

October 8, 2024



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**ME2092 Management Of New Technology
and Industrial Creativity
(MONTIC)**

Course-PM 2024

Course Page: [ME2092 HT24 Management of Technology Innovation and Creativity \(50689\) \(kth.se\)](https://kth.se/education/course/ME2092-50689)

Note: This document might be updated.

Course Language: English

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Course-PM: ME2092 Management of New Technology and Industrial Creativity, 2023

Credits: 6 ECTS

Grade scale: A-F

Level: Advanced

Language: English

COURSE OBJECTIVE

The course focuses on how organizations create innovation and new knowledge but also how they turn such processes into profitable business. The aim of the course is to prepare you to take on a decision-making role within technology- and product development and being well familiar with tools and methods used in related work and operations. The course content, thereby, covers problems and opportunities associated with different types of organizations' abilities to gain competitive advantages through innovative products (goods and services).

Course structure

The course consists of academic lectures, lectures by managers and seminars. These three parts make the foundation for understanding management of research and innovation from a theoretical as well as from a practical point of view. Theories and practical applications are discussed and compared in seminar discussions and written assignments. You will also complete an essay on innovation related to the theme in MONTIC.

Learning objectives

After having completed this course, you should be able to:

- Analyze organizations and business environments with traditional organization models for innovation and research
- Explain, compare and critically reflect on the difference between traditional management of innovation and management of innovation in digital sectors
- Explain, compare and critically reflect on different types of product development models (e.g. stage/gate models compared with models for open innovation)
- Argue for solution proposals to innovation challenges
- Explain, compare and critically reflect on different types of innovation processes (e.g. product, process, position and paradigm) as well as different types of innovation focuses (e.g. radical versus incremental, sustaining versus disruptive and system-oriented versus product-oriented)
- Explain different ways to handle intellectual property and intellectual rights as well as critically reflect on important implications for innovation connected to IPR (intellectual property rights)

Course responsible / Examiner:

Niklas Arvidsson, Professor, Industrial Engineering and Management (INDEK)

OVERVIEW

Assuming that the students have basic knowledge of economics of industrial and technical change this course focuses on the management aspects of those processes. Concepts like dominant design, various classifications of innovation (like architectural or modular, and incremental or radical innovation) are introduced as are concepts related to learning, acquisition and the appropriability of technology. Various forms of organizing innovation processes - in house as well as in ventures and open systems are analysed. The innovation management concept is also related to entrepreneurial processes and industrial creativity. The role intellectual property rights in relation to the innovation management process is also analysed. The relation between industrial and technical transformation in general and climate change in particular to innovation processes and their management is discussed.

The course is based on modern theory of management of innovation related to the new theory of the (resource based) firm and its dynamic capabilities. In addition the course is based on theories of knowledge formation and learning in firms and technical systems. The teaching consists of lectures, literature seminars and innovation challenge projects.

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Formal requirements

Get a passing grade at a literature test (TEN2) and on a project assignment (TEN1). In addition, the students are expected to show active participation in all seminars and discussions (SEM1). Attendance is compulsory at all four seminars and four out of seven guest lectures. If you do not meet these requirements will be given an extra assignment.

Examination

SEM1 – Active participation on seminars and lectures

- Hand in individual reflections on **Wednesday, December 18th, at 18.00 at the latest**
- 1.5 credits; grade scale: P, F

TEN1 – Project report

- Group work; 3 credits; grade scale: A, B, C, D, E, FX, F
- Hand in final version of project report on **Tuesday, December 17th, at 18.00 at the latest**

TEN2 – Literature test

- Individual; 1.5 credits; grade scale: A, B, C, D, E, FX, F
- Is taken on **Tuesday, November 12th, at 08.00 – 10.00**
 - If you fail, there is a second possibility on January 8th at 14.00-16.00, 2025

The final grade

The final grade will be based on the combination of TEN1 and TEN2.

Course teachers

Niklas Arvidsson [NA], Professor, Industrial Engineering and Management (INDEK)

Anna-Maria Nyquist [AMN], Researcher, Industrial Engineering and Management (INDEK)

Preliminary guests in the course (NB! There may be changes)

- Ulf Mannervik www.normannpartners.com
- Robert Book www.cgi.com
- Emrah Karakaya www.indek.kth.se
- Magnus Lagesson www.crunchfish.com
- Gina Ordoñez
- Fredrik Wolbe
- Maria Nava www.prv.se
- Additional guests will be announced later and there may be changes in this list.

Course literature

Lecture notes and selected articles (see below). Articles can be downloaded via KTH library and/or Google Scholar.

Optional but recommended reading: Managing innovation – Integrating Technological, Market and Organizational Change (5th or 6th ed.). Joe Tidd & John Bessant, Wiley.

Schedule - [ME2092 HT24 Management of Technology Innovation and Creativity \(50689\)](http://me2092.kth.se) (kth.se)

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SEMINARS

A number of selected articles complement the textbook and together make the foundation for the seminar assignments and seminar discussions. Students will be divided into two groups – A and B – and each group will have four seminars (1, 2, 3 and 4).

A written individual assignment is to be handed in at seminar 1 and 2 (in total two individual assignments). The hand-ins for seminar 3 and 4 are group-based and should be the first and second draft of the project report. Regarding seminar 1, 2 and 3 you should answer the questions assigned to each seminar using the course literature (lecture notes and selected articles), as well as by using material from e.g. a guest lecture or a newspaper article (etc.) where you can see relevant links. The hand-in to seminar 3 is also a first draft to the project report. The task for seminar 4 is that you should hand in the second draft of your project report (TEN1) and then present it at seminar 4.

The seminar assignments must be handed in via CANVAS before each seminar.

Name the documents you hand in with the course number, your name and seminar, for the two first seminars like:

- ME2092_StanSmith_Sem1
- ME2092_YinYang_Sem2

As for seminar 3 and 4, where the hand-ins are made by your project groups, name the documents with the course number, the number of your project group (see Canvas) and the seminar number like:

- ME2092_Group1_Sem3
- ME2092_Group1_Sem4

The hand-ins to all seminars as well the project reports should be uploaded to Canvas.

This means that before each of the seminar group sessions (1-3) you have to read the articles listed below and answer questions related to each seminar. Your answers are to be handed in via Canvas before each seminar. Hand-ins to seminar 1 and 2 are individual and to seminar 3 and 4 done by groups. The hand-ins to seminars 3 and 4 are drafts to the final project report.

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Seminar 1 – Search and readiness (individual assignment)

Use the literature below to answer the following questions:

1. Discuss three concepts from the article by Tidd and relate these to an industry of your choice. Exemplify different concepts in an industry of your own choice - but not from the industries discussed in the article.
2. Explain what is meant by the culture of design thinking based on the article by Prud'homme. And, explain how this connects to mechanisms for managing ambidexterity as discussed in the article by Turner et al?
3. Explain what is meant by "domains" and discuss how the article by Ramirez et al use this concept ("domain") to explain how technologies, scenarios and strategies are linked.

Literature to seminar 1:

- Lecture notes. Lecture 1 Introduction and Lecture 2 Search and readiness
- Prud'homme van Reine, P., 2017. The culture of design thinking for innovation. *Journal of Innovation Management*, 5(2), pp.56-80. [The culture of design thinking for innovation | Journal of Innovation Management \(up.pt\) \(Länkar till en externa sida.\)](#)
- Ramírez, R., Roodhart, L. & W. Manders. 2011. How Shell's Domains Link Innovation and Strategy. *Long Range Planning* (August). 44(4): 250-270. <https://www.sciencedirect.com/science/article/pii/S0024630111000185>
- Tidd, J., 2001. Innovation management in context: environment, organization and performance. *International journal of management reviews*, 3(3), pp.169-183. [Innovation management in context: environment, organization and performance...: EBSCOhost](#)
- Turner, N., Swart, J. and Maylor, H., 2013. Mechanisms for managing ambidexterity: A review and research agenda. *International Journal of Management Reviews*, 15(3), pp.317-332.
- Wallin, M. & von Krogh, G. 2010. Organizing for Open Innovation: Focus on the integration of knowledge. *Organizational Dynamics*, 9(2): 145-154. <https://www.sciencedirect.com/science/article/pii/S0090261610000227>

Write max two pages (max 800 words) for the answers to all three questions.

Hand in no later than Thursday, November 7, at 18.00

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Seminar 2 – Innovation for multi-sided, digital platforms and/or sustainability (individual assignment)

Use the literature below to answer the following questions:

1. From an innovation strategy and competitive advantage perspective, what are the main challenges and opportunities connected to technologies built on multi-sided platforms as discussed by Hagiu & Wright? And, explain what is meant by "platform competition" based on the article by Rietveld & Schilling. Exemplify the different concepts in an industry of your own choice - but not from the industries discussed in the article.
2. Explain how AI changes innovation management as discussed by Haefner et al. Exemplify how AI has changed innovation in an industry of your choice - but not from industries discussed in the article.
3. Explain the concept "disruptive innovation" as discussed by Si & Chen. Exemplify how disruptive innovation has changed innovation in an industry of your choice - but not from industries discussed in the article.

Literature:

- Lecture notes. Lecture 3 Innovation concepts and Lecture 4 Managing innovation
- Haefner, N., Wincent, J., Parida, V. and Gassmann, O., 2021. Artificial intelligence and innovation management: A review, framework, and research agenda. *Technological Forecasting and Social Change*, 162, p.120392. [Artificial intelligence and innovation management: A review, framework, and research agenda☆ - ScienceDirect](#)
- Hagiu, A. & Wright. 2015. Multi-sided platforms, In *International Journal of Industrial Organization*, Volume 43, 162-174. [https \(Länkar till en externa sida.\)://linkinghub.elsevier.com/retrieve/pii/S0167718715000363](https://linkinghub.elsevier.com/retrieve/pii/S0167718715000363) (Länkar till en externa sida.)
- Rietveld, J. and Schilling, M.A., 2021. Platform competition: A systematic and interdisciplinary review of the literature. *Journal of Management*, 47(6), pp.1528-1563. [Platform Competition: A Systematic and Interdisciplinary Review of the Literature - Joost Rietveld, Melissa A. Schilling, 2021 \(sagepub.com\) \(Länkar till en externa sida.\)](#)
- Si, S. and Chen, H., 2020. A literature review of disruptive innovation: What it is, how it works and where it goes. *Journal of Engineering and Technology Management*, 56, p.101568. [A literature review of disruptive innovation: What it is, how it works and where it goes - ScienceDirect](#)

Write max two pages (max 800 words) for the answers to all three questions.

Hand in no later than Thursday, November 14, at 18.00

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Literature seminar 3 – Managing innovation (group assignment)

The hand-in to seminar 3 is designed to become a foundation for your project (TEN1).

Use the literature below to answer the following questions:

1. What are the main challenges and opportunities connected to innovation strategies based on the articles by Raisch et al and Nambisan et al? Exemplify from an industry of your own choice (i.e. the industry that you project report will focus on).
2. What are the main challenges and opportunities connected to innovation strategies based on the articles by Boons & Lüdeke-Freund as well as Silvestre & Țîrcă? Exemplify from an industry of your own choice (i.e. the industry that you project report will focus on).

Literature:

- Lecture notes. Lecture 3 Innovation concepts and Lecture 4 Managing innovation
- Boons, F., & Lüdeke-Freund, F. (2013). Business models for sustainable innovation: state-of-the-art and steps towards a research agenda. *Journal of Cleaner production*, 45, 9-19. <https://www.sciencedirect.com/science/article/pii/S0959652612003459> (Länkar till en externa sida.)
- Nambisan, S., Lyytinen, K., Song, M., 2017. Digital Innovation Management: Reinventing Innovation Management in a Digital World. *MIS Quarterly* 41, 223–238. <https://dl.acm.org/citation.cfm?id=3177675> (Länkar till en externa sida.)
- Raisch, S., Birkinshaw, J., Probst, G. and M.L. Tushman. 2009. Organizational Ambidexterity: Balancing Exploitation and Exploration for Sustained Performance. *Organization Science* 20(9):4 , 685-95 <http://pubsonline.informs.org/doi/abs/10.1287/orsc.1090.0428> (Länkar till en externa sida.)
- Silvestre, B.S. and Țîrcă, D.M., 2019. Innovations for sustainable development: Moving toward a sustainable future. *Journal of cleaner production*, 208, pp.325-332. <https://doi.org/10.1016/j.jclepro.2018.09.244>

Write max three pages (max 1200 words) for the answers to the two questions in relation to the industry that your project report will focus on.

Hand in no later than Thursday, November 28, at 18.00

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Seminar 4 Managing innovation (group assignment)

The project report can be written **in groups of maximum five persons**. We will divide you into these groups. The purpose is to provide a solution to an innovation challenge. Every report must include management implications or recommendations based on conclusions drawn in the essay, and the analysis should be based on theory and models. NB! Use the theories and models in this course.

An industry, a company and/or an entrepreneur can be used as unit of analysis in order to reflect on theories and models discussed in the course.

Regardless of the focus of the essay it is important that you make distinct and relevant delimitations and relate your analysis, conclusions and recommendations to these delimitations.

The project report should focus on one industry or one type of business and then design an innovation strategy for either:

- an incumbent – an existing firm with an existing business; or
- a start-up – a firm and/or entrepreneur aiming to disrupt the industry and its businesses

Then design an innovation strategy for the one you have selected. The selection should be a firm or entrepreneur that exists. You cannot make one up. The innovation strategy must address challenges related to multi-sided digital platforms and/or sustainability.

Feed-back to another group

Peer assessments are important in this assignment. Each team will be assigned to review other teams' report drafts for seminar 4. The reviewers are expected to have analyzed the drafts and prepared written and oral feedback before the seminar where the report is presented. It is important that participants keep to the deadlines so that reviewers have enough time to review the drafts. Giving feedback is an effective way to contribute to other students' learning, but also a way to develop your own writing skills (learning by analyzing others' writing).

Written feedback – Checklist

- Does the report follow the instructions (see *The report* section)?
- Does the title fit the content?
- Is there an interesting introduction? Does it make you curious? Do you understand the phenomena? Is there a problematisation and a research question?
- Are terms and concepts used correctly?
- Have relevant data been used?
- Is an analytical ability displayed and has a research question (or problematisation) been answered?
- Is the report logical and rational? Is it reader-friendly? Do you like to read it? Is it understandable?
- Is the report self-supporting in that you can read the text without needing further information?
- Are the formalities correct (e.g., references, number of pages, etc.)?
- Is the language good?
- Would you as part of an executive group find the report useful when it comes to making a decision on how to design an innovation strategy?
- Any further recommendation to improve the report?

Hand in no later than Friday, December 13, at 18.00

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THE PROJECT REPORT – ESSAY (TEN1)

The project report can be written **in groups of maximum five persons**. The purpose is to provide a solution to the innovation challenges that will be presented. Every report must include management implications or recommendations based on conclusions drawn in the essay, and the analysis should be based on theory and models. NB! Use the theories and models in this course in your reports.

An industry, a company and/or an entrepreneur can be used as unit of analysis in order to reflect on theories and models discussed in the course. Regardless of the focus of the essay it is important that you make clear delimitations and relate your analysis and conclusions as well as your management implications clearly to these delimitations. Choose those delimitations that are relevant in your case!

Scope of the essay

The essay should be 4500-5500 words (including references, footnotes and other text). It will affect the grading in a negative way if you hand in a shorter or longer essay. The final report is handed in no later than **Tuesday, December 17th, at 18.00**. Hand in the essay in PDF-format via Canvas.

Name the project reports you hand in with the course number, the number of your project group and examination code, like:

- ME2092_Group1_TEN1

Notes on the structure of the essay

Schematically the paper could be disposed like this:

- Title, Authors, Course, group
- Summary/abstract
- Introduction, background and problem statement (important part)
- Theoretical models and methodology (should be short)
 - o *Note that you must explain which AI-tools you have used and how you have used them.*
- Findings and recommendations (important part)
- Conclusions and discussion (important part)
- Reference list of literature and prime sources (separate between different types of references, give full information on internet sources (URL) and date of access)

The assignment

The project report should focus on one industry or one type of business and then design an innovation strategy for either an incumbent – an existing firm with an existing business – or a start-up – a firm and/or entrepreneur aiming to disrupt the industry and its businesses. You need to make two decisions:

- Industry and business. We recommend you to focus on an industry where digitalization and/or sustainability is changing the competitive landscape.
- Focus on an incumbent / established firm or a start-up / entrepreneur.

Then design an innovation strategy for the one you have selected. This should relate directly to main challenge the industry and company is facing, i.e. digitalization and/or sustainability. The selection of company should be a firm or entrepreneur that exists. You cannot make one up.

The grading will primarily be based on the final essay, but constructive discussions and presentations in seminars and, more importantly, high evaluations of the individual assignments will be seen as additional value when giving the final grades.

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Report on individual reflections on project work

Additional to the team report, each team member shall write a report on individual reflections to the project work (between 250 and 500 words) where her/his own reflections on the quality of the team work are described, which must include recommendations for how to improve group work in the future as well as how your own role in a team and contribution to the team should be improved. This assignment is designed to comply with students' ethical obligations (see course syllabus), and to give participants the possibility of reflecting about their own strengths and weaknesses in projects and groups. So, the reflections should cover:

- Your own reflections on the quality of the team work (the process)
- Recommendations for how to improve group work in the future
- How to improve your own role and contribution to team work

This is handed in on Wednesday, December 18, 18:00 at the latest.

Overview of hand-ins and test

Hand-in / test	Date and time	Type / information	Individual or group
Seminar 1	November 7, 18:00	Seminar (SEM1)	Individual
Literature test	November 12, 08-10	Quiz on Canvas (TEN2)	Individual
Seminar 2	November 14, 18:00	Seminar (SEM1)	Individual
Seminar 3	November 28, 18:00	Seminar (SEM1)	Group
Seminar 4	December 10, 18:00	Seminar (SEM1)	Group
Feedback after seminar 4	December 13, 18:00	Seminar (SEM1)	Group
Project report (final)	December 17, 18:00	Report (TEN1)	Group
Individual reflections	December 18, 18:00	Reflections (TEN2)	Individual
Re-exam literature test	January 8, 14-16	Quiz on Canvas (TEN2)	Individual

Grading criteria:

The grading will primarily be based on the final essay, but constructive discussions and presentations in seminars and, more importantly, high evaluations of the individual assignments will be seen as additional value when giving the final grades.

The grades of the essay will be based on the following:

To receive an **A**, the student must: Critically apply the course literature and other relevant literature to meet the purpose and objectives of the essay. This involves having a clear purpose and objective, clearly motivated choices of relevant theories, an analysis that leads to discussions and conclusions at a higher level as well as clear and articulated communication of the essay.

To receive a **C**, the student must: Critically apply the course literature to meet the purpose and objectives of the essay. This involves having a purpose and objective, motivated choices of theories, analysis and conclusions at a high level and clear communication of the essay.

To receive an **E**, the student must: Apply the course literature to meet the objectives of the essay. This involves having an objective, a choice of theories, conclusions as well as satisfactory communication of the essay.

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ETHICAL APPROACH

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.
- Check: <https://www.kth.se/en/biblioteket/skriva-referera/skriv-referenser-1.856564>