The Future Value of Investing in Adaptivity in Offices

P5 Presentation - Tom van Eerden

10-4-2018

TU Delft

€?

Content

- Introduction
- Definitions & scope
  - Background of Adaptivity
  - Investing in Adaptivity
  - Valuation methods
- Case
- Conclusions
- Recommendations

Problem statement

Problem statement

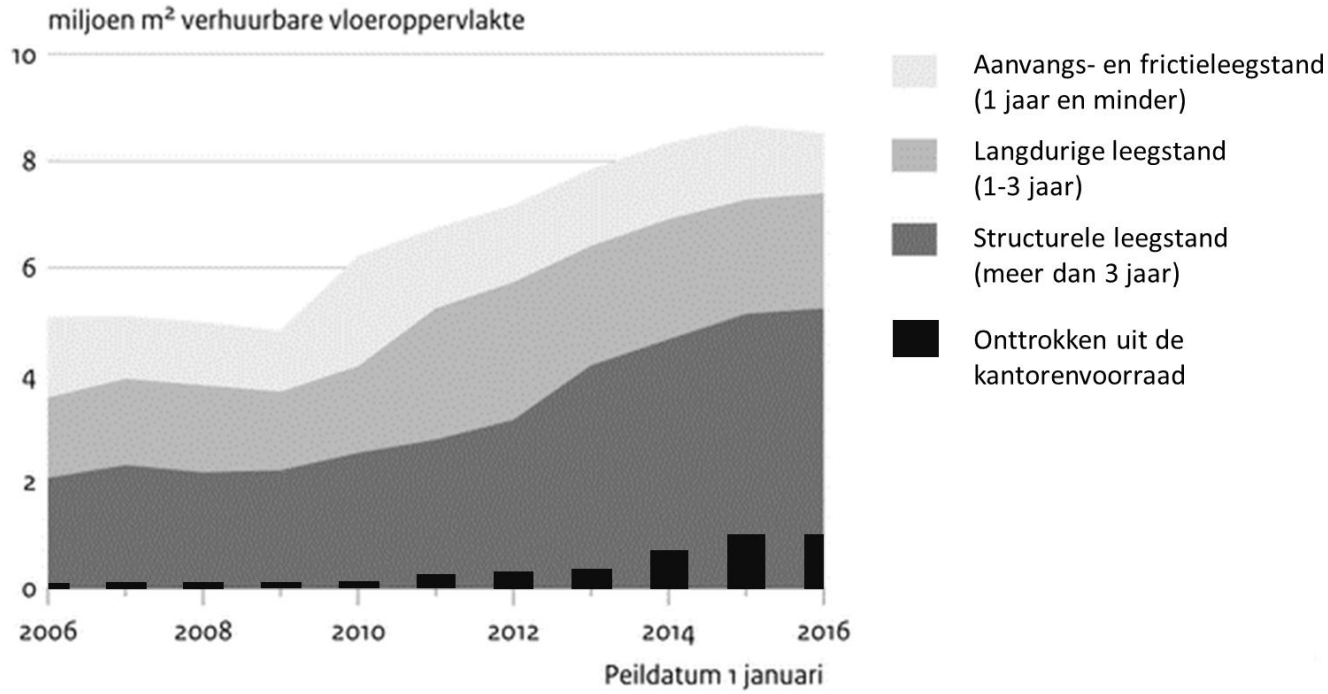

Figure 1: The division of levels in vacancy & sqm extracted from supply (CLO, 2016; Dynamis, 2017)

Trends

Figure 3: Grootschalige kantooropnames verleden tijd (bureau stedelijke planning, 2017)

Cycle

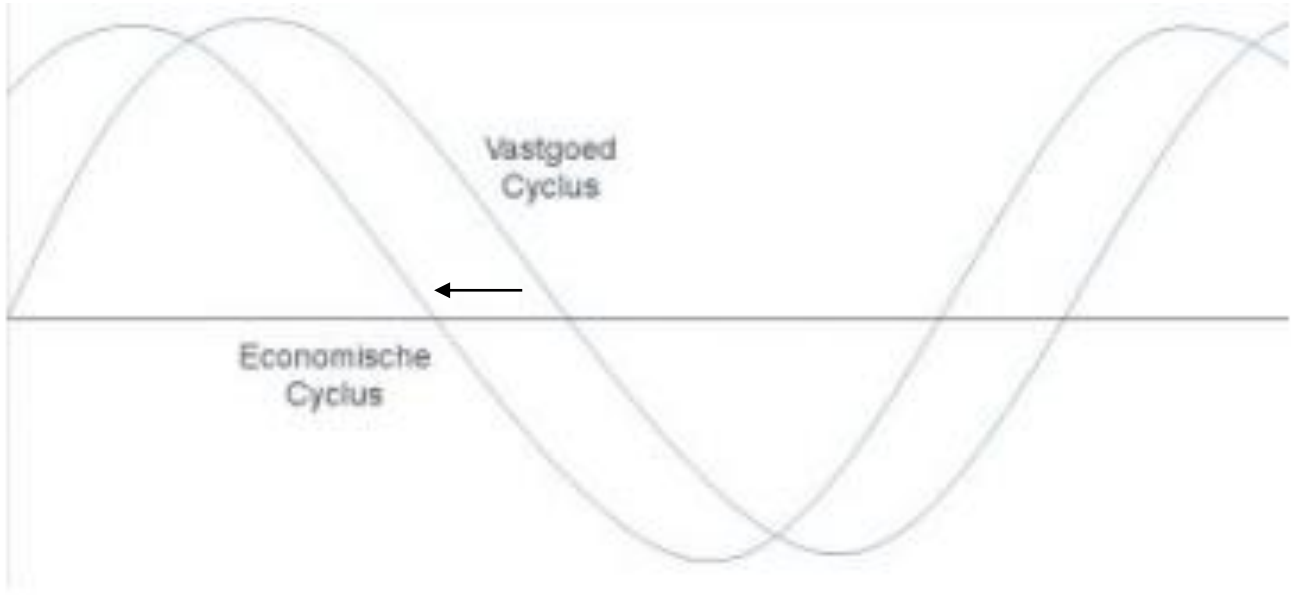

Figure 4: Vastgoedcyclus (IVVD, 2017)

Research aim

The aim of this research is **to develop a financial decision model** for an owner/investor to value the future value of adaptivity for an investment in an office building in the Netherlands.

By **showing the uncertainties and advantages of investing in adaptivity** during the total technical life cycle, the **willingness to invest** in the adaptive capacity of an office building could be increased.

Research question

- How to cope with future uncertainty in a DCF method to value the adaptive capacity of office buildings to stimulate investors to invest in adaptivity?

Research question

- How to cope with future uncertainty in a DCF method to value the adaptive capacity of office buildings to stimulate investors to invest in adaptivity?
  - What is **adaptivity**?

Research question

- How to cope with future uncertainty in a DCF method to value the adaptive capacity of office buildings to stimulate investors to invest in adaptivity?
  - What is **adaptivity**?
  - What is the reason to **invest in adaptivity**?

Research question

- How to cope with future uncertainty in a DCF method to value the adaptive capacity of office buildings to stimulate investors to invest in adaptivity?
  - What is **adaptivity**?
  - What is the reason to **invest in adaptivity**?
  - What are the crucial inputs within the current **valuation method** and what should be added to the method?

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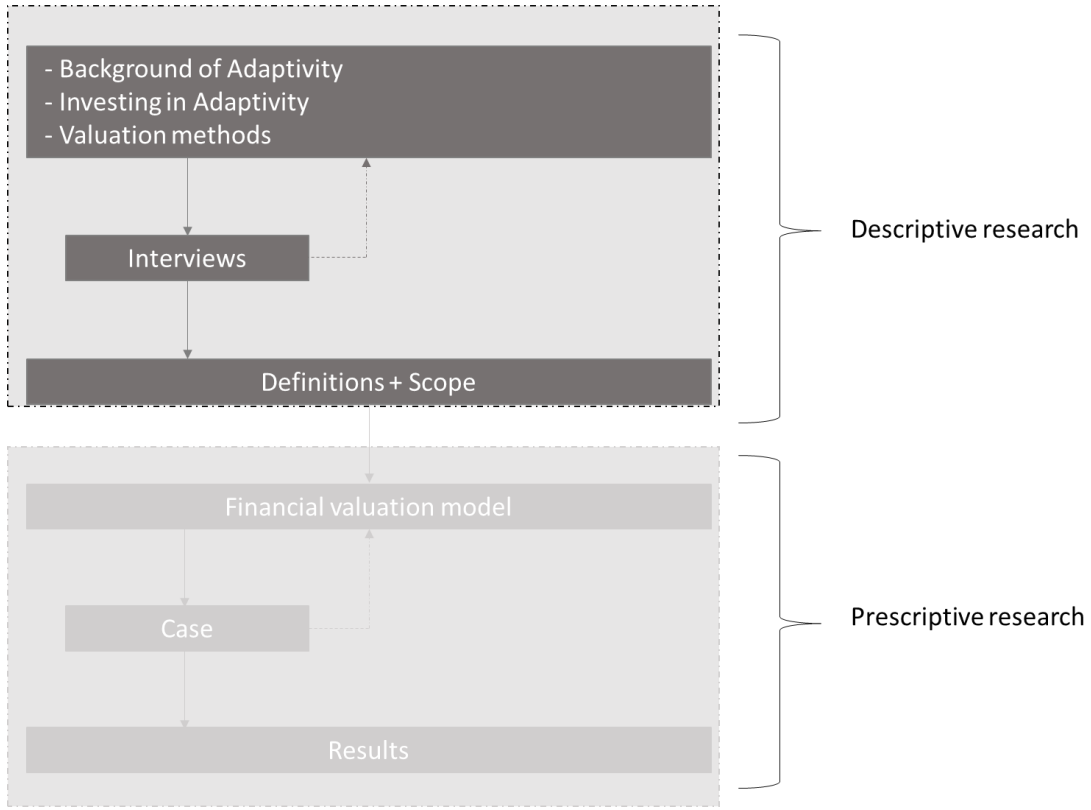
Methodology



Definitions & Scope - Adaptivity

Definitions & Scope - Adaptivity

Use dynamics

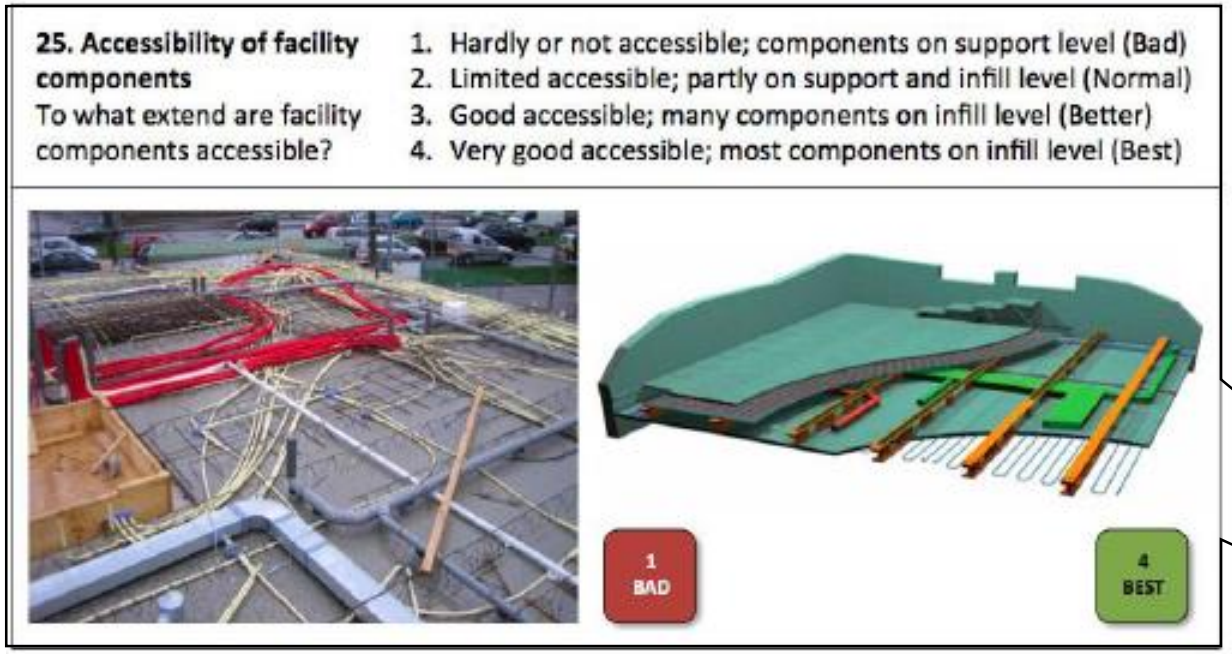
Transformation dynamics

Definitions & Scope - Adaptivity

Use dynamics

Transformation dynamics

Definitions & Scope - Adaptivity



FLEX 2.0

Figure 8: FLEX 2.0 (Geraedts, 2013)

Definitions & Scope – Investing in Adaptivity

Commercial investor

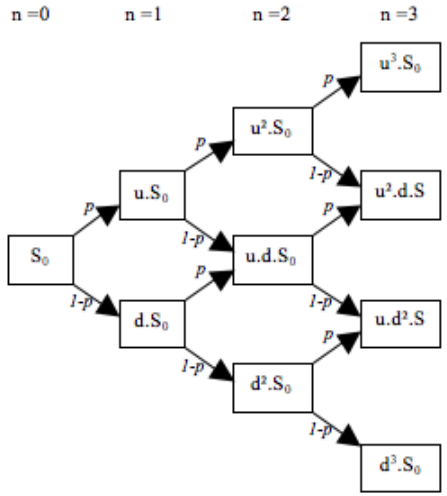
Investor-owner

Definitions & Scope – Valuation methods

Definitions & Scope – Valuation methods

Decision Tree Analysis (DTA)

Monte Carlo Simulation



Option Theory

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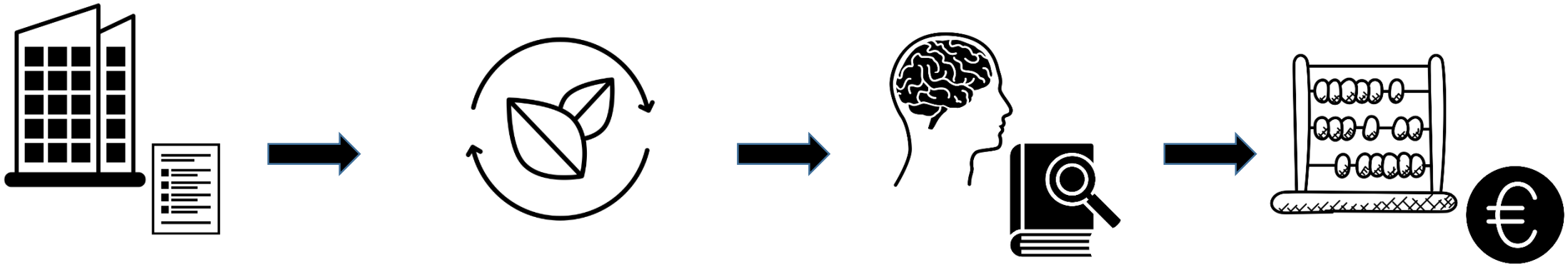
Case - Methodology



Step 0: Project information

Step 1: Formulating Adaptivity requirements

Step 2: Assumptions

Step 3: Calculation

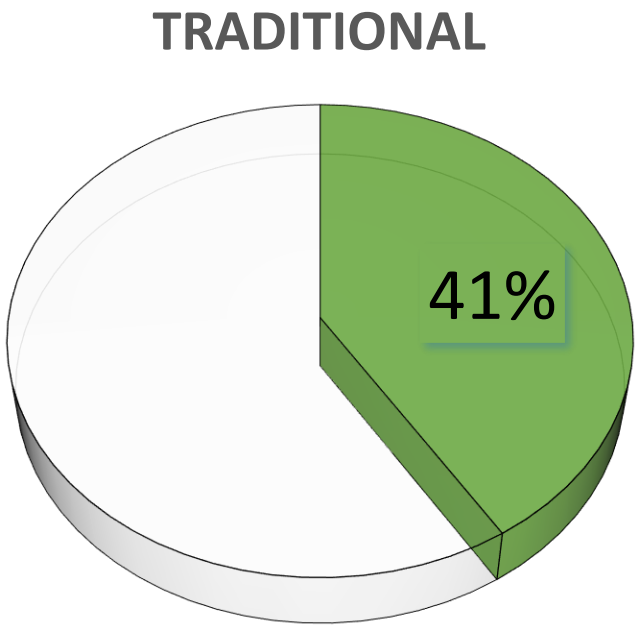
Case

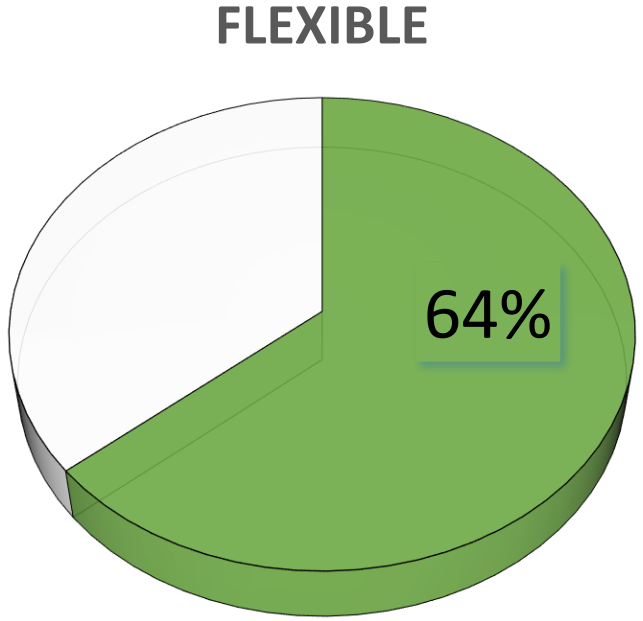
“de Schelde”, Bergen op Zoom, Noord-Brabant

Case

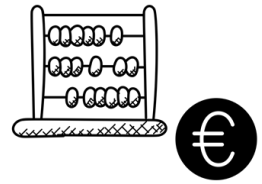
Figure 20: Concept plattegronden (Brink Groep, 2011)

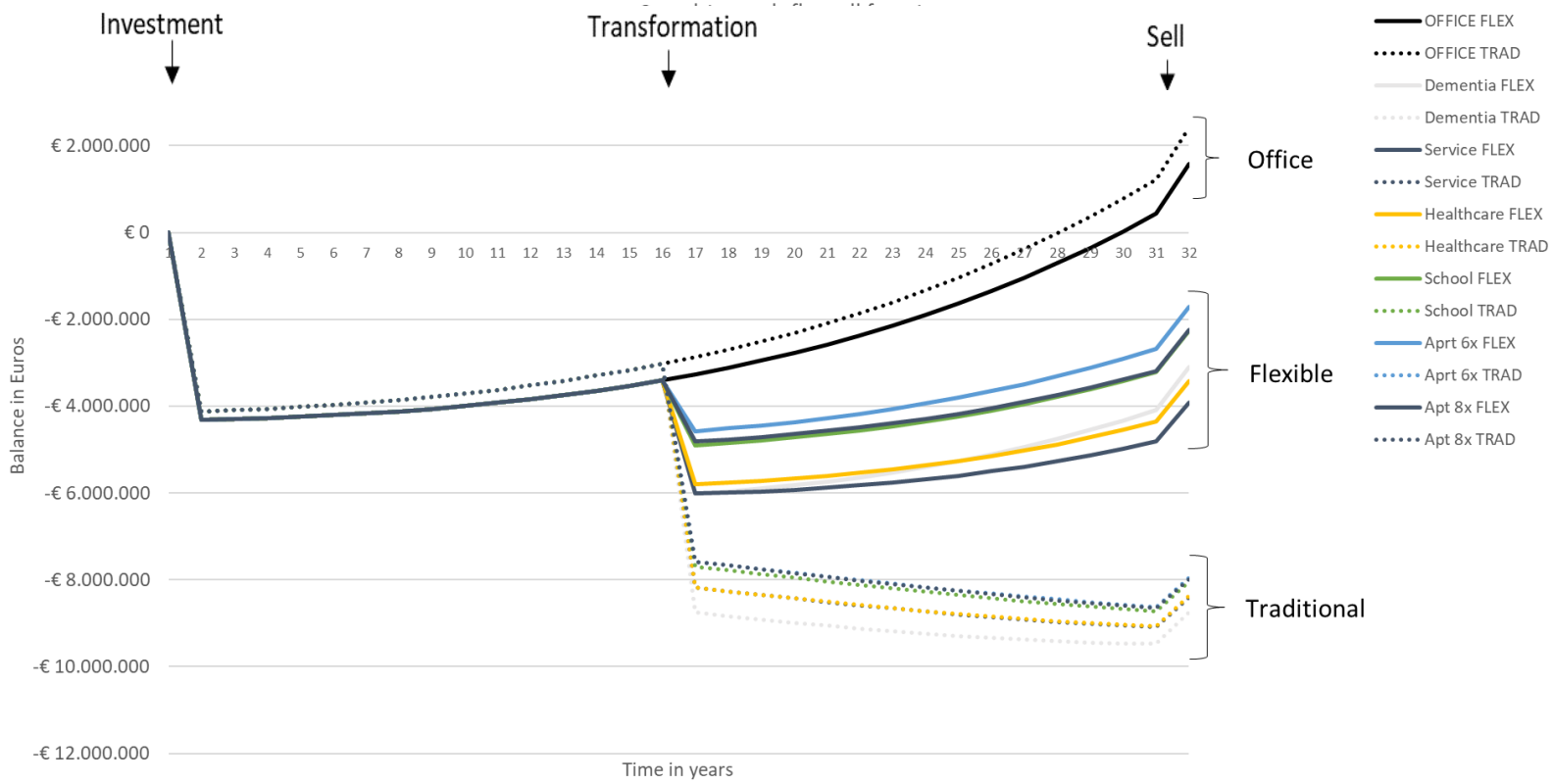
Case



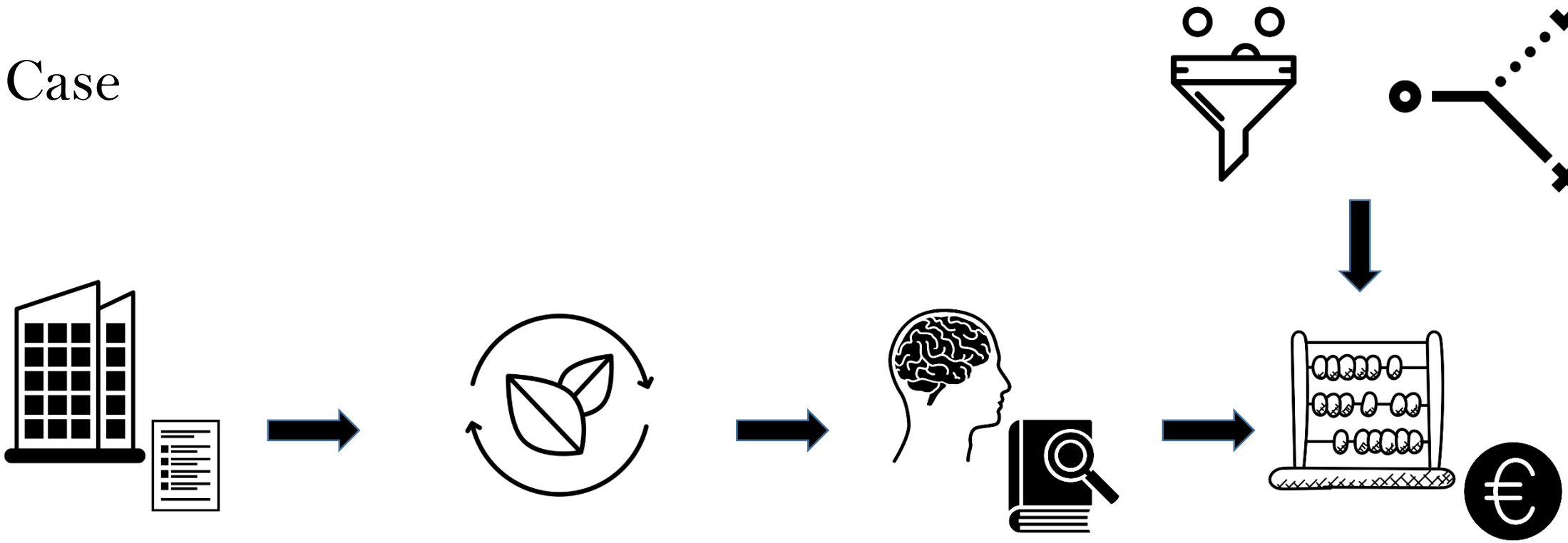


Case




Investment
Transformation
Sell
€ 2.000.000
€ 0
-€ 2.000.000
-€ 4.000.000
-€ 6.000.000
-€ 8.000.000
-€ 10.000.000
-€ 12.000.000
Balance in Euros
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
Time in years
Office
Flexible
Traditional
OFFICE FLEX
OFFICE TRAD
Dementia FLEX
Dementia TRAD
Service FLEX
Service TRAD
Healthcare FLEX
Healthcare TRAD
School FLEX
School TRAD
Aprt 6x FLEX
Aprt 6x TRAD
Apt 8x FLEX
Apt 8x TRAD

Case



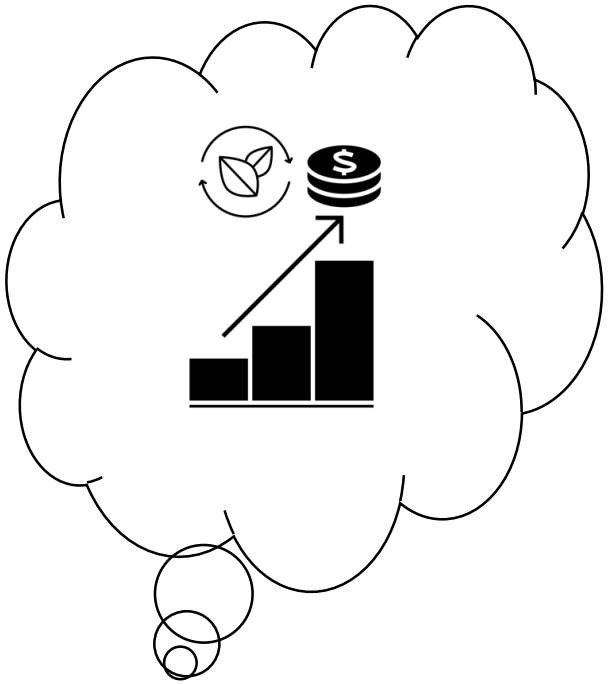
Step 0: Project information

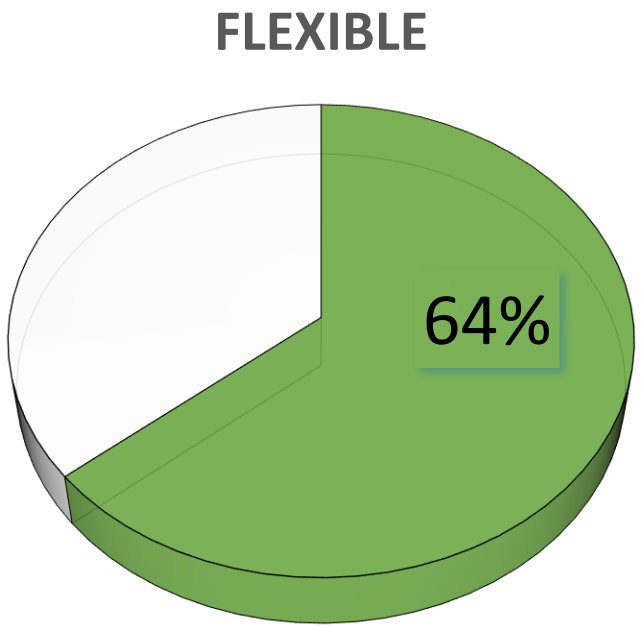
Step 1: Formulating Adaptivity requirements

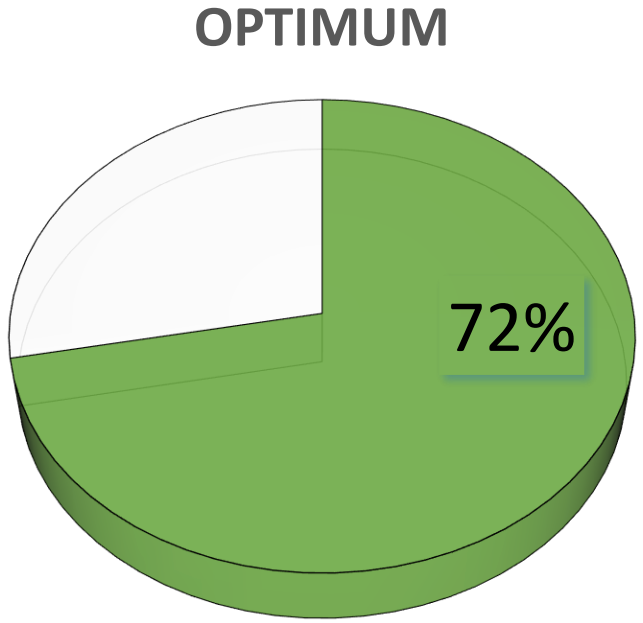
Step 2: Assumptions

Step 3: Calculation

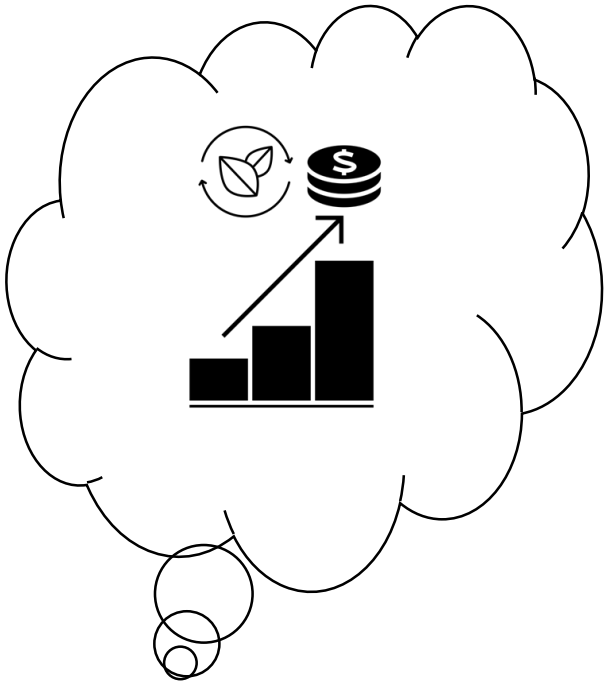
Case

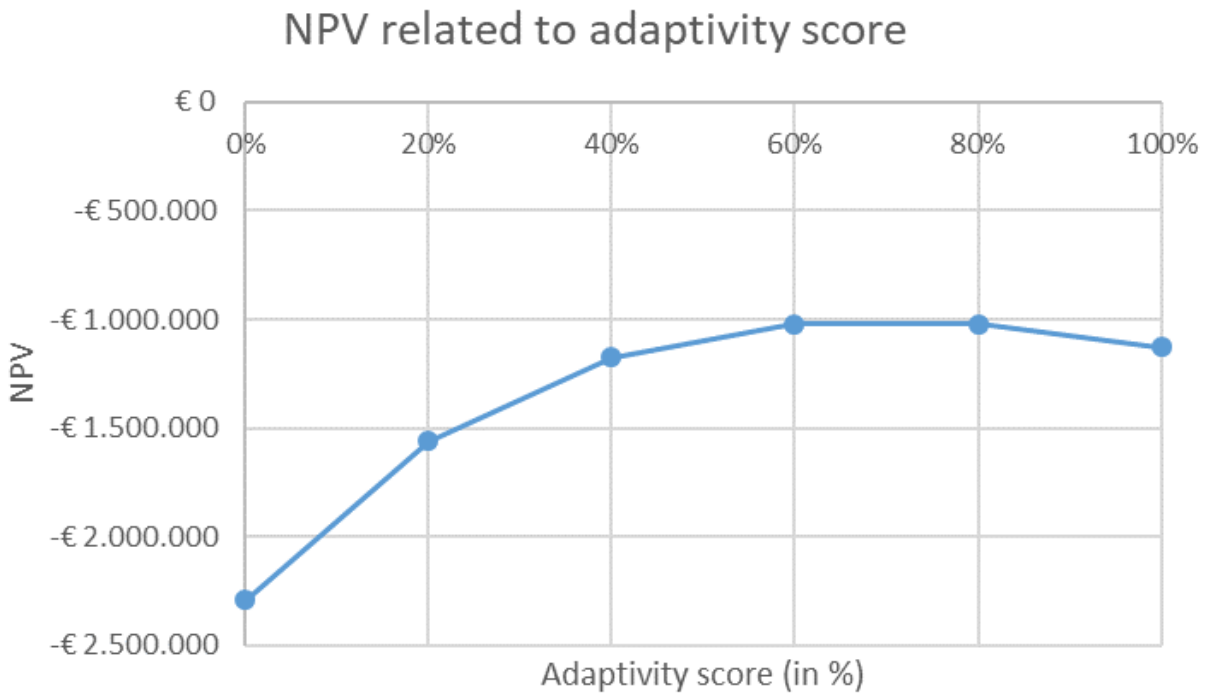




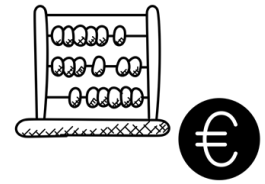


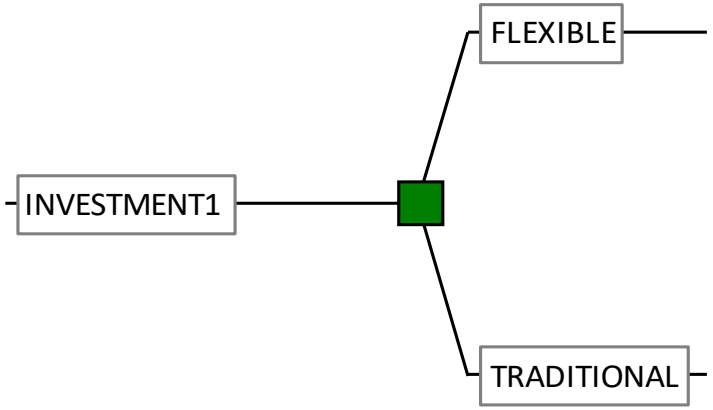
Case



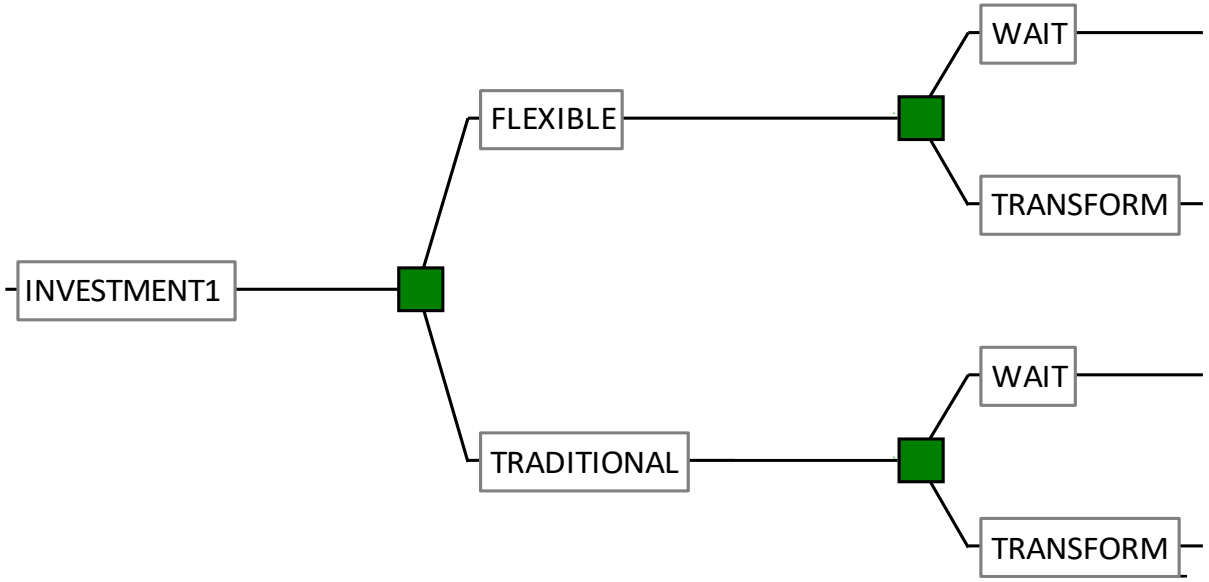

NPV related to adaptivity score
€ 0
-€ 500.000
-€ 1.000.000
-€ 1.500.000
-€ 2.000.000
-€ 2.500.000
NPV
0%
20%
40%
60%
80%
100%
Adaptivity score (in %)

Case

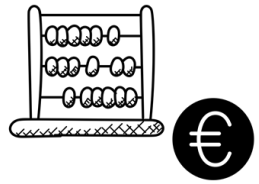


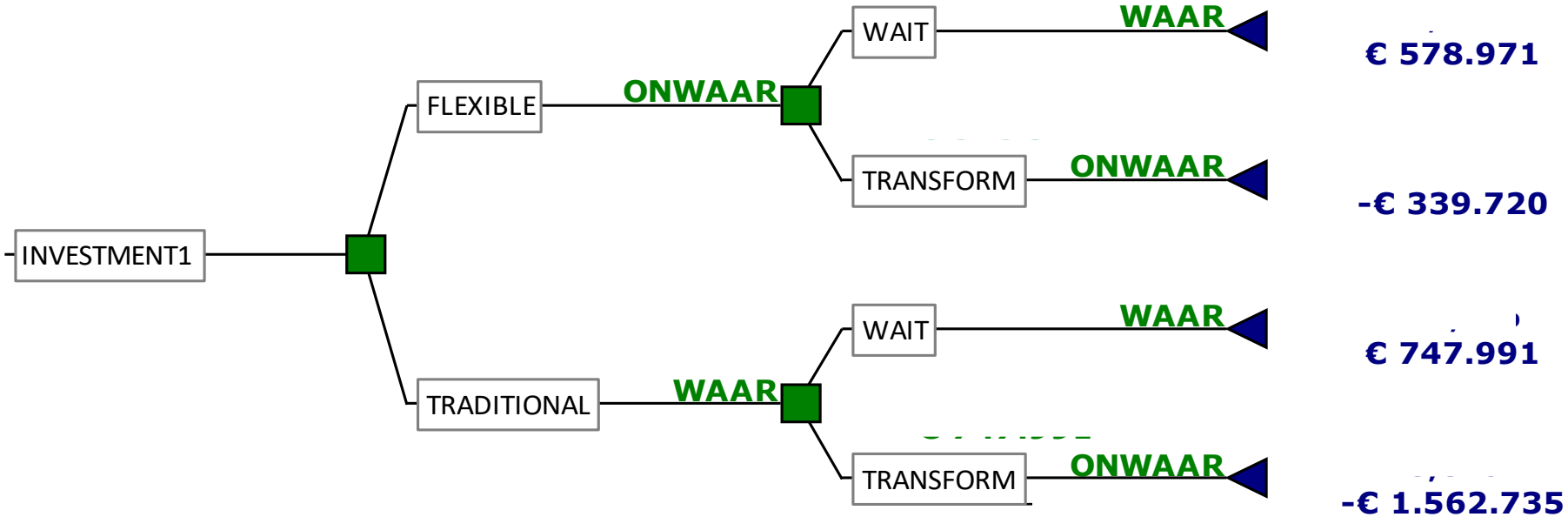


Case

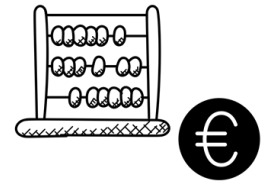

INVESTMENT1
FLEXIBLE
TRADITIONAL
WAIT
TRANSFORM
WAIT
TRANSFORM

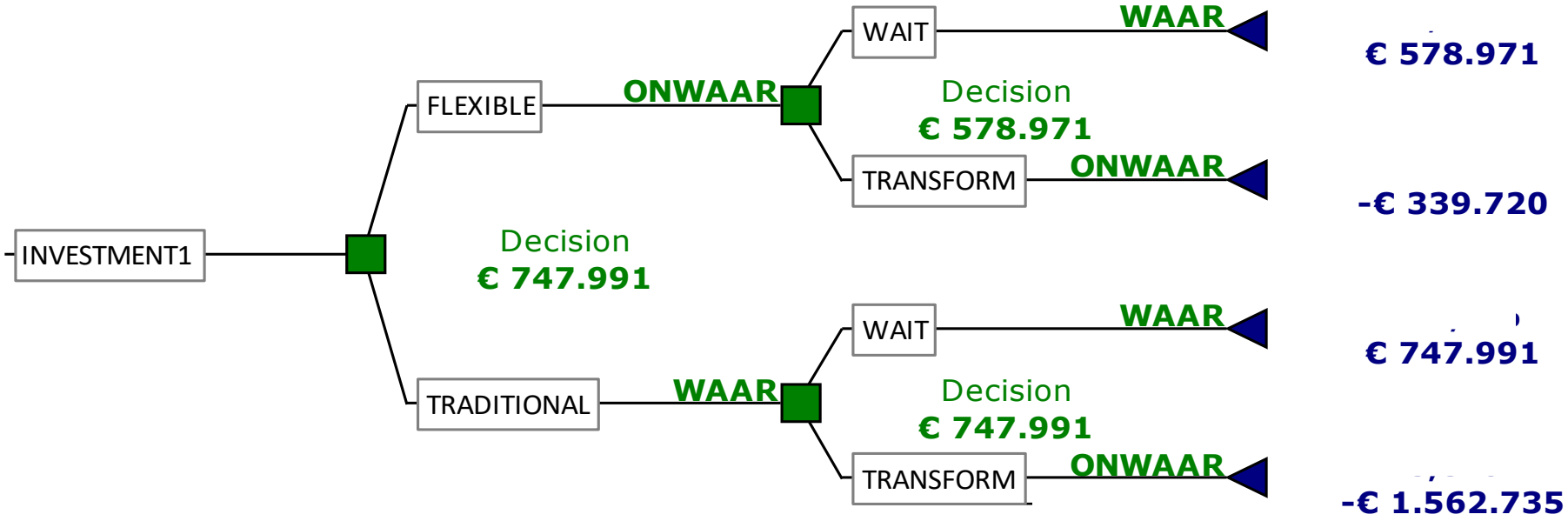
Case




INVESTMENT1
FLEXIBLE
TRADITIONAL
ONWAAR
WAAR
WAIT
TRANSFORM
WAIT
TRANSFORM
WAAR
ONWAAR
WAAR
ONWAAR
€ 578.971
-€ 339.720
€ 747.991
-€ 1.562.735

Case




INVESTMENT1
FLEXIBLE
TRADITIONAL
ONWAAR
WAAR
Decision
€ 747.991
WAIT
TRANSFORM
WAIT
TRANSFORM
Decision
€ 578.971
Decision
€ 747.991
WAAR
ONWAAR
WAAR
ONWAAR
€ 578.971
-€ 339.720
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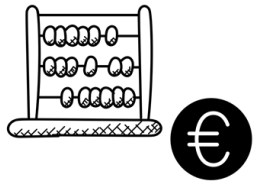
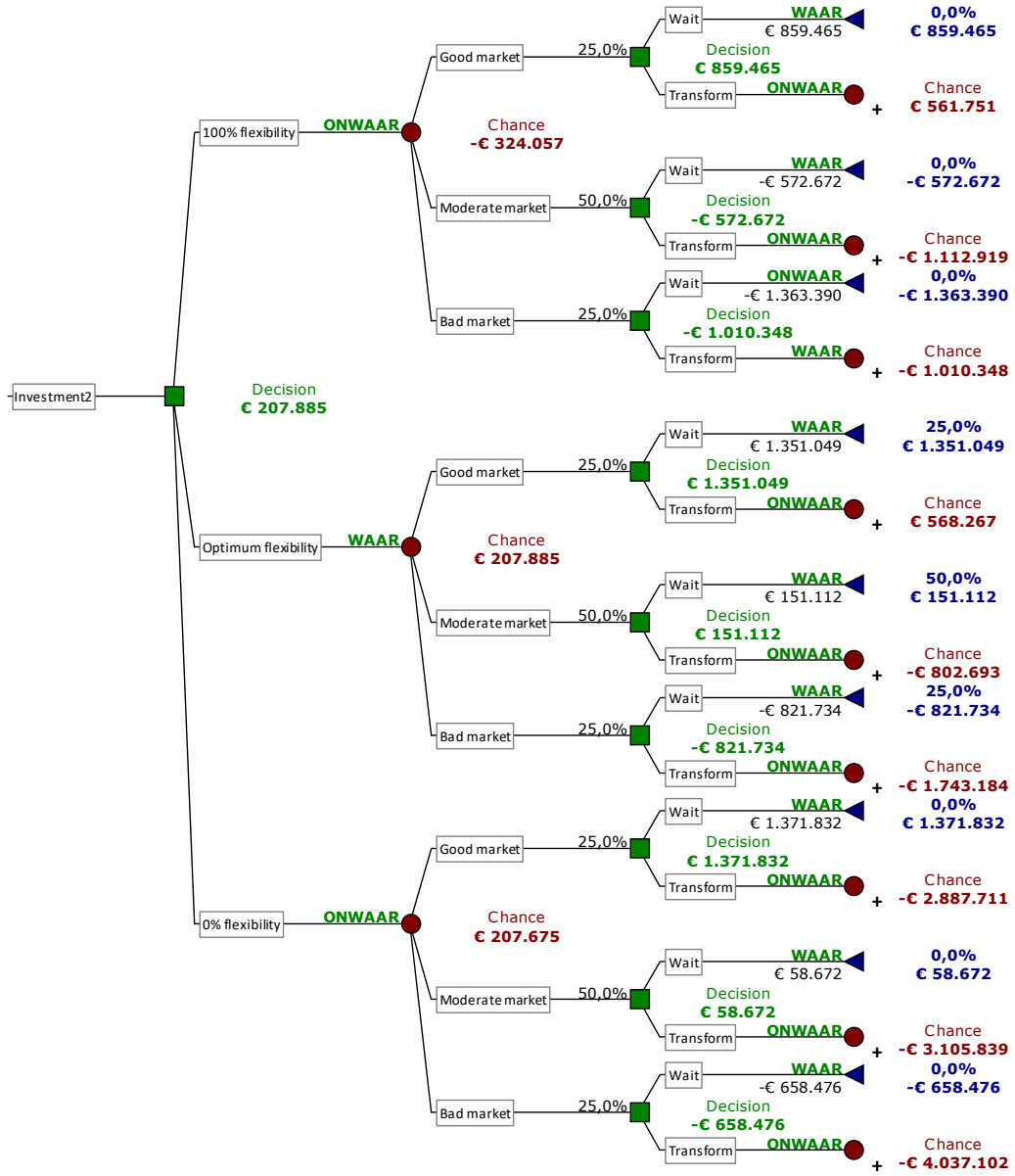
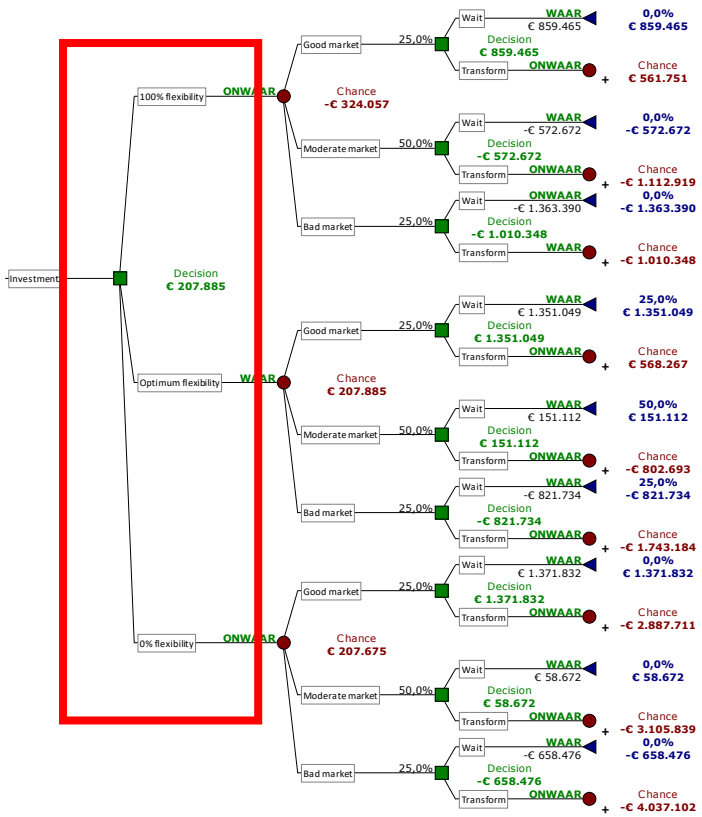
Case




Investment2
Decision
€ 207.885
100% flexibility
ONWAAR
Chance
-€ 324.057
Good market
25,0%
Wait
WAAR
€ 859.465
0,0%
€ 859.465
Decision
€ 859.465
Transform
ONWAAR
Chance
€ 561.751
Moderate market
50,0%
Wait
WAAR
-€ 572.672
0,0%
-€ 572.672
Decision
-€ 572.672
Transform
ONWAAR
Chance
-€ 1.112.919
Bad market
25,0%
Wait
ONWAAR
-€ 1.363.390
0,0%
-€ 1.363.390
Decision
-€ 1.010.348
Transform
WAAR
Chance
-€ 1.010.348
Optimum flexibility
WAAR
Chance
€ 207.885
Good market
25,0%
Wait
WAAR
€ 1.351.049
25,0%
€ 1.351.049
Decision
€ 1.351.049
Transform
ONWAAR
Chance
€ 568.267
Moderate market
50,0%
Wait
WAAR
€ 151.112
50,0%
€ 151.112
Decision
€ 151.112
Transform
ONWAAR
Chance
-€ 802.693
Bad market
25,0%
Wait
WAAR
-€ 821.734
25,0%
-€ 821.734
Decision
-€ 821.734
Transform
ONWAAR
Chance
-€ 1.743.184
0% flexibility
ONWAAR
Chance
€ 207.675
Good market
25,0%
Wait
WAAR
€ 1.371.832
0,0%
€ 1.371.832
Decision
€ 1.371.832
Transform
ONWAAR
Chance
-€ 2.887.711
Moderate market
50,0%
Wait
WAAR
€ 58.672
0,0%
€ 58.672
Decision
€ 58.672
Transform
ONWAAR
Chance
-€ 3.105.839
Bad market
25,0%
Wait
WAAR
-€ 658.476
0,0%
-€ 658.476
Decision
-€ 658.476
Transform
ONWAAR
Chance
-€ 4.037.102

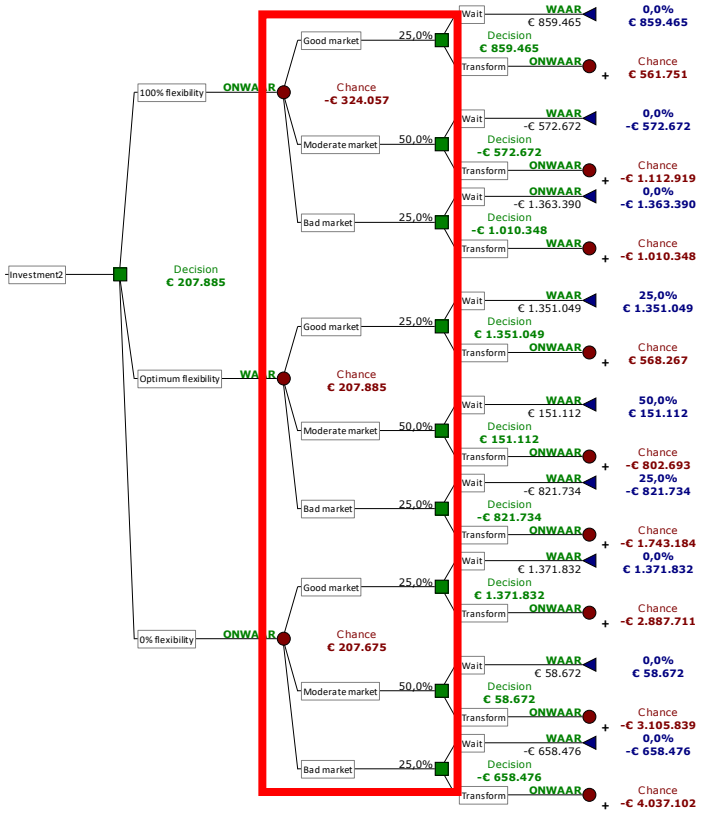
Case



1ste Decision:

- 100% Adaptivity
- Optimum Adaptivity (72%)
- 0% Adaptivity

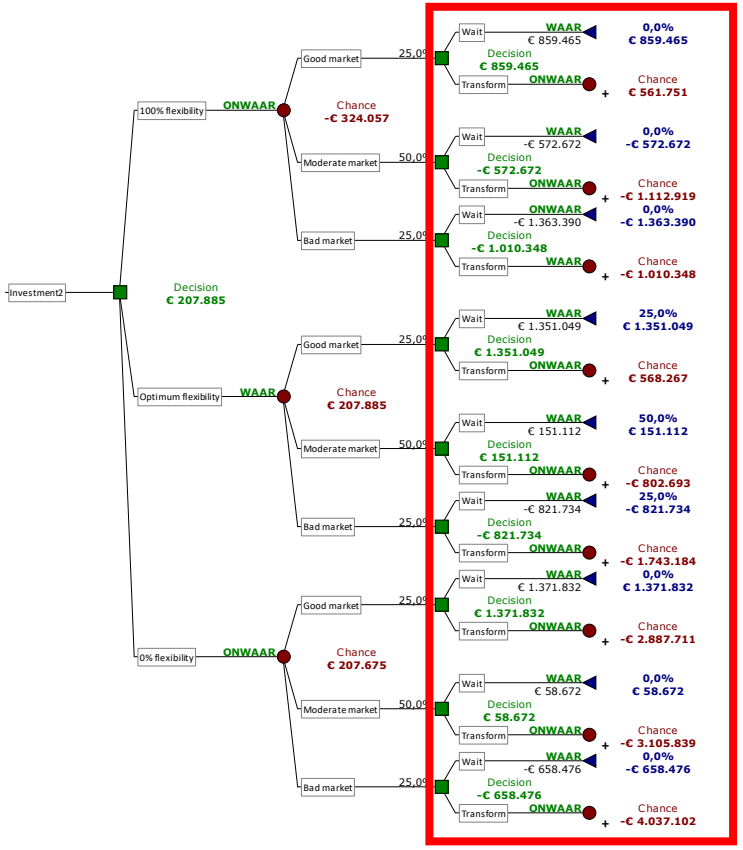
Case



1ste Event (for every branch):

- Good Market scenario
- Moderate Market scenario
- Bad Market scenario

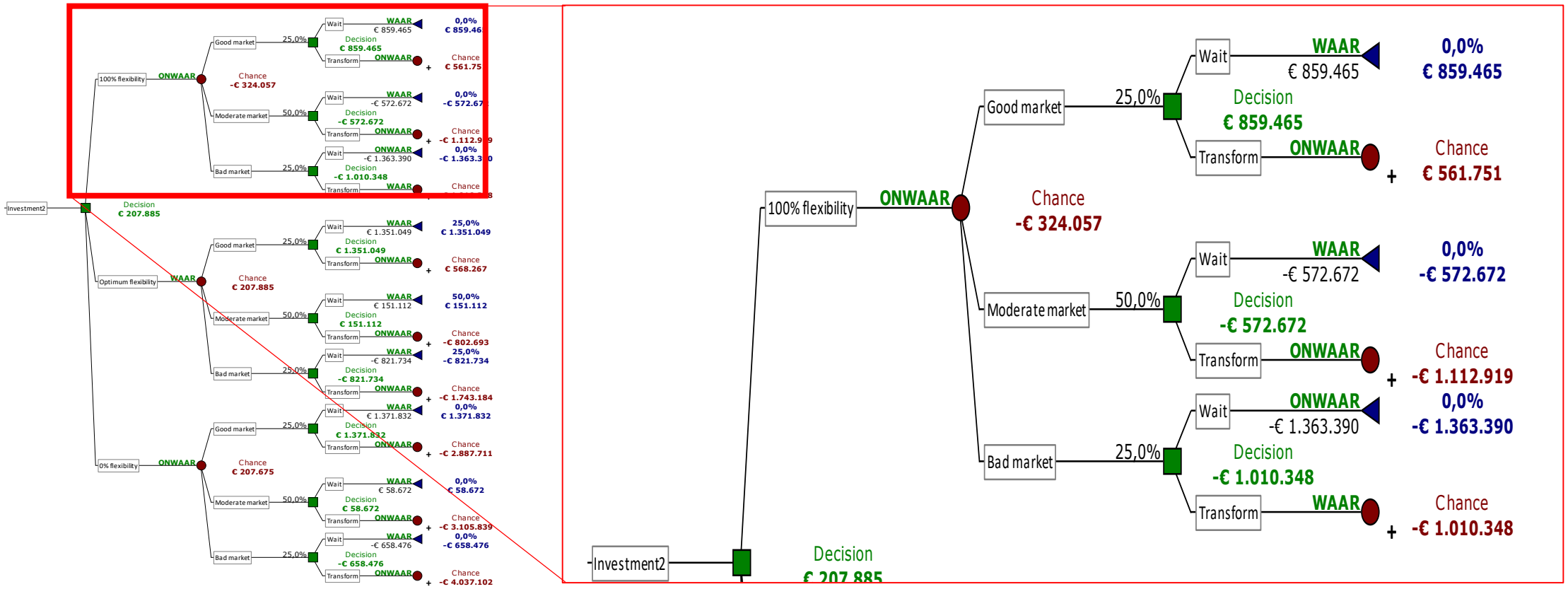
Case



2de Decision (for every branch):

- Wait
- Transform (all different functions)

Case


Investment2
Decision
€ 207.885
100% flexibility
ONWAAR
Chance
-€ 324.057
Good market
25,0%
Wait
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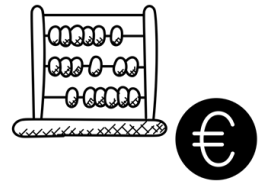
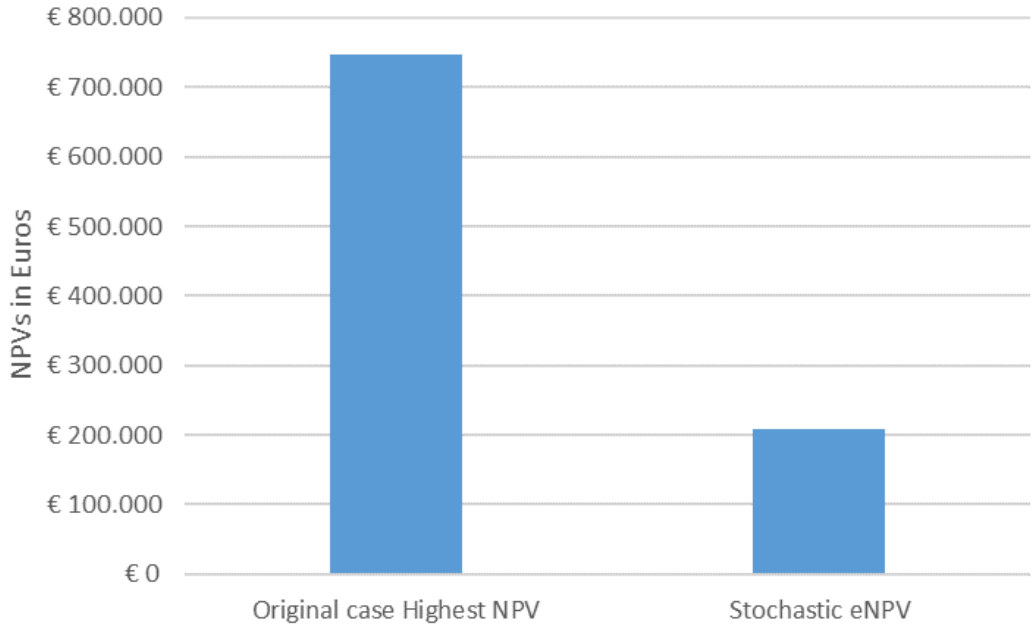
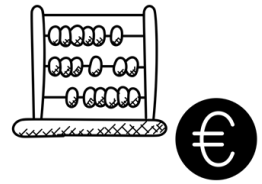
-€ 4.037.102

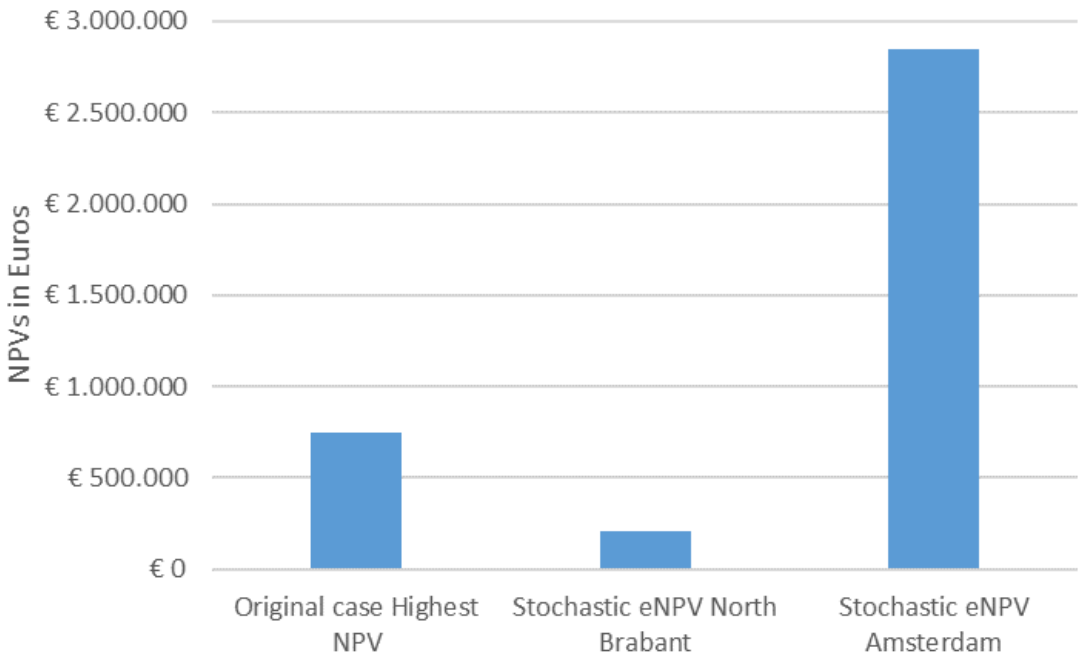
Case



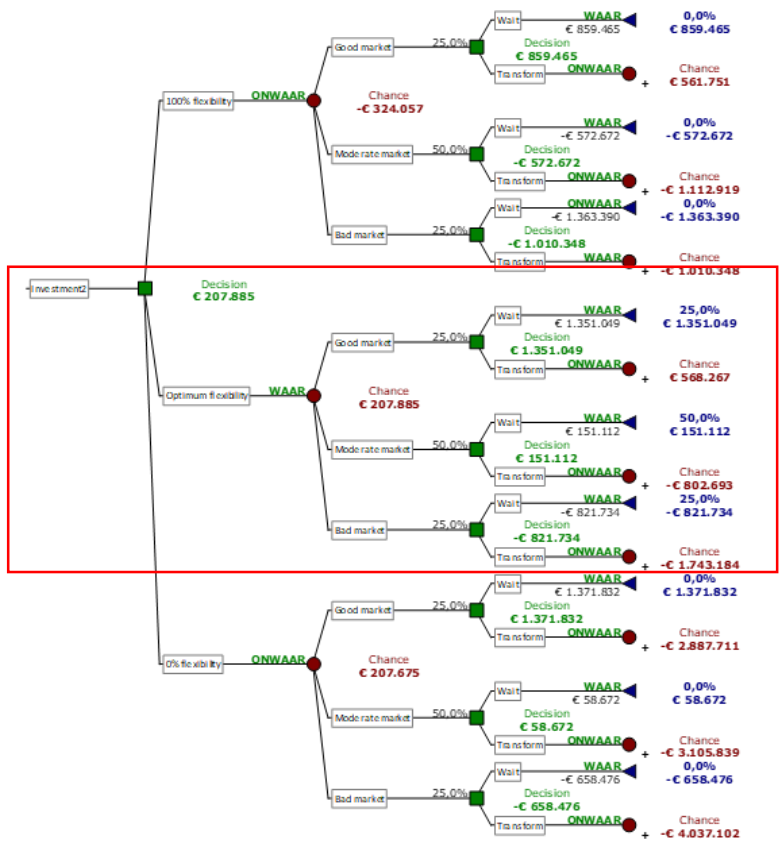

€ 800.000
€ 700.000
€ 600.000
€ 500.000
€ 400.000
€ 300.000
€ 200.000
€ 100.000
€ 0
NPVs in Euros
Original case Highest NPV
Stochastic eNPV

Case




€ 3.000.000
€ 2.500.000
€ 2.000.000
€ 1.500.000
€ 1.000.000
€ 500.000
€ 0
NPVs in Euros
Original case Highest NPV
Stochastic eNPV North Brabant
Stochastic eNPV Amsterdam

Case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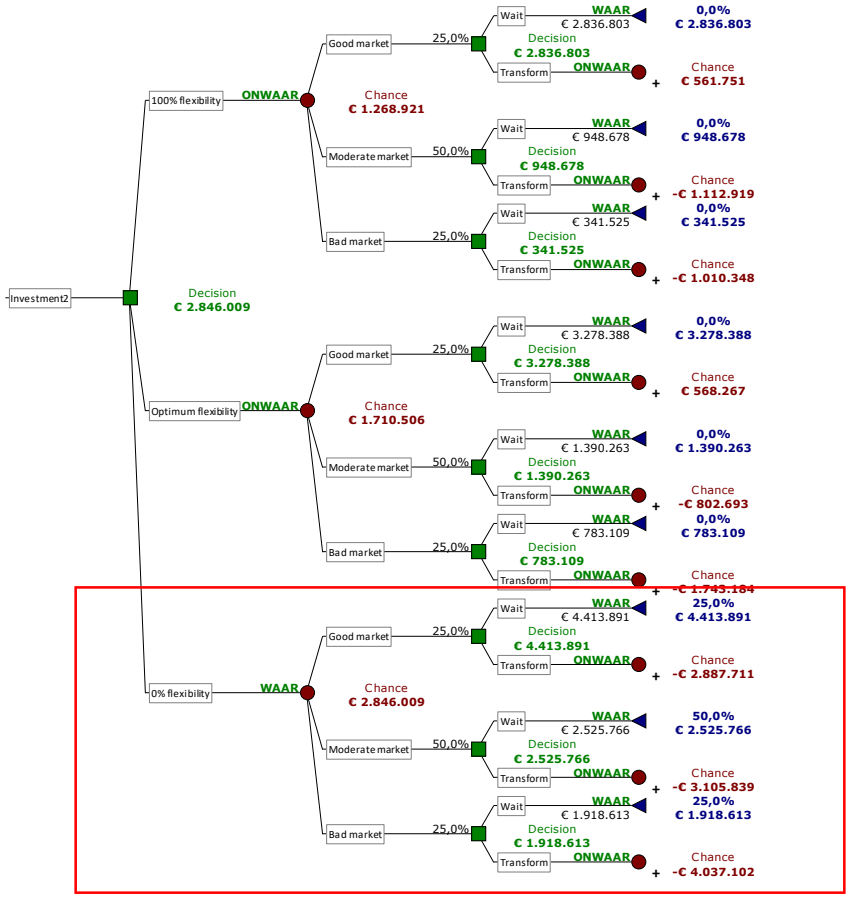

Investment2
Decision
€ 2.846.009
100% flexibility
ONWAAR
Chance
€ 1.268.921
Good market
25,0%
Wait
WAAR
€ 2.836.803
0,0%
€ 2.836.803
Decision
€ 2.836.803
Transform
ONWAAR
Chance
€ 561.751
Moderate market
50,0%
Wait
WAAR
€ 948.678
0,0%
€ 948.678
Decision
€ 948.678
Transform
ONWAAR
Chance
-€ 1.112.919
Bad market
25,0%
Wait
WAAR
€ 341.525
0,0%
€ 341.525
Decision
€ 341.525
Transform
ONWAAR
Chance
-€ 1.010.348
Optimum flexibility
ONWAAR
Chance
€ 1.710.506
Good market
25,0%
Wait
WAAR
€ 3.278.388
0,0%
€ 3.278.388
Decision
€ 3.278.388
Transform
ONWAAR
Chance
€ 568.267
Moderate market
50,0%
Wait
WAAR
€ 1.390.263
0,0%
€ 1.390.263
Decision
€ 1.390.263
Transform
ONWAAR
Chance
-€ 802.693
Bad market
25,0%
Wait
WAAR
€ 783.109
0,0%
€ 783.109
Decision
€ 783.109
Transform
ONWAAR
Chance
-€ 1.743.184
0% flexibility
WAAR
Chance
€ 2.846.009
Good market
25,0%
Wait
WAAR
€ 4.413.891
25,0%
€ 4.413.891
Decision
€ 4.413.891
Transform
ONWAAR
Chance
-€ 2.887.711
Moderate market
50,0%
Wait
WAAR
€ 2.525.766
50,0%
€ 2.525.766
Decision
€ 2.525.766
Transform
ONWAAR
Chance
-€ 3.105.839
Bad market
25,0%
Wait
WAAR
€ 1.918.613
25,0%
€ 1.918.613
Decision
€ 1.918.613
Transform
ONWAAR
Chance
-€ 4.037.102

Content

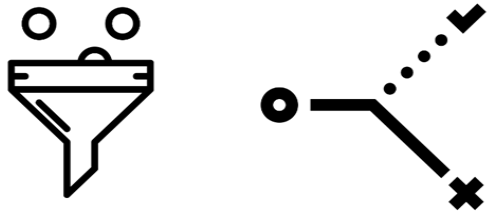
- Introduction
- Definitions & scope
  - Background of Adaptivity
  - Investing in Adaptivity
  - Valuation methods
- Case
- Conclusions
- Recommendations

Conclusions

How to cope with future uncertainty in a DCF method to value the adaptive capacity of office buildings to stimulate investors to invest in adaptivity?

- Use dynamics vs transformations dynamics
- Valuation method contains:

- Addition on valuation method:



- The location of a property influences the outcome.

Recommendations

- **Multiple case study** to verify if the ratio of investment costs and transformation costs related to the adaptive indicators are right, it is recommended to do further research with more cases.
- To **bundle the adaptive indicators into packages**, it will be more clear in which of the adaptive indicators the investor should be investing. Especially for the short term investors it could be interesting.
- To further examine the financial aspects in the financial model to conclude about the environmental **impact of not using adaptivity** after one functional life cycle.
- To do **a qualitative research** about the different investors and their motives to invest in adaptivity.
- To do **a case study with different locations** in the Netherlands and define the impact of the location and the local market on the investment decision to invest in adaptivity in new developments and **renovate/transform of existing buildings.**

Thank you!

TU Delft BOSS

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Steps of the investor

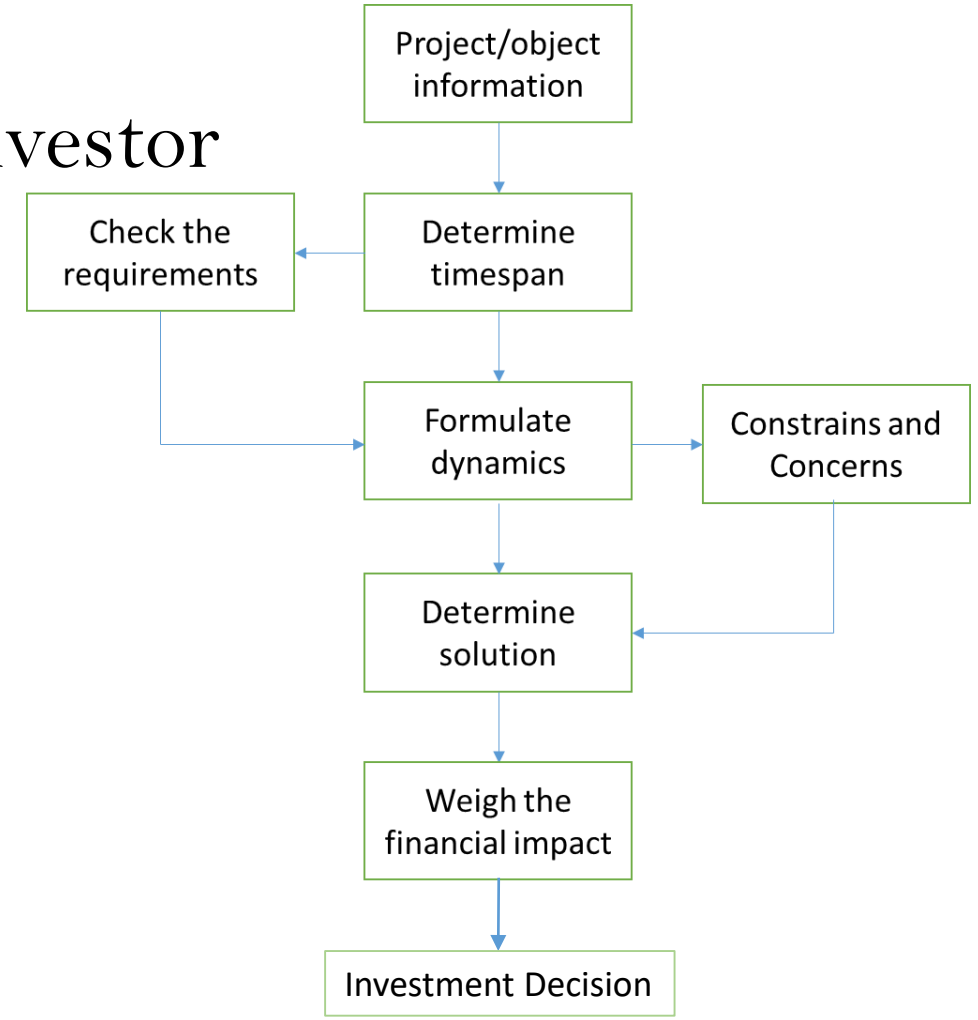
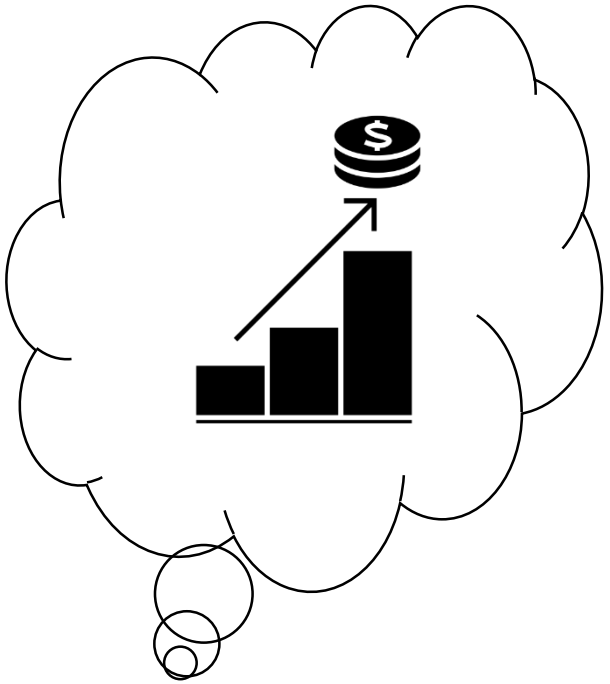
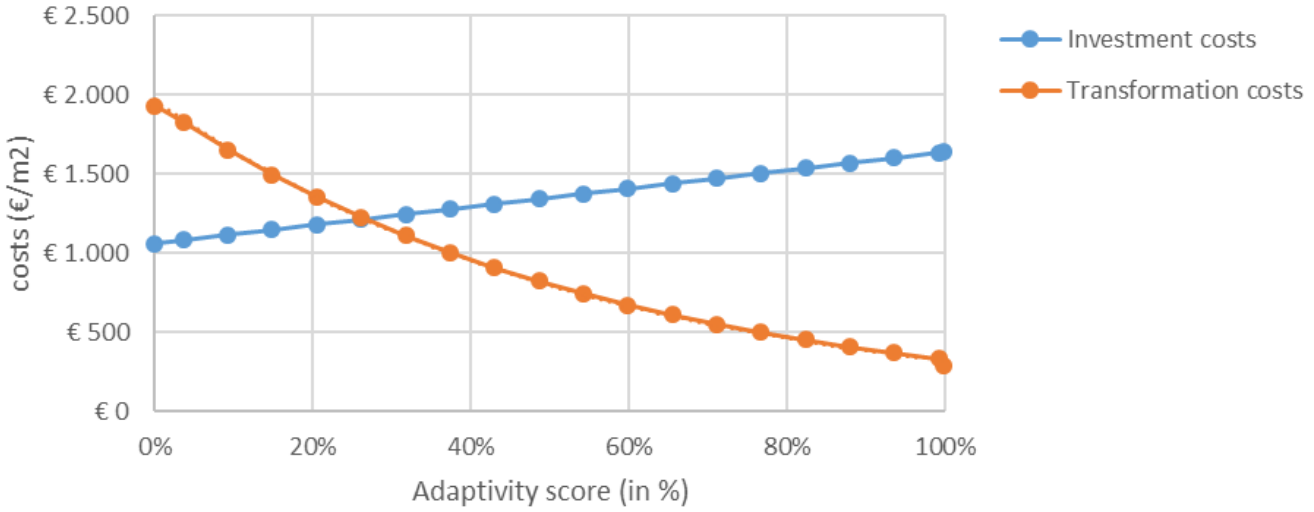


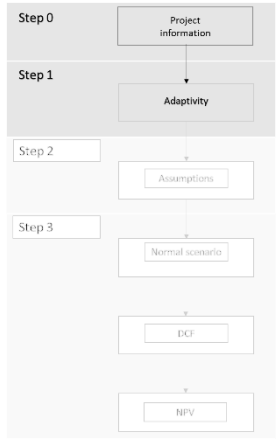
Figure 13: own ill.

Input

Case

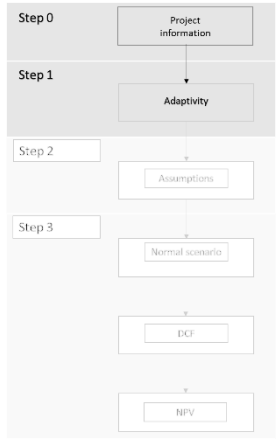






Stochastic Case

Case



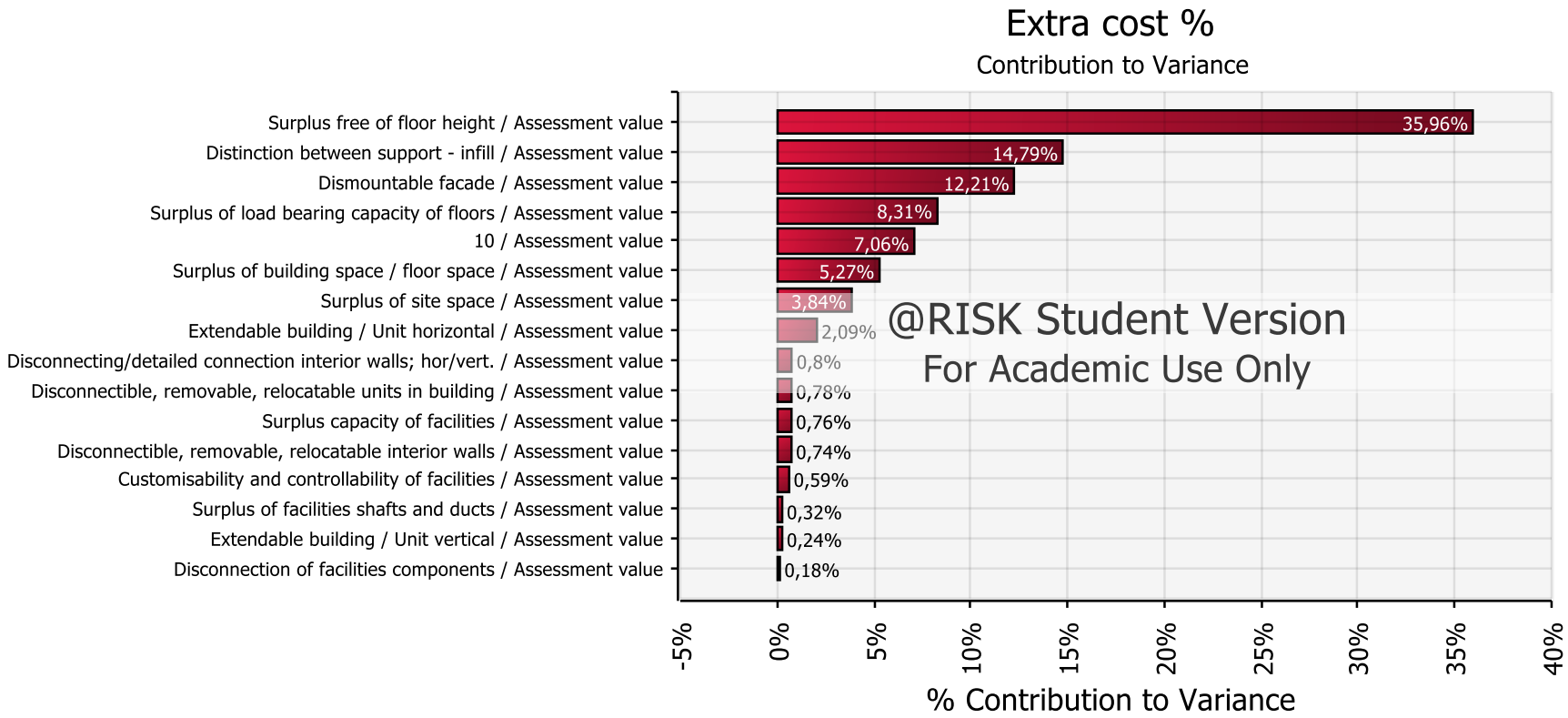
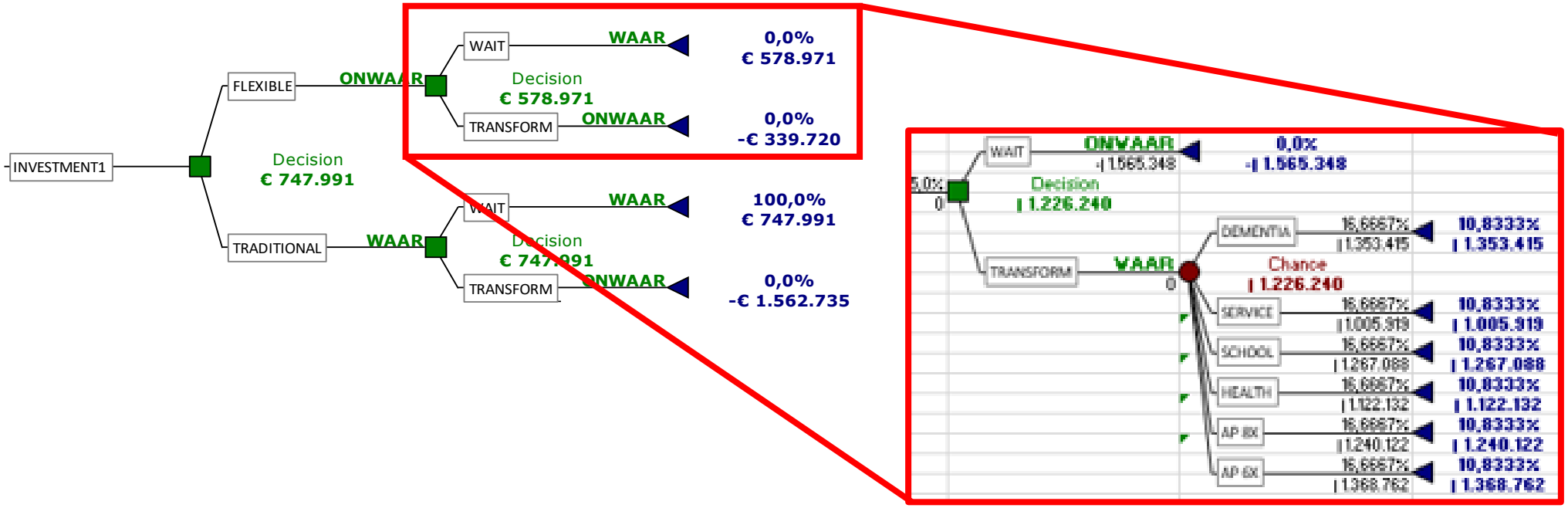


Figure 30:(own ill.)

Stochastic Case

Case


INVESTMENT1
Decision
€ 747.991
FLEXIBLE
ONWAAR
WAIT
WAAR
0,0%
€ 578.971
Decision
€ 578.971
TRANSFORM
ONWAAR
0,0%
-€ 339.720
TRADITIONAL
WAAR
WAIT
WAAR
100,0%
€ 747.991
Decision
€ 747.991
TRANSFORM
ONWAAR
0,0%
-€ 1.562.735
WAIT
ONWAAR
-| 1.565.348
0,0%
-| 1.565.348
Decision
| 1.226.240
TRANSFORM
WAAR
Chance
| 1.226.240
DEMENTIA
16,6667%
| 1.353.415
10,8333%
| 1.353.415
SERVICE
16,6667%
| 1.005.919
10,8333%
| 1.005.919
SCHOOL
16,6667%
| 1.267.088
10,8333%
| 1.267.088
HEALTH
16,6667%
| 1.122.132
10,8333%
| 1.122.132
AP (X
16,6667%
| 1.240.122
10,8333%
| 1.240.122
AP (X
16,6667%
| 1.368.762
10,8333%
| 1.368.762