperation and spillovers, intellectual property protection.

• Market failures due to reasons other than imperfect competition: externalities (with introduction to ‘new growth’ theory), public goods (with introduction to social choice theory), risk and uncertainty.

• Regulation and competition policy: natural monopoly and technological change.

• Environmental policy, education and innovation policy.

**Economic Policy (OGO) (0SV70)**

To examine whether (or not) the right choices are made by policy makers, social cost benefit analysis (SCBA) is increasingly used. Since 2003, SCBA is used as a standard methodology to evaluate large infrastructural projects in the Netherlands. With SCBA, policy makers have an opportunity to evaluate in a quantitative manner the social costs and benefits of particular investment projects. In contrast to private cost benefit analysis, a number of different variables have to be taken into account such as a social discount rate, a different time horizon of discounting as well as a different way of calculating the social benefits (e.g. coming from other sectors).

This course is mainly group work in which a number of cases (related to new energy, mobility, ICT, etc) are examined using the methods and tools related to SCBA.