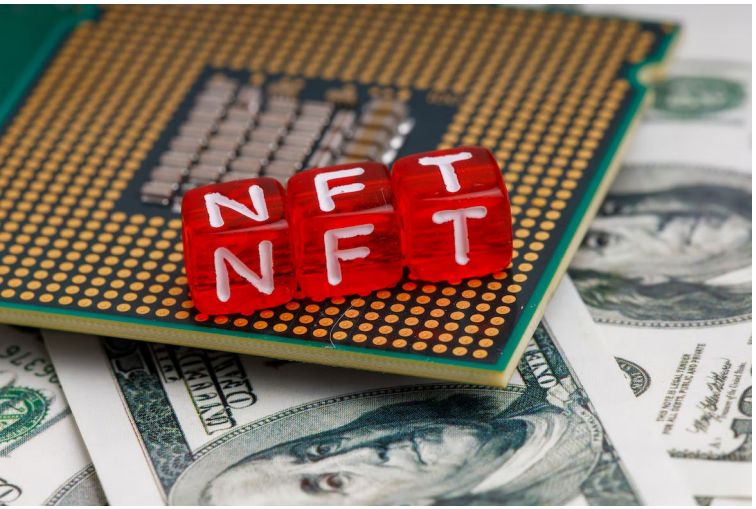
Technology Dynamics MOT1412

Lecture I
September 5th, 2022

Dr. Claudia Werker

Non-fungible tokens: economic value?

https://video.twimg.com/ext_tw_video/1565500939057905664/pu/vid/720x720/0I9L6cekME5_2o_p.mp4?tag=12



https://www.youtube.com/watch?v=XsGOQP-B0gU&t=1712s

Lecture I

Getting to know each other

0. Resp. innovation and the 4th Industrial Revolution

Course Overview

1. Innovation: Concept and measurement

Introduction to (blended) learning and assessment

Introduction of exercises for groups work this afternoon

Forming groups

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Getting to know each other I

Getting to know each other II

Getting to know each other III

In what area do you hold a Bachelor degree?

- Architecture or Industrial Design
- Engineering or Computer Sciences
- Applied Sciences or Physics
- Others

Getting to know each other IV

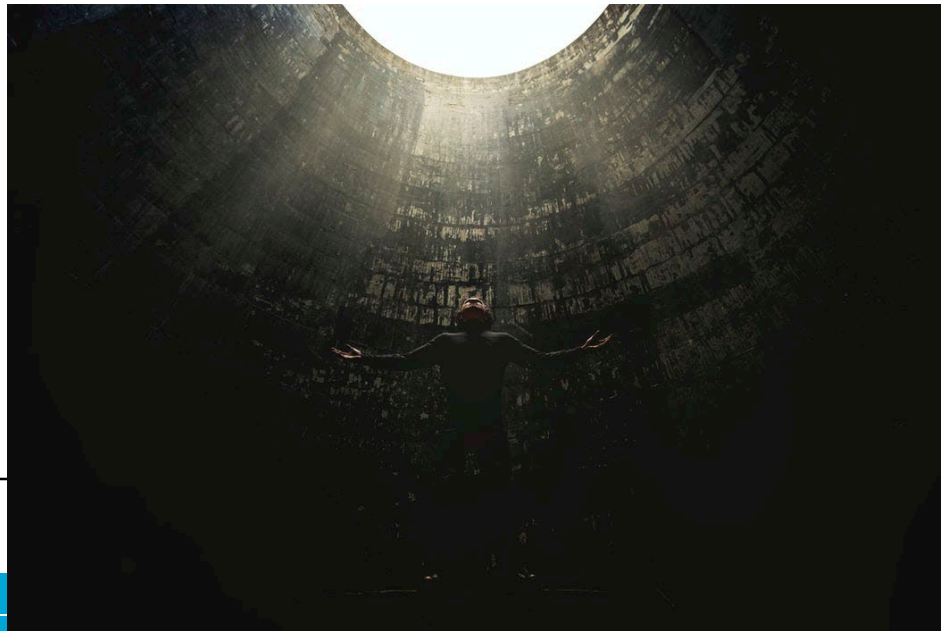
Where did you get your Bachelor degree?

- In the Netherlands or Europe
- In Asia
- In North- or South America or in Australia/New-Zealand

Getting to know each other V

What do you expect to learn in this course?

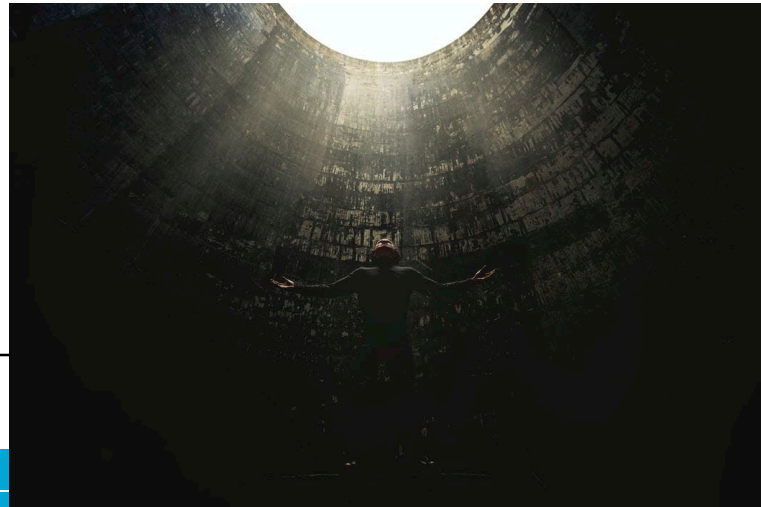
- Contents
- Skills
- Others, please specify



Getting to know each other VI

What do expect to learn in this course?

- Content:
  - Technology Dynamics
  - assess technology from an interdisciplinary economical and ethical perspective
- Skills:
  - read scientific papers
  - write up answers to academic research questions and present them
  - collaborate in a group (chairing etc.)
- Others



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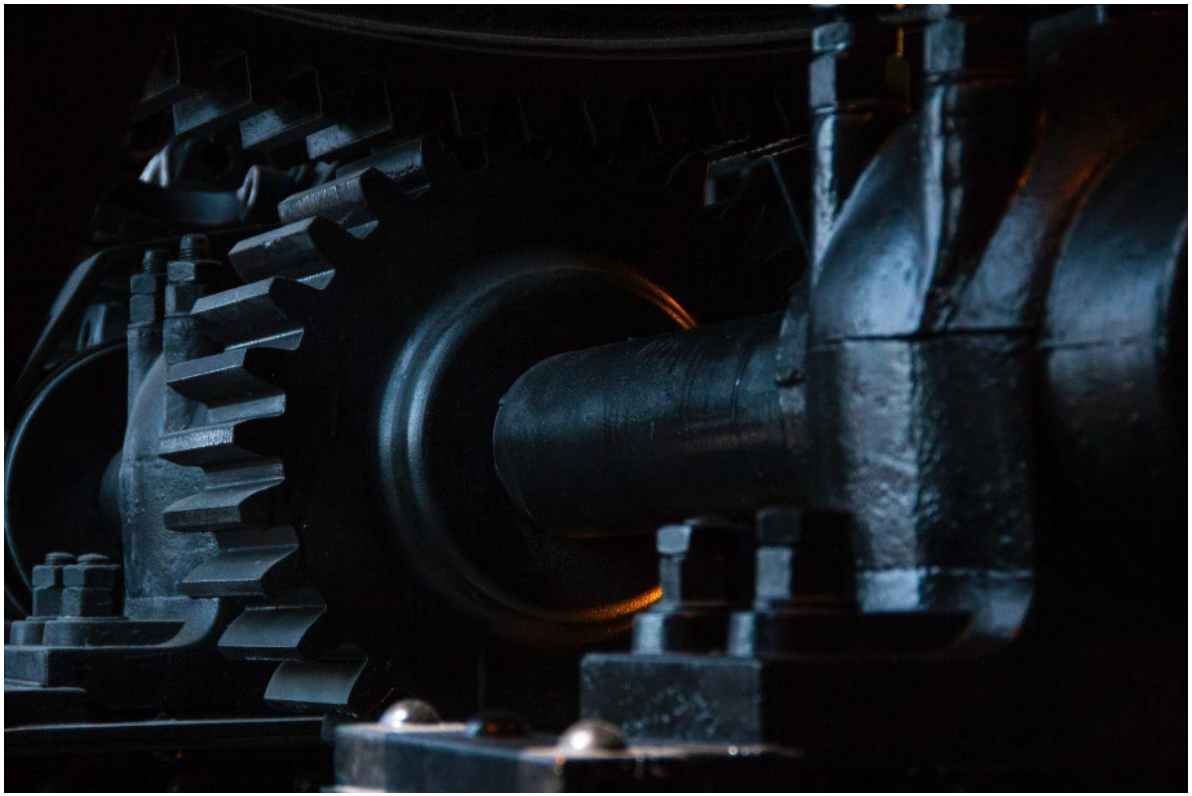
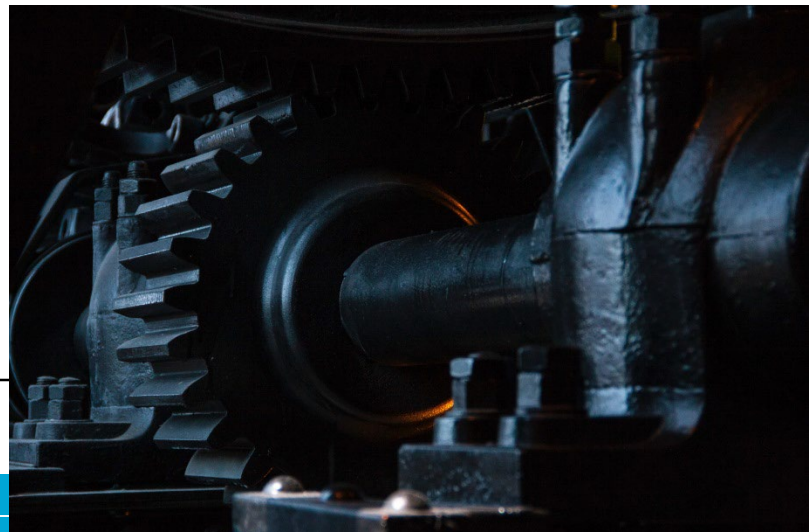
0.1 The 4th Industrial Revolution I



0.1 The 4th Industrial Revolution II

- 1st industrial revolution (end 18h century), trigged by the water- and steam-powered mechanical manufacturing

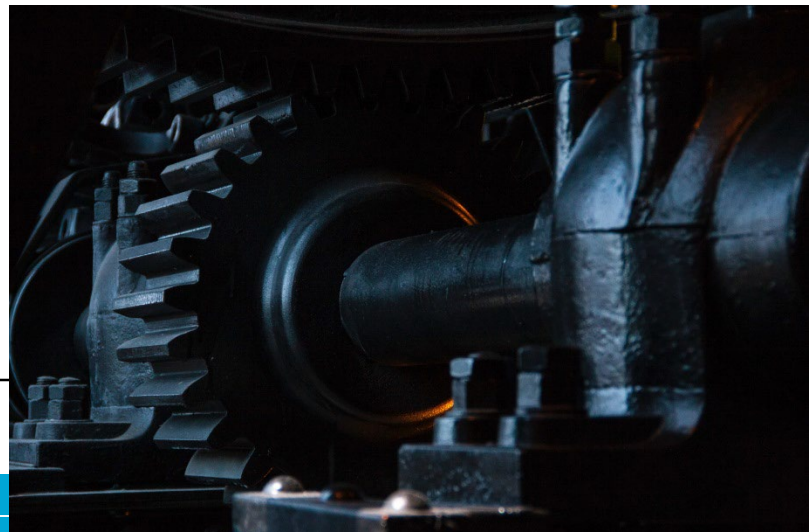
- 2nd industrial revolution (beginning of 20th century), driven by mass manufacturing



0.1 The 4th Industrial Revolution III

- 3rd industrial revolution (1970s), emerged from the introduction of programmable logic controllers (PLC) for automation purposes in manufacturing

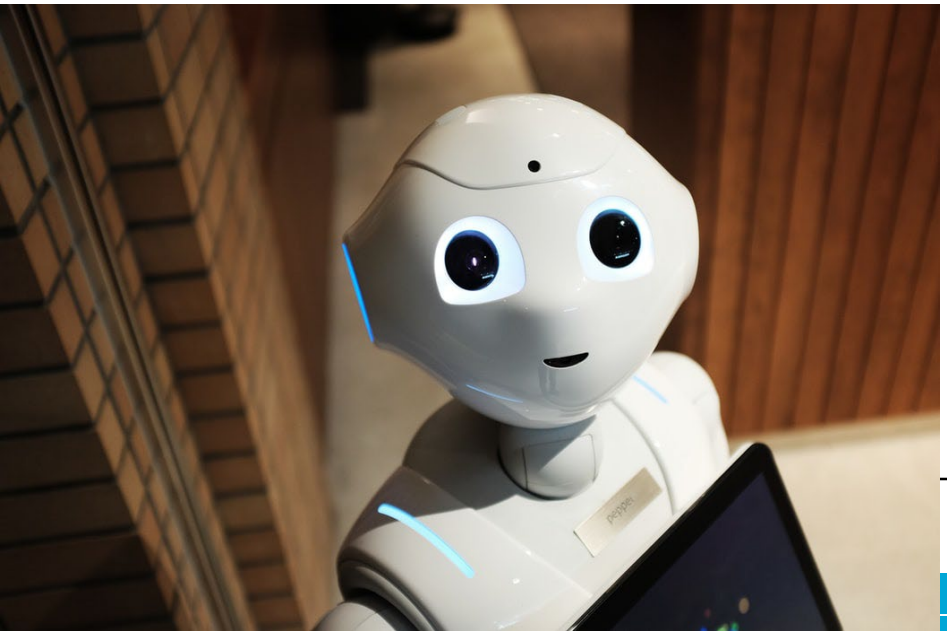
- 4th upcoming industrial revolution, set off by the internet allowing human-machine interaction throughout large networks



0.2 Responsible Innovation I

Conceptually:

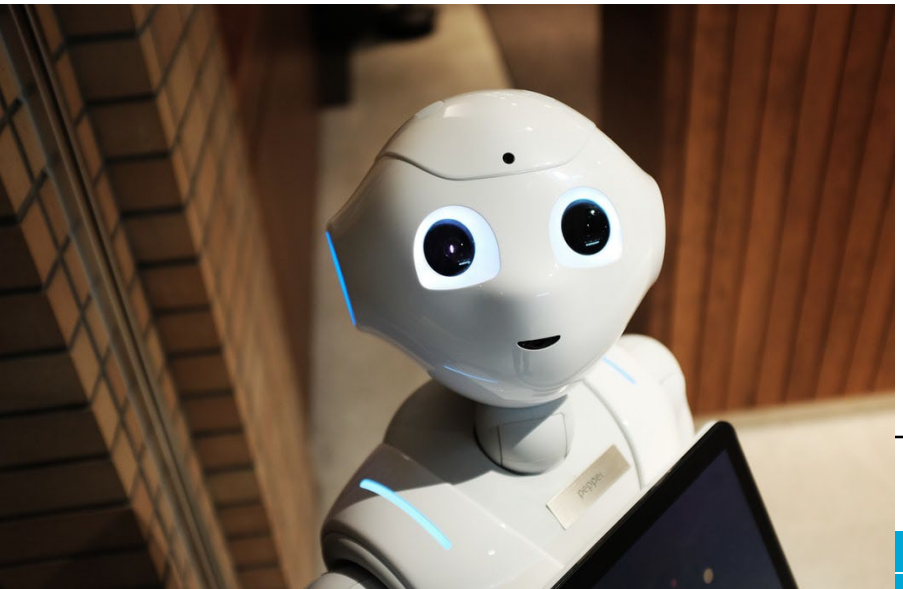
- employing and exploiting the potential of science, technology and innovation
- by incorporating values, i.e. “things worth striving for” (Taebi et al., 2014, p. 119), societal needs and economic opportunities



0.2 Responsible Innovation II

In practical terms:

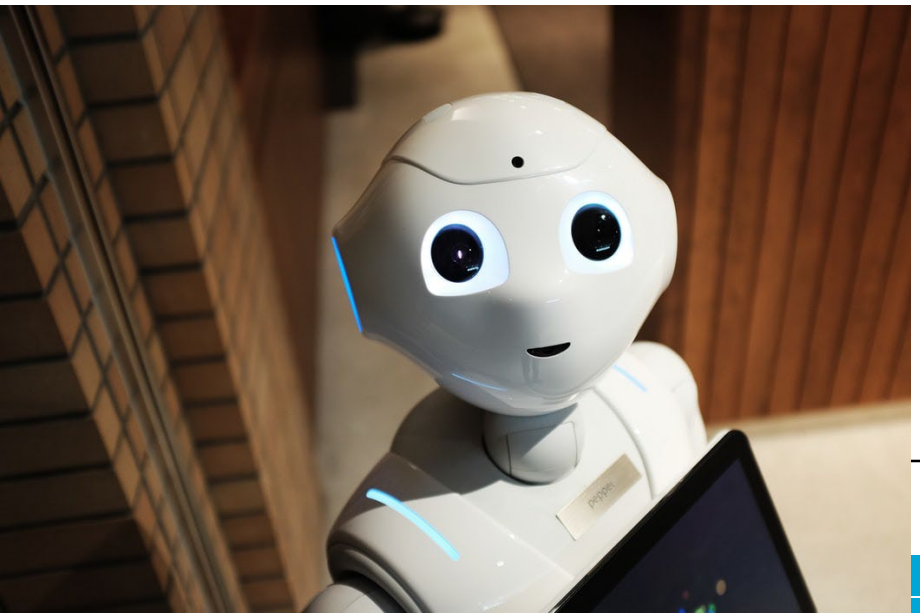
- consider contextual factors of a firm, a technological sector or a geographical area
- bottom-up approach: individual innovative agents develop shared values and joint activities
- top-down approach: groups of innovative agents contribute to monitoring, open-end experimentation, trust-building and legitimization



0.3 Responsible Innovation and 4th Industrial Revolution

Core of this course:

- analyzing innovation and technological development
- as part the fourth industrial revolution
- by a combination of economic (Economics of Technology and Innovation) and ethical approaches (Responsible Research and Innovation)



Skill: Quick Reading

- Become familiar with the source
  - read the abstract
  - skim the section headings
  - skim the bibliography
- Locate the point of the argument, i.e. the main claim
  - read introduction and conclusion
  - write down the problem and its resolution
  - find the evidence supporting the main claim
- If necessary identify sub-claims
- Identify key concepts
- Determine whether you need to read the paper as a whole or in part.

Source: Booth et al. (1995): The Craft of Research, p 82

Example: Quick Reading

van de Poel, I., Asveld, L., Flipse, S., Klaassen, P., Scholten, V., & Yaghmaei, E. (2017). Company Strategies for Responsible Research and Innovation (RRI): A Conceptual Model. Sustainability, 9(11), https://www.mdpi.com/2071-1050/9/11/2045/htm

SPOILER: Rules for groups distribution

- five students (exceptionally six)
- at least people of two nationalities present
- a maximum of three people having the same nationality

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0. Resp. innovation and the 4th Industrial Revolution

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1. Innovation: Concept and measurement

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Forming groups

Course Overview I: Content

0. Responsible innovation and the 4th industrial revolution
1. Innovation: Concepts and Measuresment
2. Innovation Systems and Proximity
3. Technological and Sectorial Innovation Systems
4. Geographical Innovation Systems
5. Digitization, Big Data and Disruptions
6. Responsible Research and Innovation (RRI)
7. RRI Systems

Course Overview II: Schedule 2022/23

05.09. lecture (I.) and groups work (II.): Ch. 0 and 1

12.09. lecture (III.) and groups work (IV.): Ch. 2

19.09. lecture (V.) and groups work (VI.): Ch. 3

26.09. lecture (VII.) and groups work (VIII.): Ch. 4

03.10. trial exam I (IX.) and its assessment (X.): Ch. 1-4

10.10. MOOC (XI.) and groups work (XII.): Ch. 5

17.10. lecture (XIII.) and groups work (XIV.): Ch. 6 and 7

24.10. trial exam II (IX.) and its assessment (X.): Ch. 5-7

07.11. exam/ 23.01. re-sit (trial exam preceding it t.b.a.)

Course Overview III: From traditional teaching to independent learning

Date	Ch	Teaching style	Skills
05.09.	0/1	Traditional lecture (TL) and groups‘ work (GW)	Organizing and leading a group; quick read material
12.09.	2	TL and GW, 2.1 blended learning/flipped classroom (B/F)	See above, presentations and discussions, case studies, cite sources
19.09.	3	B/F+, i.e. introduced briefly by the professor, and GW	See all of the above
26.09.	4	B/F by lecturer and GW	See all of the above
03.10.	trial	Trial exam I and assessment	Writing and assessing exam
10.10.	5	MOOC and GW	Independent work
17.10.	6/7	B/F+ and GW	See all of the above
24.10.	trial	Trial exam II and assessment	Writing and assessing exam

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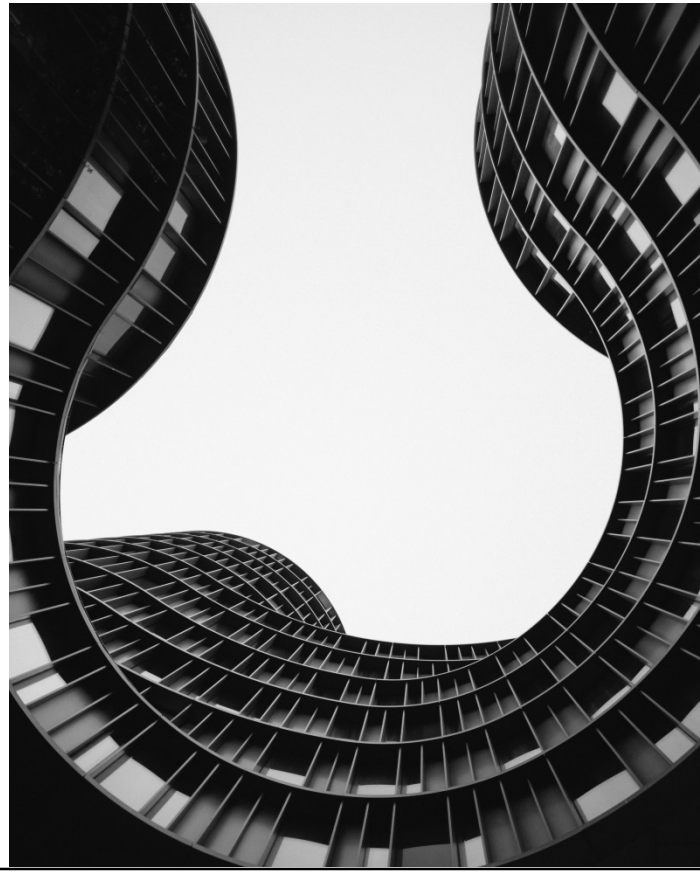
Learning Goals: Chapter 1

- define innovation
- recognize and identify different types of innovation
- characterize different kinds of innovation indicators
- explain their advantages and disadvantages
- critically assess the use of innovation indicators
- read texts using speedy reading
- use references according to the standards of social sciences

1. Innovation: Concept and Measurement

1.1 The Concept of Innovation

1.2 Innovation Indicators: measuring innovation



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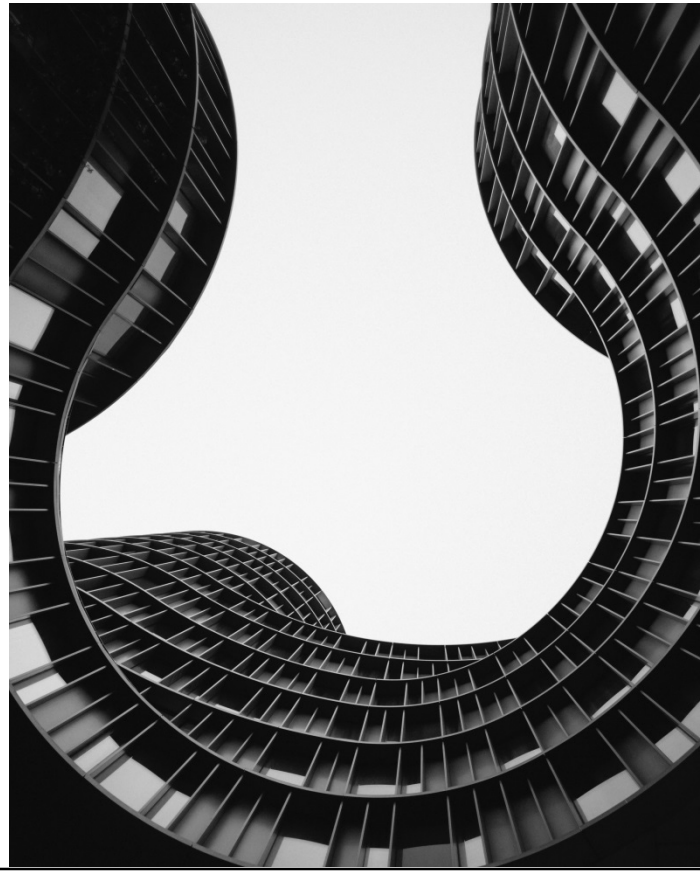
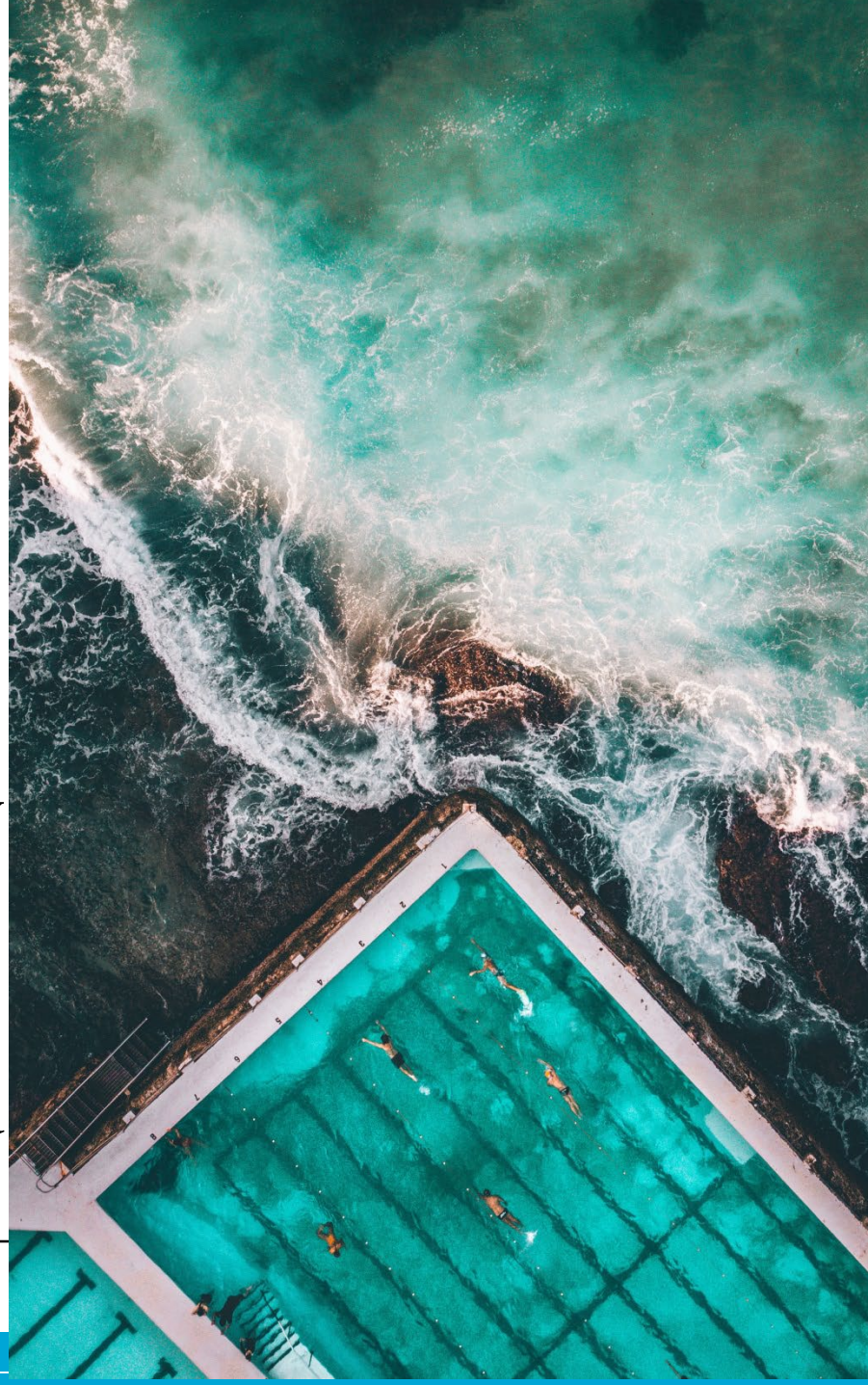


Warming up
(3 minutes)

Talk to your neighbour:

- What is an innovation?
- Give a definition and an example – preferably from your own engineering background



1.2 The Concept of Innovation I

Innovation: novel idea developed and transformed into a product, process or service or has been commercialized

How does innovation upend the system?

- radical innovation
- incremental innovation

1.2 The Concept of Innovation II

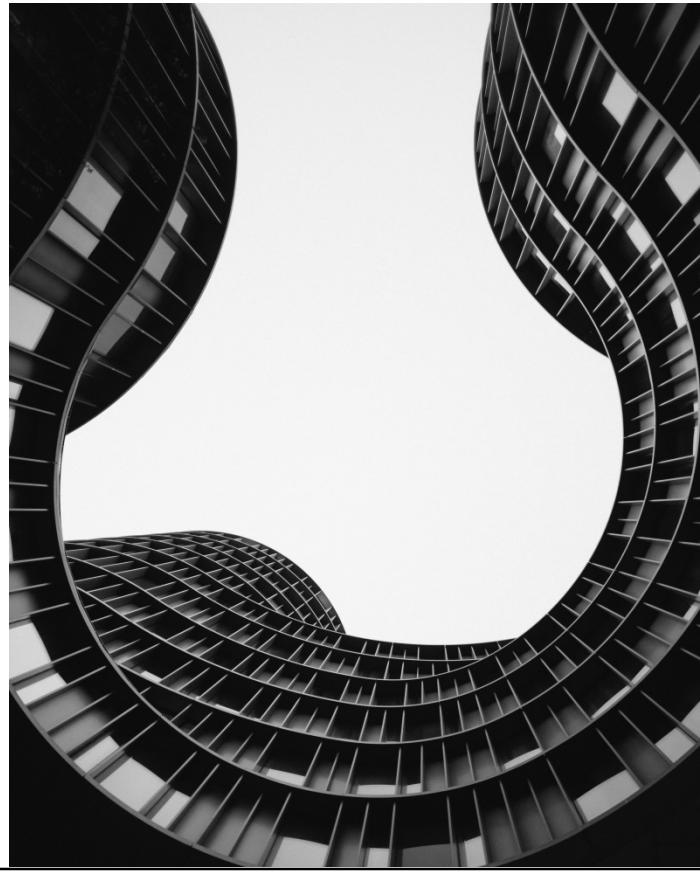
Which part of the economic processes does it influence?

- process innovation
- product innovation
- organizational innovation
- market innovation

1. Innovation: Concept and Measurement

1.1 The Concept of Innovation

1.2 Innovation Indicators: measuring innovation



1.2 Innovation indicators I

classified according to stage in innovation process

- Measures for innovation input
  - R&D investment
  - R&D personnel
- Measures for innovation throughput
  - patent citations
- Measures for innovation output
  - patent applications
  - number of process and product innovations
  - literature-based innovation output indicators, e.g. publications
  - Sales of innovative products

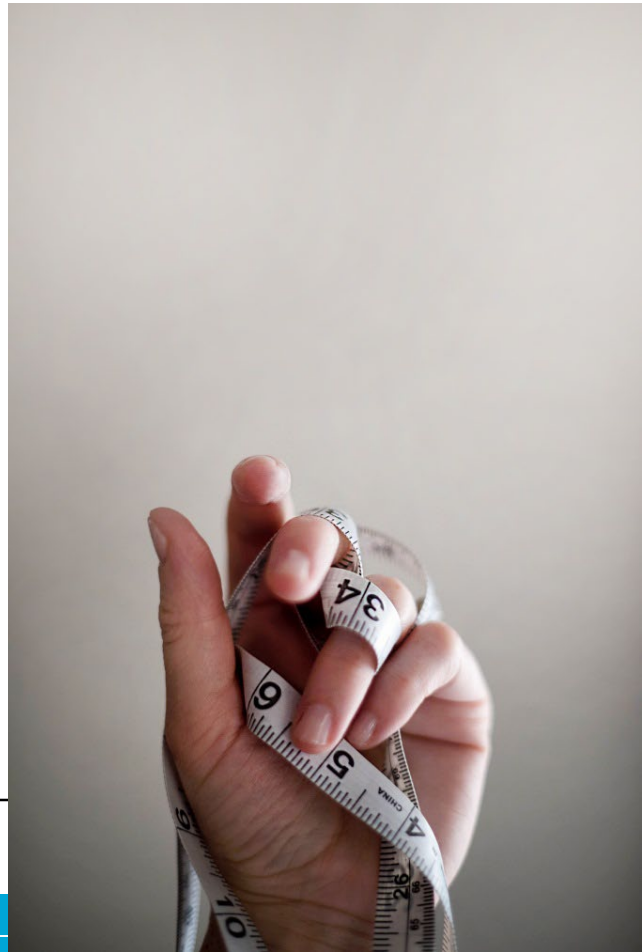
1.2 Innovation indicators: measuring innovation II

Innovation indicators:

- can be both used and abused
- lose information once used as targets for firms, universities or policy
- have different meanings countries in different stages of development

Useful:

- additional quantitative and qualitative indicators
- combined use of indicators



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LEARNING: Please use Brightspace for all information on MOT1412 Technology Dynamics! https://brightspace.tudelft.nl/

Important files

1. **schedule**
2. **reader**
3. **groups‘ work including exercises**
4. slides
5. possibly additional material

Introduction to blended learning

Chapters of reader:

- text
- reading lists
- links to videos

Extra-file with exercises

Important!

You will have to increasingly prepare the lectures in advance!

We will use the lecturing time for answering questions.

Introduction to the assessment I

Important!

The two trial exam (writing and assessment) are compulsory.

You can only take the exam if you at least

- **tried to answer every question including some indication if you cannot do so in both trial exams**
- **completely assess the trial exam of one fellow student for both trial exams**
- **upload both on time on Brightspace**

Introduction to the assessment II

- Compulsary trial exams on
  - October 3rd, 2022, and on
  - October 24th, 2022
- Exam on November 7th, 2022
- Resit on January 23rd, 2023 (preceded by a trial exam t.b.a.)

Exercises on the trial exams provide an indication of how the exam will look like.

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Introduction to the groups‘ work this afternoon I

- Groups‘ work on campus (supervised)
- Take-away groups‘ work (self-organized)
- Tasks for individual follow-up (independent)

Introduction to the groups‘ work this afternoon II

5 ECTS = 120-150 hours/ten weeks (Q1)

12.5-15 hours/week

3 hours of lecturing and on-campus groups‘ work + 1.5h self-organized groups work = 4.5 hours/week

8-10.5 hours for individual follow-up

Introduction to the groups‘ work this afternoon III

Please

- open https://brightspace.tudelft.nl
- go to MOT1412 2022-2023 Q1 - content – exercises
- open the file MOT1412 Technology Dynamics Groups Work including Exercises

- Go to **Week of September 5th, 2022**:
  - Groups‘ Work directly after the lecture
  - Take-away groups‘ work
  - Tasks for individual follow-up

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Forming groups II

Procedure:

- if you have a group formed according to the rules go to Caetano, Vincenzo or Francisco at the end of the lecture
- to get your group number and room number
- make sure that you are at the assigned room at 15.40h the latest

Forming groups III

Rooms available at TPM and at the Pulse building:

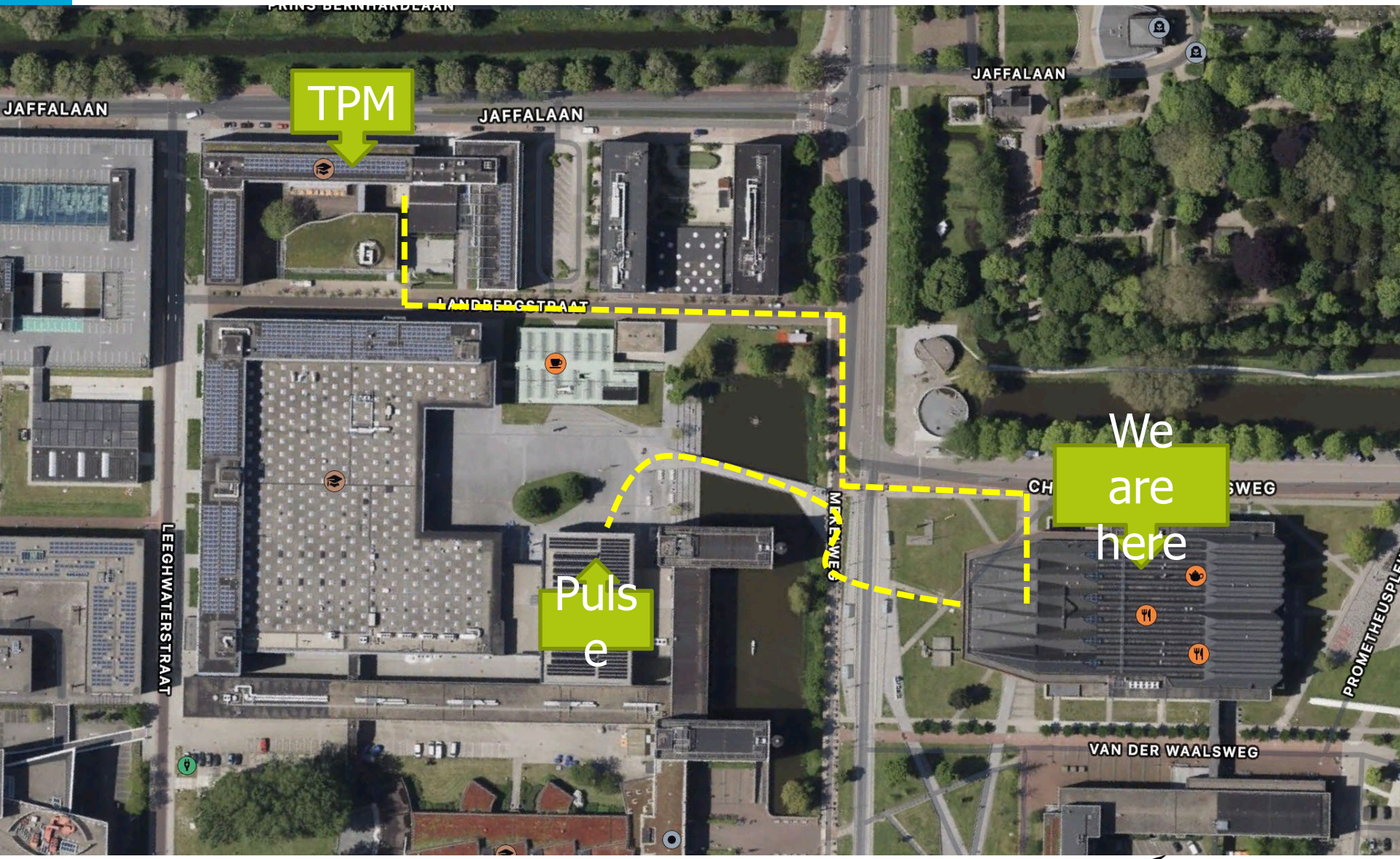
- **Pulse-Hall 4: five groups (58 places)**
- **Pulse-Technology: five groups (50 places)**
- **TPM-Hall B: five groups (56 places)**
- **TPM-Hall C: five groups (60 places)**
- **TPM-Hall D: four groups (34 places)**
- **TPM-Hall E: four groups (36 places)**
- **TPM-Instr. Room D1: four groups (42 places)**
- **TPM-Instr. Room D2: four groups (42 places)**

Forming groups IV

Asking questions during groups‘ work:

- about content: professors answer those
- about practical issues: teaching assistants collect those

Forming groups IV



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