- **Investing**
- Accounting and profitability
- Projects
- Production as a part of value chain
- Production processes and production control
- Production systems and organizations
- Creating value

Investing
Case-example

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In this exercise:

- Return on investment
  - Initial investment and cost of capital
  - Net present value (NPV)

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Evaluation of return on investment

- **The profitability of an investment can be assessed by its investment costs, cash flow from the investment and cost of capital**
- **Common methods used to assess the profitability of an investment are:**
    - Net present value (NPV)
    - Internal rate of interest (IRR)
    - Payback period

Initial investment and cash flow

- **BWM factory's Initial Investment was 1 Billion US ($ 1,000,000,000)**
- **Production facilities could operate for example 10 years**
- **One 3-Series car costs around $ 40 000**
  - Taxes are ignored for simplicity
  - Car manufacturers receive an average of 6% margin on one car sold
  - Suppose the customer pays for the car immediately upon purchase
- **Suppose the cost of the factory to be $ 100 000 000 a year**
- **If the factory produces 150,000 cars a year, then the annual free cash flow will be**

$$\mathbf{150\,000 * \$40\,000 * 6\,\% - \$100\,000\,000 = \$260\,000\,000}$$

Statistics Canada (2007). *Manufaturing plants have short lives.* [Viitattu 6.8.2019]. Saatavissa: https://www150.statcan.gc.ca/n1/pub/11-402-x/2007/4005/grafx/htm/ceb4005_002_5-eng.htm

Cost of capital

WACC = Weighted Average Cost of Capital,
that is defined as follows:

$$WACC = \left[\frac{E_{TOT_i}}{A_{TOT_i}} \cdot r_E + \frac{D_{TOT_i}}{A_{TOT_i}} \cdot r_D \cdot (1 - \tau)\right] \cdot 100\%,$$

where A_{TOTi} = Total Assets,
D_{TOTi} = Total Liabilities (Debts),
E_{TOTi} = Total Equity,
τ = corporate tax rate,
r_E = required yield for equity and
r_D = average interest rate for debts.

KPMG (2017). *Cost of Capital Study 2017.* [Viitattu 6.8.2019]. Saatavissa: https://assets.kpmg/content/dam/kpmg/ch/pdf/cost-of-capital-study-2017-en.pdf

Cost of capital

- **The average capital cost of investment in the automotive industry is about 7.6%**
    - Weighted Average Cost of Capital, WACC
- **Money is more valuable today than in the future**
    - Capital has a 'cost'
    - If money is available right away, it can make a profit
    - The present value of future cash flows is obtained by discounting

KPMG (2017). *Cost of Capital Study 2017.* [Viitattu 6.8.2019]. Saatavissa: https://assets.kpmg/content/dam/kpmg/ch/pdf/cost-of-capital-study-2017-en.pdf

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In this exercise:

- Return on investment
  - Initial investment and cost of capital
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Net present value (NPV)

- **NPV will help you evaluate the return on investment**
  - However, NPV does not tell you the exact value of the investment!
  - NPV factors in the timing of cash flows
- **In general, the investment is profitable if the NPV is positive**
- **The net present value is calculated:**

$$\mathbf{NPV} = \sum_{t=0}^{n} \frac{\mathbf{FCF}_t}{(1 + WACC)^t}$$

NPV

- **NPV is the sum of discounted cash flows**
- **The table below lists free cash flows and their discounted values**
  - Year 0 includes only the initial investment
  - NPV is approximately $ 721.7 million
  - NPV gets a positive value
  - That is, along with the NPV rule, the investment is profitable

Year	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
Free cash flow	-1000000000	260000000	260000000	260000000	260000000	260000000	260000000	260000000	260000000	260000000	260000000
Discounted cash flow	-1000000000	241635687,7	224568483	208706768,6	193965398,3	180265240,1	167532751	155699582,7	144702214,4	134481611,9	124982910,7
WACC	7,60 %										
NPV	**776540648,6**										

Week 5 assignment:
Project plan and return on investment

Evaluating Return on Investment (Excel file)

- Estimate your initial investment in euros

  - *Initial investment includes equipment, facilities and other procurements to start a business*

- Estimate your company's free cash flow for years 0–4

  - Year 0 includes only the initial investment

  In years 1-4, business is conducted normally

- Calculate the net present value of your investment using 10% average cost of capital (WACC = 10%)

  - Is the investment profitable?

Week 5 assignment:
Project plan and return on investment

- **Return Excel-file and text part as a pdf to myCourses. The weekly assignment must be returned not later than Monday, 9 November at 6:00 pm**

- **Remember to give feedback:**
  1. How long did it take to do the assignment?
  2. What new did you learn?
  3. What should be developed in this exercise?
  4. General comments on the course so far?