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# Introduction to the Geography of Innovation

**August 19-23, 2024**

## Lecturer

Tom Broekel is a Professor in Regional Innovation at the University of Stavanger School of Business and Law in Norway. His research is focused on the geography of innovation, knowledge networks, analysis of R&D policy, regional news, renewable energies, and tourism. His teaching encompasses courses in innovation studies, economic geography, advanced statistics, social network analysis, and the geography of innovation.

## Course objectives

In today's world, technological progress and innovation are not just buzzwords but at the heart of economic development and firm growth. However, the benefits of these advancements are not uniformly distributed, often giving rise to spatial inequalities, societal unrest, and the marginalization of certain regions. The course, 'Introduction to the Geography of Innovation,' delves into the spatial dynamics of innovation and its critical role in global economic landscapes.

By integrating insights from innovation studies, evolutionary economics, and evolutionary economic geography, this course offers students a comprehensive framework to understand the processes of knowledge generation, diffusion, and application across different geographical contexts. Students will learn about the foundations of innovation dynamics in space and time by thoroughly exploring concepts such as knowledge types, externalities, and networks alongside contemporary international academic literature.

Moreover, the course critically examines relevant policy frameworks, including the EU research framework programs and the Smart Specialization Strategy. It offers a nuanced understanding of how policy intersects with innovation and its spatial distribution. Students will engage with real-world case studies and policy discussions, equipping them with the tools to contribute to inclusive and spatially aware economic development strategies.

Ultimately, 'The Geography of Innovation' aims to empower students to link theoretical concepts with empirical findings and policy implications, preparing them for the challenges and opportunities of shaping the future economic landscape.

## Course content

- Basics of Knowledge and Innovation and Knowledge Spillover
- Agglomeration, Externalities, and Spin-offs
- Types of Knowledge Transfers and Proximities
- Knowledge Networks

- Evolutionary Economic Geography and Regional Branching
- Relatedness and Complexity
- Political Support for Innovation and R&D
- Political Support for Collaboration and Networks

## Prerequisites

- **Both bachelor and master students can participate**. Bachelor students must be at least in the second year of their bachelor studies and must have completed basic courses in micro- and macroeconomics

## Instructional methods

- On-campus lectures and seminars

## Reading list for entry exam

- **B/M** Mokyr, J. (2010): Chapter 2 – The Contribution of Economic History to the Study of Innovation and Technical Change: 1750–1914, in: Hall, B. H., & Rosenberg, N. (2010). Economics of Innovation. Elsevier B.V., pages: 11-50

## Additional reading list (optional references will be given during the course)

- **B/M:** Arthur, W. B. (2021). Foundations of complexity economics. *Nature Reviews Physics*, *3*(2), 136–145. https://doi.org/10.1038/s42254-020-00273-3
- Boschma, R.A. (2005). Proximity and innovation: a critical assessment. Regional studies, 39(1): 61-74
- **M:** Boschma, R. A.; Frenken, K. (2009). Technological relatedness and regional branching. In M. P. F. H. Bathelt & D. F. Kogler (Eds.), Dynamic Geographies of Knowledge Creation and Innovation. Routledge. London. UK / New York, USA
- Buenstorf, G., & Fornahl, D. (2009). B2C— bubble to cluster: the dot-com boom, spin-off entrepreneurship, and regional agglomeration. *Journal of Evolutionary Economics*, *19*(3), 349– 378.
- **B/M:** Castaldi, C., Frenken, K., & Los, B. (2015). Related Variety, Unrelated Variety and Technological Breakthroughs: An analysis of US State-Level Patenting. *Regional Studies*, *49*(5), 767–781.
- Cordes. C. (2014). The Application of Evolutionary Concepts in Evolutionary Economics. Papers on Economics & Evolution, 2014-2
- Foray, D.; David, P. A.; Hall, B. (2011). Smart Specialization - From academic idea to political instrument, the surprising career of a concept and the difficulties involved in its implementation. MTEI Working Paper 2011-001
- **B/M:** Iammarino, S., Rodriguez-Pose, A., & Storper, M. (2019). Regional inequality in Europe: Evidence, theory and policy implications. *Journal of Economic Geography*, *19*(2), 273–298. https://doi.org/10.1093/jeg/lby021
- Malecki, E. J. (2010). Everywhere? The geography of knowledge. *Journal of Regional Science*, *50*(1), 493–513. https://doi.org/10.1111/j.1467-9787.2009.00640.x
- **M:** Scott, A. J., & Storper, M. (2015). The nature of cities: The scope and limits of urban theory. *International Journal of Urban and Regional Research*, *39*(1), 1–15

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## Time schedule

30 hours (an hour lasts 45 minutes, for a total of 1350 minutes)

| | | Time | Minutes | Activity | Content | Presenter |
|---|---|---|---|---|---|---|
| 19.08.2024 | Monday | 09:00-10:30 | 90 | Lecture | Course Introduction, Motivation, Knowledge & Innovation | TB |
| | | 11:00-12:30 | 90 | Lecture | Externalities & Knowledge Transfers | TB |
| | | 12:30-14:00 | | Break | | |
| | | 14:00-15:30 | 90 | Lecture | Proximities | TB |
| 20.08.2024 | Tuesday | 09:00-10:30 | 90 | Lecture | Agglomeration & Complex Systems & Scaling | TB |
| | | 11:00-12:30 | 90 | Lecture | Spin-offs & Life Cycle | TB |
| | | 12:30-14:00 | | Break | | |
| | | 14:00-15:30 | 90 | Lecture | Evolutionary Economic Geography & Branching | TB |
| | | 16:00-16:45 | 45 | Presentation & Discussion | Entrepreneurship & Start-up Support | Group A |
| | | 16:45-17:30 | 45 | Presentation & Discussion | Measuring Innovation and Technological Progress | Group B |
| 21.08.2024 | Wednesday | 09:00-10:30 | 90 | Lecture | Relatedness & Knowledge Space | TB |
| | | 11:00-12:30 | 90 | Lecture | Complexity & "The Matrix" | TB |
| | | 12:30-14:00 | | Break | | |
| | | 14:00-15:30 | 45 | Presentation & Discussion | Empirical Evidence for Innovation and Economic Growth | Group C |
| | | | 45 | Presentation & Discussion | Smart - Specialization Framework | Group D |
| 22.08.2024 | Thursday | 09:00-10:30 | 90 | Lecture | Knoweldge Networks | TB |
| | | 11:00-12:30 | 90 | Lecture | Political support for innovation, collaboration & networks | TB |
| | | 12:30-14:00 | | Break | | |
| | | 14:00-15:30 | 45 | Presentation & Discussion | (Innovation) Cluster - Policy | Group E |
| | | | 45 | Presentation & Discussion | Mission Orientated Policy | Group F |
| | | 15:45-17:15 | 90 | Lecture | Final discussions & course reflection | TB |
| 23.08.2024 | Friday | 09:00-10:30 | 90 | Exam | Written Exam | |
| **Total minutes** | | | **1350** | | | |

## Procedure of course

This course includes both lectures and group presentation sessions. The lectures, primarily held in the mornings (refer to the schedule above), are led by Tom Broekel. Slides will be made available in advance. While the lecture content is designed to be accessible without extensive prior knowledge, students are expected to review the core readings listed in the provided reading list.
Afternoons are dedicated to group presentations, allowing students to engage in collaborative projects that enhance and deepen their understanding of the course material.

### Group presentation guidelines

Overview: Besides the instructor's presentations of the core course content in the mornings, there are dedicated time slots for student group presentations. These presentations are a key component of the course, aimed at fostering an interactive and engaging learning environment.

While these presentations are not graded, they allow students to creatively explore and communicate their assigned topics.

Group Formation and Topics: The class was divided into six almost equally sized random groups (check Moodle for your group), each assigned a specific topic. The topics can be found in the timetable above and in more detail, including some initial references at the end of the document. Each group will have a 45-minute time slot to present and facilitate discussion. It is recommended that approximately 30 minutes be dedicated to the presentation itself, with the remaining 15 minutes reserved for general discussions and audience engagement.
Content and Presentation Format: The primary goal of the presentation is to provide a comprehensive and accurate overview of the assigned topic. It is essential to present facts, mechanisms, and lines of thought clearly and scientifically. While covering every nuance is unnecessary, focus and depth on specific aspects are encouraged. The presentation should be accessible to a general audience unfamiliar with the course content.
Creative Approaches: Students are encouraged to avoid traditional PowerPoint slides and instead explore a variety of creative formats, including but not limited to:

- **Role plays** (ideal for policy-related topics)
- **Video documentaries or features** (suitable for theoretical and empirical subjects)
- **Dramatic plays**
- **Narrated poems or tales**
- **Illustrated posters** (accompanied by narration)
- **Comic strips** (with voice-over narration)
- **Other innovative formats** that align with the topic and available resources.

Use of Generative AI Tools: Students are encouraged to utilize generative AI tools (e.g., ChatGPT, Copilot, Claude, Elicit) for brainstorming, topic synthesis, content creation (text, visuals, videos, sounds), and final production. While these tools can significantly enhance the presentation, students should be cautious of potential inaccuracies and verify the information generated.
Documentation and Sharing: Each group must document its approach, tools, and production process. This documentation should be prepared for sharing with the rest of the class as part of the learning experience.
Support and Inquiries: Students are encouraged to ask questions and seek guidance. This is an opportunity to experiment, be creative, and enhance the overall learning experience for everyone involved.

### Assessment

A written exam will take place on the course's last day (Friday).

## Summaries and References for Group Work Topics

### Group A: Entrepreneurship & Start-up Support

Entrepreneurial ecosystems play a crucial role in fostering innovation and economic growth. These ecosystems comprise infrastructure, finance, policy, culture, and human capital, collectively supporting start-ups and entrepreneurial ventures. Effective support mechanisms, such as incubators and accelerators, provide new businesses with essential resources,

mentoring, and networking opportunities. The focus on nurturing entrepreneurial activities can lead to regional development and innovation.

Initial references:

- Stam, E. (2015). Entrepreneurial ecosystems and regional policy: A sympathetic critique. *European Planning Studies*, 23(9), 1759-1769. DOI: https://10.1080/09654313.2015.1061484
- Kansheba, J.M.P., & Wald, A.E. (2020). Entrepreneurial ecosystems: a systematic literature review and research agenda. Journal of Small Business and Enterprise Development, 27(6), 943-964. https://doi.org/10.1108/JSBED-11-2019-0364
- Buenstorf, G., & Fornahl, D. (2009). B2C—bubble to cluster: the dot-com boom, spin-off entrepreneurship, and regional agglomeration. *Journal of Evolutionary Economics*, *19*(3), 349–378. https://doi.org/10.1007/s00191-008-0119-3

## Group B: Measuring Innovation and Technological Progress

Measuring innovation and technological progress involves various indicators, including patents, R&D expenditures, and innovation surveys. These metrics help assess the impact of technological advancements on economic development. The geographic distribution of these activities can reveal regional disparities in innovation capacity, highlighting the role of clusters and agglomeration economies.

Initial references:

- Griliches, Z. (1990). Patent Statistics as Economic Indicators: A Survey. *Journal of Economic Literature*, *28*(4), 1661–1707. http://www.jstor.org/stable/2727442
- Kleinknecht, A., Van Montfort, K., & Brouwer, E. (2002). The Non-Trivial Choice between Innovation Indicators. *Economics of Innovation and New Technology*, *11*(2), 109–121. https://doi.org/10.1080/10438590210899
- Dziallas, M., & Blind, K. (2019). Innovation indicators throughout the innovation process: An extensive literature analysis. *Technovation*, *80–81*(February 2017), 3–29. https://doi.org/10.1016/j.technovation.2018.05.005

## Group C: Empirical Evidence for Innovation and Economic Growth

Empirical studies demonstrate a strong link between innovation and economic growth. Innovations, particularly in technology, can improve productivity and job creation and increase competitiveness. Regional studies often highlight the benefits of innovation clusters, where localized knowledge spillovers and collaboration drive economic performance.

Initial references:

- Maradana, R. P., Pradhan, R. P., Dash, S., Gaurav, K., Jayakumar, M., & Chatterjee, D. (2017). Does innovation promote economic growth? Evidence from European countries. *Journal of Innovation and Entrepreneurship*, *6*(1), 1–23. https://doi.org/10.1186/s13731-016-0061-9
- Feldman, M.P., & Audretsch, D.B. (1999). Innovation in cities: Science-based diversity, specialization, and localized competition. European Economic Review, 43(2), 409-429. https://doi.org/10.1016/S0014-2921(98)00047-6

- Bilbao-Osorio, B., & Rodriguez-Pose, A. (2004). From R&D to Innovation and Economic Growth in the EU. *Growth and Change*, *35*(4), 434–455. https://doi.org/10.1111/j.1468-2257.2004.00256.x

## Group D: Smart Specialization Framework

Smart Specialization involves regions identifying unique areas of competitive advantage, focusing on innovation to drive economic growth. It emphasizes leveraging existing strengths and capacities, fostering innovation, and developing new areas of economic activity through targeted investment in research and development.

Initial References:

- Foray, D., David, P. A., & Hall, B. H. (2011). Smart specialisation. From academic idea to political instrument, the surprising career of a concept and the difficulties involved in its implementation, *Management of Technology & Entrepreneurship Institute* (No. 001; MTEI Working Paper). https://infoscience.epfl.ch/record/170252
- McCann, P., & Ortega-Argilés, R. (2015). Smart Specialization, Regional Growth and Applications to European Union Cohesion Policy. Regional Studies, 49(8), 1291-1302. https://doi.org/10.1080/00343404.2013.799769
- Balland, P.A., Boschma, R., & Crespo, J. (2019). Smart specialization policy in the European Union: Relatedness, knowledge complexity and regional diversification. Regional Studies, 53(9), 1252-1268. https://doi.org/10.1080/00343404.2018.1437900

## Group E: (Innovation) Cluster Policy

Cluster policy focuses on enhancing the competitiveness and innovation potential of geographically proximate firms and institutions. By fostering collaboration and knowledge sharing, clusters can drive regional economic development and innovation. Policies often target specific industries or sectors with high growth potential.

Initial references:

- Porter, M.E. (2000). Location, competition, and economic development: Local clusters in a global economy. Economic Development Quarterly, 14(1), 15-34. https://doi.org/10.1177/089124240001400105
- Delgado, M., Porter, M.E., & Stern, S. (2014). Clusters, convergence, and economic performance. Research Policy, 43(10), 1785-1799. https://doi.org/10.1016/j.respol.2014.05.007
- Cantner, U., Graf, H., & Rothgang, M. (2019). Geographical clustering and the evaluation of cluster policies: introduction. *Journal of Technology Transfer*, *44*(6), 1665–1672. https://doi.org/10.1007/s10961-018-9666-4

## Group F: Mission-Oriented Policy

Mission-oriented policies address societal challenges by setting specific, ambitious goals that mobilize various sectors and disciplines. These policies often focus on transformative innovation to tackle issues such as climate change, health, and digital transformation, requiring coordinated efforts across public and private sectors.

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Initial references:


- Mazzucato, M. (2018). Mission-oriented innovation policies: Challenges and opportunities. Industrial and Corporate Change, 27(5), 803-815. https://doi.org/10.1093/icc/dty034
- Foray, D. (2018). Smart specialization strategies as a case of mission-oriented policy-a case study on the emergence of new policy practices. *Industrial and Corporate Change*, *27*(5), 817–832. https://doi.org/10.1093/icc/dty030
- Matthijs J. Janssen, Jonas Torrens, Joeri H. Wesseling, Iris Wanzenböck, The promises and premises of mission-oriented innovation policy—A reflection and ways forward, *Science and Public Policy*, Volume 48, Issue 3, June 2021, Pages 438–444, https://doi.org/10.1093/scipol/scaa072