

TIK 4021

Innovation and Global Challenges

Teaching Schedule and Reading List Spring 2014

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Preliminary version – the overall framework will look like this, but there may be some minor changes to the curriculum and site visits, possibly minor time changes as well although we will try to avoid it.

The main goal of the course is to increase the students' knowledge of important concepts, issues, theories and dilemmas in innovation, building on introductory courses in innovation studies at the University of Oslo and elsewhere in the ESST partner institutions. Through examples related to global challenges such as climate change, economic growth, catching up and public health, the topic of innovation is tied to some of the most important issues of our time. At the end, the students should be able to participate in high-level discussions about contemporary innovation theory and policy. From the lecturer side, the goal is also to create a good learning environment with interesting tasks and discussions – and to have fun while doing so!

Teaching is more closely related to the actual research carried out by the TIK personnel and guest lecturers. The modules should provide concepts and frameworks that can be used in students' master theses, and the essay at the end of the course will be closely related to this as well. In addition, there will be practical group works in the course. This will mainly be self-supervised, although there may be special lectures and other types of input and feedback. Lecturers will be available for questions and we will try to adjust the feedback to the needs in the various groups. The course starts with an introduction and a presentation of the group work in week 5, followed by four modules each lasting two weeks. The group work will be finalized in the last of these modules.

Deadline for the final exam essay will be as follows: students should hand this in at the end of the working day Friday, April 4th.

Week 5 – Introduction

Date/time	Lecturer	Title	Readings
Tuesday January 28 th 1215 – 1400	Magnus Gulbrandsen	Introduction to TIK4021, some advice on writing a master thesis and intro group work	Nothing!! But reviewing earlier texts is useful.
Thursday January 30 th 1215 – 1400		The first group work task will be published on Fronter – we expect you to meet up and start the group work	Look ahead: plenty to read in the modules to come

This week students are urged to revisit earlier texts, for example from the Oxford Handbook of Innovation or other literature with a broad overview of different innovation topics.

Week 6 and 7 – Research, innovation and commercialization

Date/time	Lecturer	Title	Readings
Tuesday February 4 th 1215 – 1400	Magnus Gulbrandsen	Public research organizations and innovation – what does the literature tell us?	Literature with * and ** for this week. The chapter by Mowery and Sampat in the Oxford Handbook is also a nice introduction to the topic.
Friday February 7 th 1215 – 1400	Magnus Gulbrandsen	Continuation: modeling the role of public research in innovation	See above.
Tuesday February 11 th 1215 – 1400	Ole Kristian Gjelstuen	Guest lecture from <i>Inven2</i>	For this week the literature is marked with + or ++ in the list below.
Thursday February 13 th 11.15-13.00	Magnus Gulbrandsen	Key terms and conflicts in commercialization: patenting, licensing, entrepreneurship	
Friday February 14 th 1015 – 1200	Magnus Gulbrandsen	Presentation of group work and summary of module	

Reading list

Texts marked with an asterisk (*) are mainly related to week 6, those with two ** are mandatory reads, the rest are voluntary. Texts marked with the + sign are related to week 7, again with ++

marking mandatory stuff and + marking what is extremely interesting yet somehow did not make the top 5.

++ Abreu, M. & V. Grinevich (2012), The nature of academic entrepreneurship in the UK: Widening the focus on entrepreneurial activities, *Research Policy*, forthcoming.

** Beise, M. & H. Stahl (1999), Public research and industrial innovations in Germany, *Research Policy*, 28(4): 397-422.

** Bekkers, R. and I.M. Bodas Freitas (2008), Analysing knowledge transfer channels between universities and industry: To what degree do sectors also matter? *Research Policy*, 37 1837–1853.

+ Bozeman, B. (2001), Technology transfer and public policy: a review of research and theory, *Research Policy*, 29:627-655.

** Cohen, W.M., R.R. Nelson & J.P. Walsh (2002), Links and impacts: the influence of public research on industrial R&D, *Management Science*, 48:1-23.

+ Debackere, K. and R. Veugelers (2005), The role of academic technology transfer organizations in improving industry science links, *Research Policy*, 34:321–342.

+ Etzkowitz, H. (1998), The norms of entrepreneurial science: cognitive effects of the new university–industry linkages, *Research Policy*, 27(8):823–33.

* Etzkowitz, H. & Loet Leydesdorff (2000), The dynamics of innovation: From National Systems and ‘Mode 2’ to a Triple Helix of University-Industry-Government relations, *Research Policy*, 29:109-123.

** Fransman, M. (2001), Designing Dolly: interactions between economics, technology and science and the evolution of hybrid institutions, *Research Policy*, 30:263-273.

+ Grimaldi, R., M. Kenney, D.S. Siegel & M. Wright, 2011, 30 years after Bayh-Dole: Reassessing academic entrepreneurship, *Research Policy*, 40:1045-1057

+ Gulbrandsen, M. (2005), ‘But Peter’s in it for the money’: the liminality of entrepreneurial scientists, *VEST Journal for Science and Technology Studies*, 18:49-75.

* Gulbrandsen, M., D.C. Mowery & M. Feldman (2011), Introduction to the special section: heterogeneity and university-industry relations, *Research Policy*, 40:1-5.

+ Guston, D.H. (1999), Stabilizing the boundary between US politics and science: the role of the office of technology transfer as a boundary organization, *Social Studies of Science*, 29:87-111.

* Larédo, P. & P. Mustar (2004), Public-Sector Research: a Growing Role in Innovation Systems, *Minerva*, 42:11-27.

* Larsen, M.T (2011), The implications of academic enterprise for public science: An overview of the empirical evidence, *Research Policy*, 40:6-19.

* Murmann, J.P. (2000), Knowledge and competitive advantage in the synthetic dye industry, 1850-1914: The coevolution of firms, technology and national institutions in Great Britain, Germany, and the United States, *Enterprise & Society*, 1:699-704.

+ O’Gorman, C. Byrne, O., Pandya, D. (2008), How scientists commercialise new knowledge via entrepreneurship, *Journal of Technology Transfer*, 33:23–43.

** Rosenberg, N. & R. Nelson, 1994, American universities and technical advance in industry, *Research Policy*, 23:323-348.

+ Slaughter, S. and G. Rhoades (1993), Changes in Intellectual Property Statutes and Policies at a Public University: Revising the Terms of Professional Labor, *Higher Education*, 26:287-312.

++ Tuunainen, J. (2005), Contesting a Hybrid Firm at a Traditional University, *Social Studies of Science*, 35:173–210.

++ Vohora, A., M. Wright and A. Lockett (2004), Critical junctures in the development of university high-tech spinout companies, *Research Policy*, 33:147-175.

* Whitley, R., 2002, "Developing innovative competences: the role of institutional frameworks", *Industrial and Corporate Change*, 11:497-528.

Week 8 and 9 – Innovation and sustainability: energy, climate change and natural resources

Date/time	Lecturer	Title	Readings
<i>Tuesday February 18th 1215 – 1400</i>	Jens Hanson	The Great Energy Transition: Perspectives on sustainable transition and transformation	Jacobsson & Bergek (2004), Geels & Schot (2002), Markard & Truffer (2008) Intro to group work
<i>Wednesday February 19th 1215 – 1400</i>	Sjur Kasa	Policies for transition strategies /Dynamics of technological innovation systems	Bergek et al. (2008), Jacobsson & Bergek (2004), van Alphen et al. (2009)
<i>Friday February 21st 1215 – 1400</i>	PhD	Group work session	
<i>Tuesday February 25th 1215 – 1400</i>	Olav Wicken	Long term transformation processes: Path dependency and path creation	Fagerberg et al 2009, Ragu and Garud (2012)

Thursday February 27 th 1015 – 1200	Allan Dahl Andersen	Understanding dynamics in natural resource based industries/economies (in the context of climate change)	Smith 2007, Ville and Wicken 2013, Andersen 2012
Friday February 28 th 1215 – 1400	PhD	Workshop: group work session	

Reading list

van Alphen, K., van Ruijven, J., Kasa, S., Hekket, M. & Turkenburg, W. (2009): The performance of the Norwegian carbon dioxide, capture and storage innovation system, *Energy Policy*, 37 (1): 43-55.

Andersen, A. D. (2012). Towards a new approach to natural resources and development: the role of learning, innovation and linkage dynamics. *International Journal of Technological Learning, Innovation and Development*, 5(3), 291–324.

Bergek, A., Jacobsson, S., Carlsson, B., Lindmark, S. & Rickne, A. (2008): Analyzing the functional dynamics of technological innovation systems: a scheme of analysis. *Research Policy*, 37 (3): 407-429.

Christiansen, A. C. (2002). "New renewable energy developments and the climate change issue: a case study of Norwegian politics", *Energy Policy*, 235-243.

Fagerberg, J. D. Mowery, B. Verspagen (2009): "The evolution of Norway's national innovation system", *Science and Public Policy*, 36 (6), 431-444.

Ferranti, D., Perry, G.E., Lederman, D., Maloney, W.F., (2002) From Natural Resources to the Knowledge Economy, World Bank Latin America, World Bank: Washington
http://elibrary.worldbank.org/docserver/download/9780821350096.pdf?expires=1354009560&id=id&accname=ic_oslonor&checksum=0776AAB4BB11236376DC27C446AF600A

Garud, R. and Karnøe, P. (eds) (2012), *Path Dependence and Creation*, Psychology Press,

Geels, F.W. & Schot, J. (2007): Typology of sociotechnical transition pathways, *Research Policy*, 36: 399-417.

Jacobsson, S. & Bergek, A. (2004): Transforming the Energy Sector: The Evolution of Technological Systems in Renewable Energy Technology. *Industrial and Corporate Change*, 13 (5): 815-849.

Jacobsson, S. & Bergek, A. (2011): Innovation system analyses and sustainability transitions: contributions and suggestions for research, *Environmental Innovation and Sustainable Transitions* 1 (1): 41-57.

Jaffe, A.B., Newell, R.G., Stavins, R.N. (2002): Environmental Policy and Technological Change. *Environmental and Resource Economics*, 22, 41-69.

Kasa S, Underthun, A, 2010 "Navigation in new terrain with familiar maps: Masterminding socio-spatial equality through resource oriented innovation policy." *Environment and Planning A*, 42, 1328-1345.

Markard, J. & Truffer, B. (2008): Technological innovation systems and the multi-level perspective: towards an integrated framework, *Research Policy*, 37 (4): 596-615.

Narula, R. 2002. "Innovation systems and 'inertia' in R&D location: Norwegian firms... from *Research Policy*

Rogge, K.S., Hoffmann, V.H. (2010): The impact of the EU ETS on the sectoral innovation system for power generation technologies – Findings for Germany, *Energy Policy*, 38 (12): 7639–7652.

Smith, K. (2007). Innovation and growth in resource-based economies. *CEDA Growth*, (58), 50–57.

Ville, S., & Wicken, O. (2012). The dynamics of resource-based economic development: Evidence from Australia and Norway. *Industrial and Corporate Change*.

Tjernshaugen, A. (2011). "The growth of political support for CO2 capture and storage in Norway", *Environmental Politics*, 20, 227-245.

Unruh, G. C. (2000). "Understanding carbon lock-in", *Energy Policy*, 28:817-830.

Week 10 and 11 – How and Why Innovation Differs: Economics of Innovation and Heterogeneous Performance

Date/time	Lecturer	Title	Readings
<i>Tuesday March 4th 1215 – 1400</i>	Fulvio Castellacci	Innovation and Economic Performance across Countries: Absorptive Capacity, Social Capabilities and Institutional Conditions	Abramovitz (1986)* Fagerberg (1994)* Castellacci (2007)* Fagerberg & Srholec (2008) Castellacci (2008a)
<i>Thursday March 6th 1215 – 1400</i>	Fulvio Castellacci	Innovation and Economic Performance across Regions: Agglomeration Economies, Regional Systems and Policies	Asheim & Gertler (2005)* Breschi and Lissoni (2001)* Cooke (2001)*
<i>Friday March 7th 1215 – 1400</i>	Fulvio Castellacci	Innovation and Economic Performance across Sectors: Technological Regimes and Trajectories in Manufacturing	Malerba (2005)* Castellacci (2008b)* Castellacci (2008c)* Miles (2005)

		and Service Industries	Pavitt (1984)
Tuesday March 11 th 1215 – 1400	Fulvio Castellacci	Innovation and Economic Performance across Firms: Capabilities, Resources and Strategies	Bartelsman and Doms (2000)* Wieser (2005)* Castellacci (2011)* Crepon et al. (1998)
Wednesday March 12 th 1015 – 1200	Fulvio Castellacci	Presentation of group work and summary	

Reading list

Compulsory readings are marked with an asterisk *

*Abramovitz, M. (1986): "Catching-up, forging ahead and falling behind", *Journal of Economic History*, 46: 385-406.

*Asheim, B.T., Gertler, M. (2005): "The geography of innovation: Regional innovation systems", in Fagerberg, J., Mowery, D. and Nelson, R. (Eds.): *The Oxford Handbook of Innovation*.

*Bartelsman, E. J. and Doms, M. (2000): "Understanding productivity: lessons from longitudinal microdata", *Journal of Economic Literature*, 38 (3): 569-594. [Link](#)

*Breschi and Lissoni (2001): "Knowledge spillovers and local innovation systems: A critical survey", *Industrial and Corporate Change*, 10 (4): 975-1005. [Link](#)

Cappelen, Å., Raknerud, A. and Rybalka, M. (2012): "The effects of R&D tax credits on patenting and innovation"; *Research Policy*, 41: 334-345.

*Castellacci, F. (2007): "Evolutionary and new growth theories. Are they converging?", *Journal of Economic Surveys*, 21 (3): 585-627. [Link](#)

Castellacci, F. (2008a): "Technology clubs, technology gaps and growth trajectories", *Structural Change and Economic Dynamics*. [Link](#)

*Castellacci, F. (2008b): "Technological paradigms, regimes and trajectories: manufacturing and service industries in a new taxonomy of sectoral patterns of innovation", *Research Policy*, 37, 978-994. [Link](#)

Castellacci, F. (2008c): "Innovation and the competitiveness of industries: Comparing the mainstream and evolutionary approaches", *Technological Forecasting and Social Change*. [Link](#)

*Castellacci, F. (2011): "How does competition affect the relationship between innovation and productivity? Estimation of a CDM model for Norway", *Economics of Innovation and New Technology*. [Link](#)

*Cooke, P. (2001): "Regional innovation systems, clusters and the knowledge economy", *Industrial and Corporate Change*, 10 (4): 945-974. [Link](#)

Crepon, B., Duguet, E. and Mairesse, J. (1998): "Research, innovation and productivity: an econometric analysis at the firm level", *Economics of Innovation and New Technology*, 7 (2), 115-158. [Link](#)

*David, P.; B. Hall and A. Toole, A. (2000): "Is public R&D a complement or substitute for private R&D? A review of the econometric evidence", *Research Policy*, 29: 497–529.

*Fagerberg, J. (1994): “Technology and International differences in growth rates”, *Journal of Economic Literature*, 32: 1147-1175.

Fagerberg, J., and Srholec, M. (2008): “National innovation systems, capabilities and economic development”, *Research Policy*, 37: 1417-1435. [Link](#)

*Malerba, F. (2005): “Sectoral systems: How and why innovation differs across sectors”, in Fagerberg, J., Mowery, D. and Nelson, R. (Eds.): *The Oxford Handbook of Innovation*.

Miles, I. (2005): “Innovation in services”, in Fagerberg, J., Mowery, D. and Nelson, R. (Eds.): *The Oxford Handbook of Innovation*.

*OECD (2010): “R&D tax incentives: rationale, design, evaluation”, mimeo, OECD.

*Lundvall, B.Å. and Borràs, S. (2005): “Science, technology and innovation policies”, in J. Fagerberg, D. C. Mowery & R. R. Nelson (Eds.), *The Oxford Handbook of Innovation*, Oxford University Press, Oxford.

Pavitt, K. (1984): “Sectoral patterns of technical change: towards a taxonomy and a theory”, *Research Policy*, 13, 343-373. [Link](#)

*Wieser, R. (2005): “Research and development productivity and spillovers: empirical evidence at the firm level”, *Journal of Economic Surveys*, 19 (4): 587-621. [Link](#)

Week 12 and 13 – Innovation in practice: management, policy and wrapping up the group work

Date/time	Lecturer	Title	Readings
<i>Tuesday March 18th 1215 – 1400</i>	Magnus Gulbrandsen	Innovation in practice – what can be done with policy and management?	Introduction to the topic
<i>Wednesday March 19th 1215 – 1400</i>	Students themselves!	Innovation management – the literature	Students present the readings
<i>Friday March 21st 1215 – 1400</i>	Students themselves!	The literature continues (I will see whether it is possible to have everything on Wednesday from 1215 to 1600 instead of spread over two days)	Students continue their presentations, discussion about what we can learn from this
<i>Tuesday March 25th 845 – 1600</i>	Magnus Gulbrandsen	Site visit at a company (details to be confirmed later)	Presentation of group work during the visit
<i>Wednesday March 26th 1215 – 1400</i>	Magnus Gulbrandsen	Innovation and global challenges	We reflect upon what we have learned during the course

Reading list

For this module, a selection of articles on innovation management – some classics, some newer ones – will be put in the Fronter folder. Each of the articles will be presented (fairly briefly) by one of the students, who will also be charged with writing a short (maximum two pages) summary for the benefit of the other students. The final number of articles will therefore depend upon the number of students (see Fronter for more details). A main part will be a site visit at a company where the students will meet innovation in practice – hopefully it will be messy and confusing but also inspiring, useful and a starting point for learning and reflection. There will be presentations of the company, its way of work and its sector, and probably something more as well. If students are interested, we may organize some other company/site visits that will not be formally part of the course.

Exam

The exam will be very closely tied to the work with the master theses (or to the group work, if some students would prefer that). Students should hand this in at the end of the working day Friday, April 4th. Week 14 is devoted to the exam. Magnus Gulbrandsen will be available during the normal teaching hours on Tuesday and Thursday this week to answer questions about the exam task.