

The implementation of adaptability as a tool for future proof buildings in the Netherlands

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02 | Methodology

03 | Theory

04 | Practice

05 | Proposal

06 | Discussion & conclusion

01

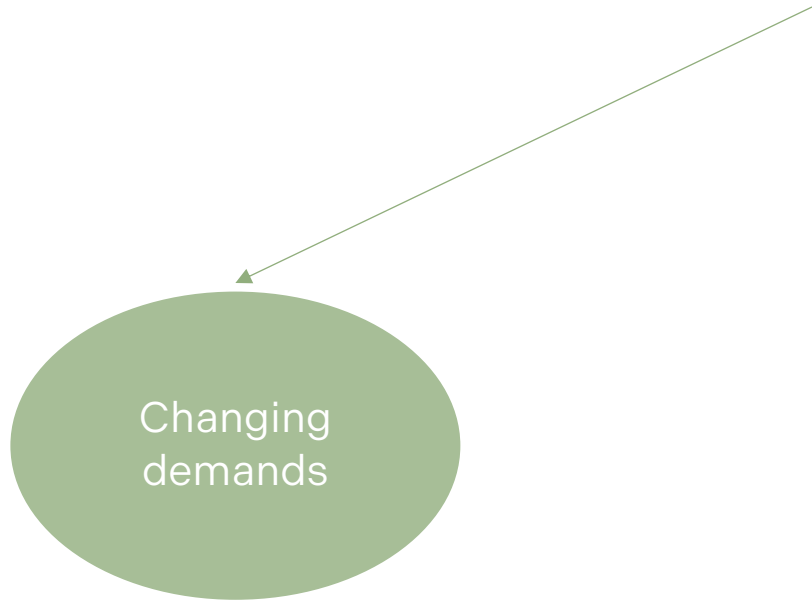
Introduction

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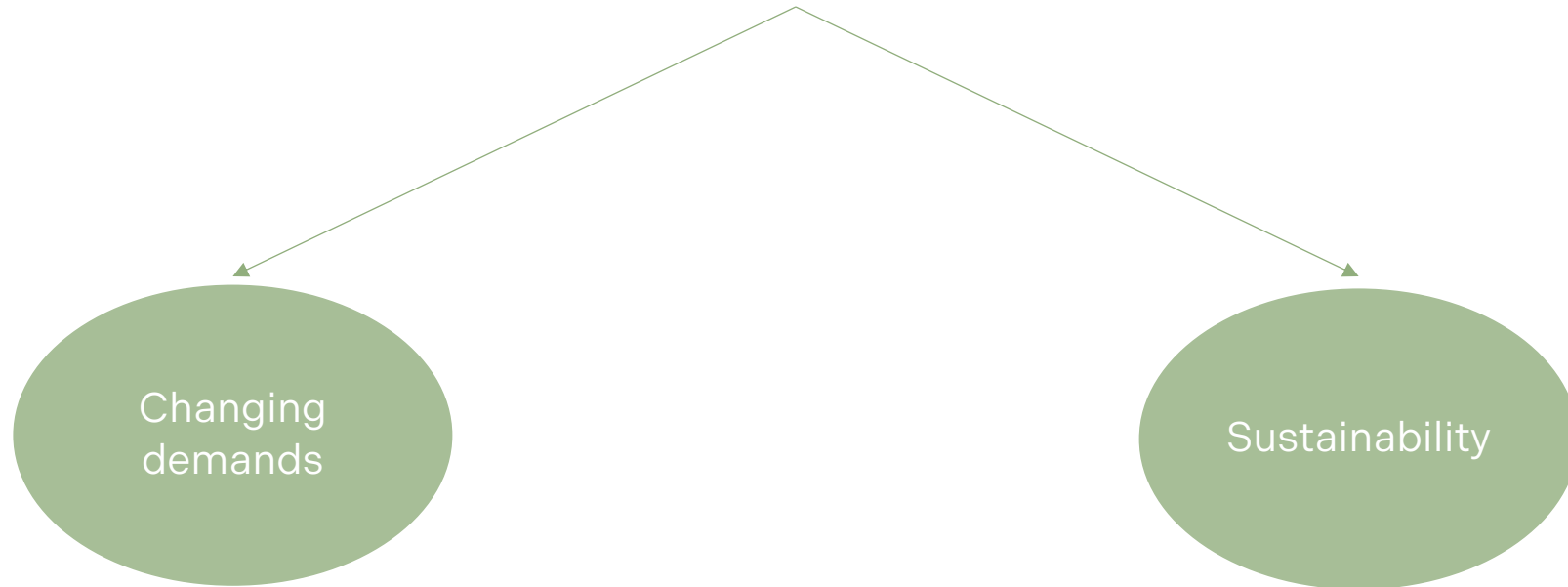
Do you live in an adaptable home?

Why adaptable buildings?

Why adaptable buildings?



Why adaptable buildings?



Why adaptable buildings?

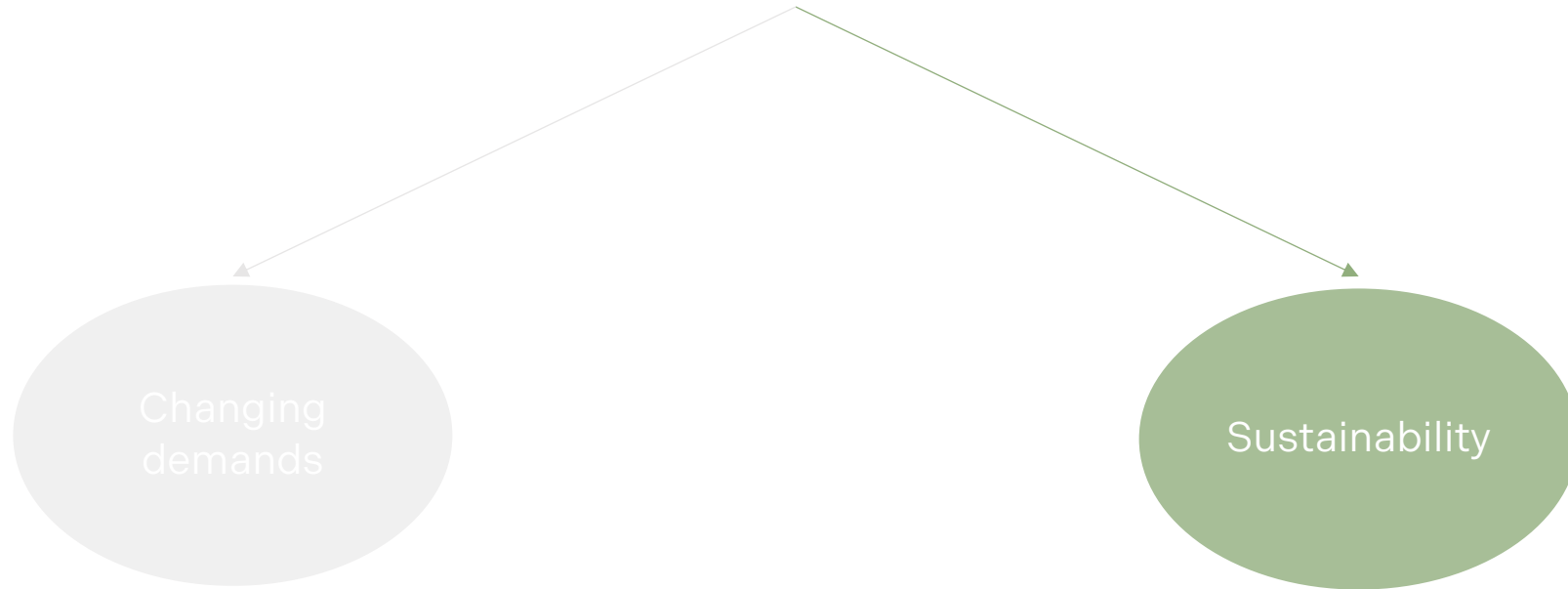


Why adaptable buildings?

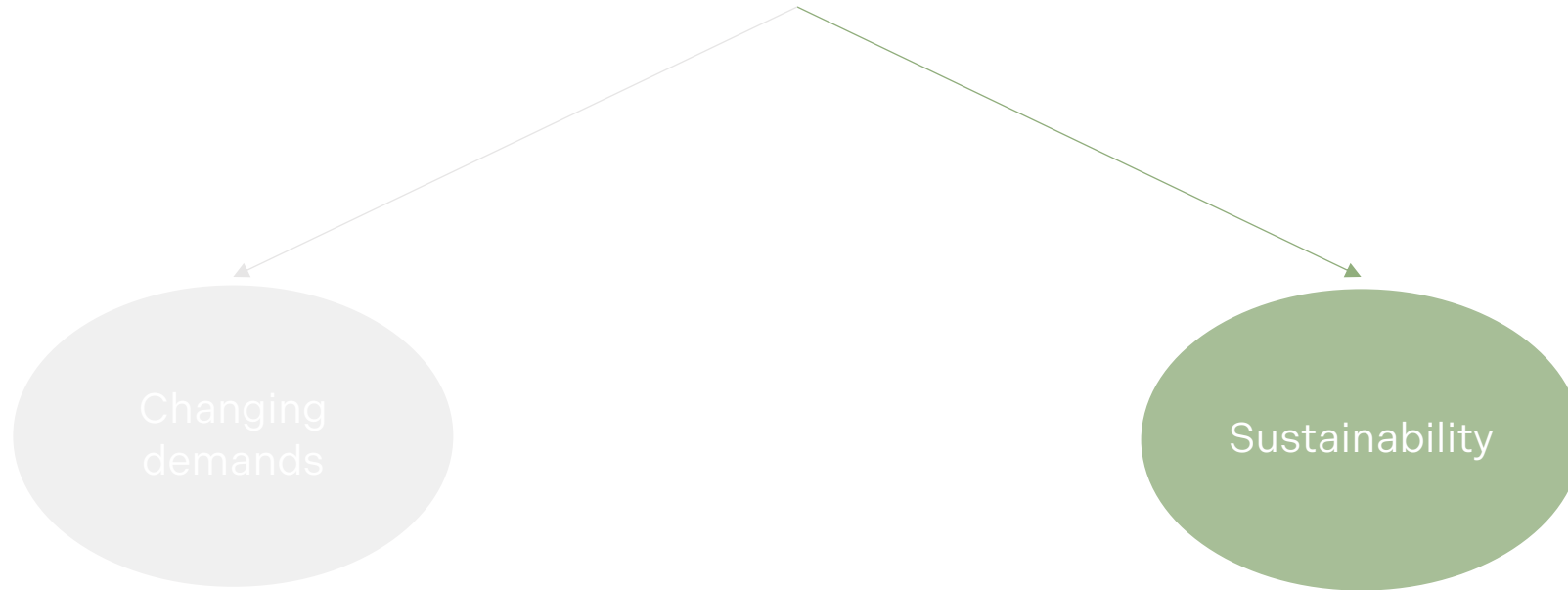


"All buildings are predictions."
(Brand, 1995)

Why adaptable buildings?



Why adaptable buildings?



*"A sustainable building is not one that must last forever, but one that can easily adapt to change."
(Graham, 2009)*

Problem.

01 | Introduction

02 | Methodology

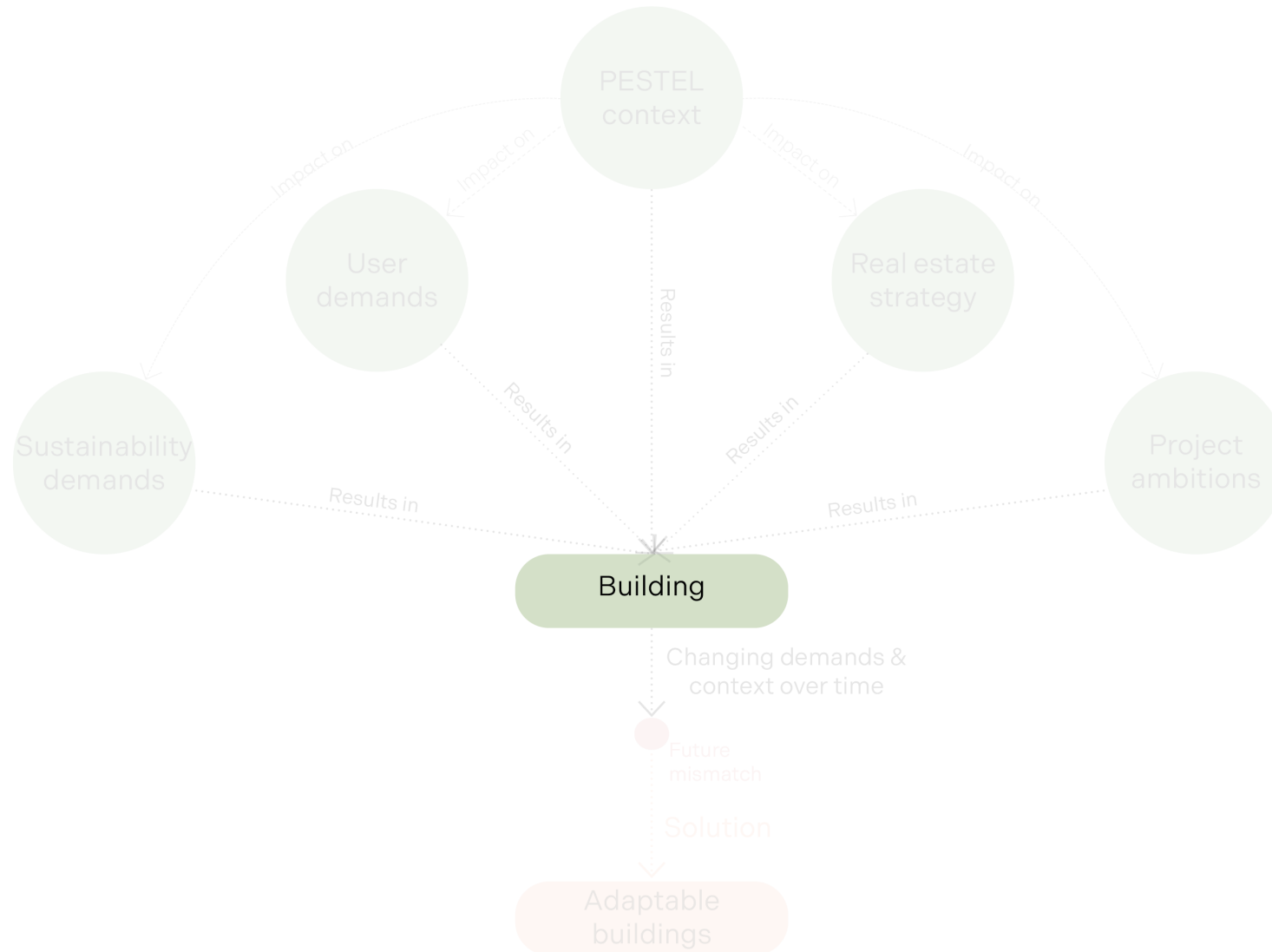
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Problem.



01 | Introduction

02 | Methodology

03 | Theory (qualitative research)

04 | Practice (qualitative research)

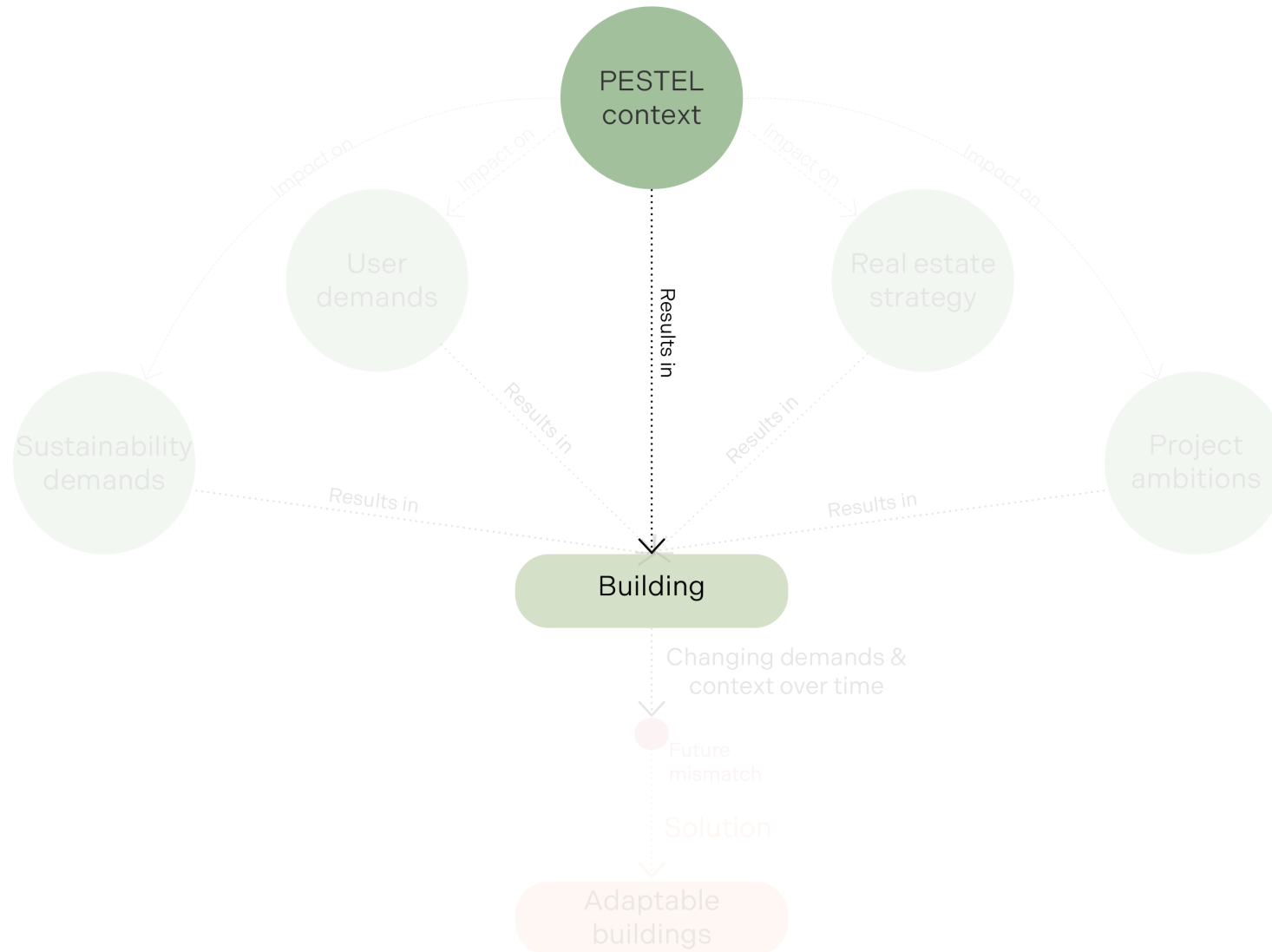
05 | Proposal (results)

06 | Discussion & conclusion

own research

Problem.

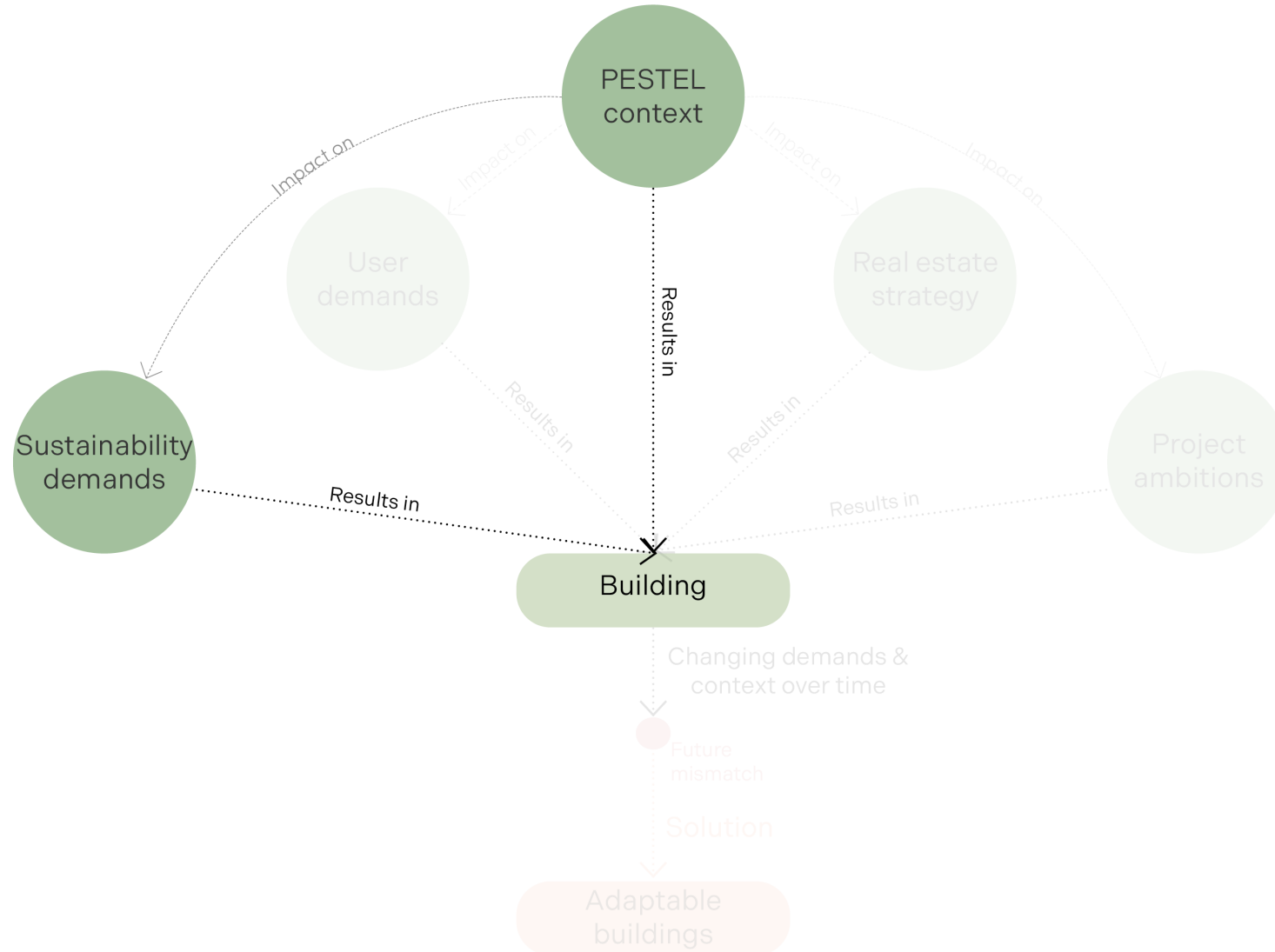
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(Own figure)

Problem.

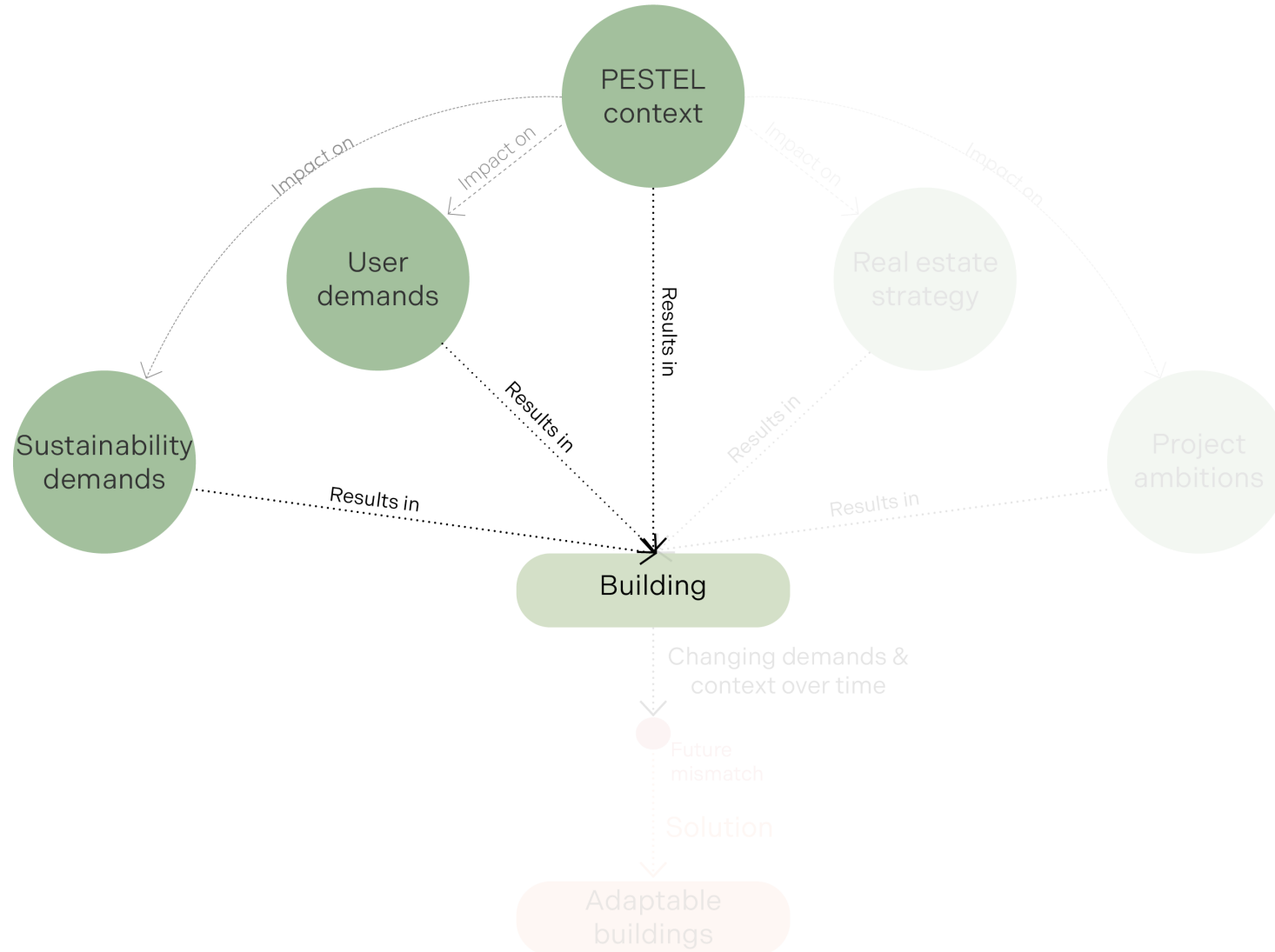
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(Own figure)

Problem.

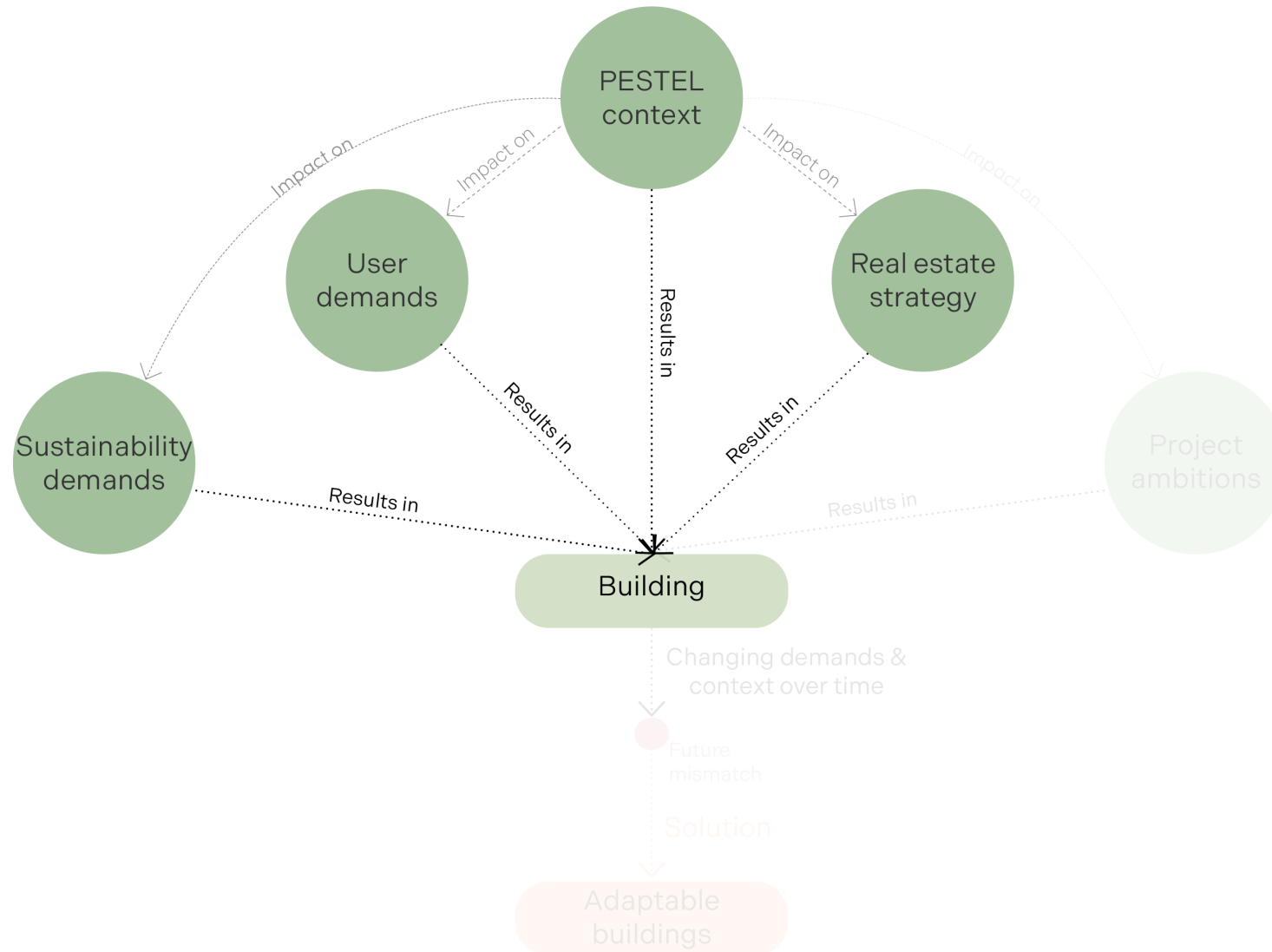
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(Own figure)

Problem.

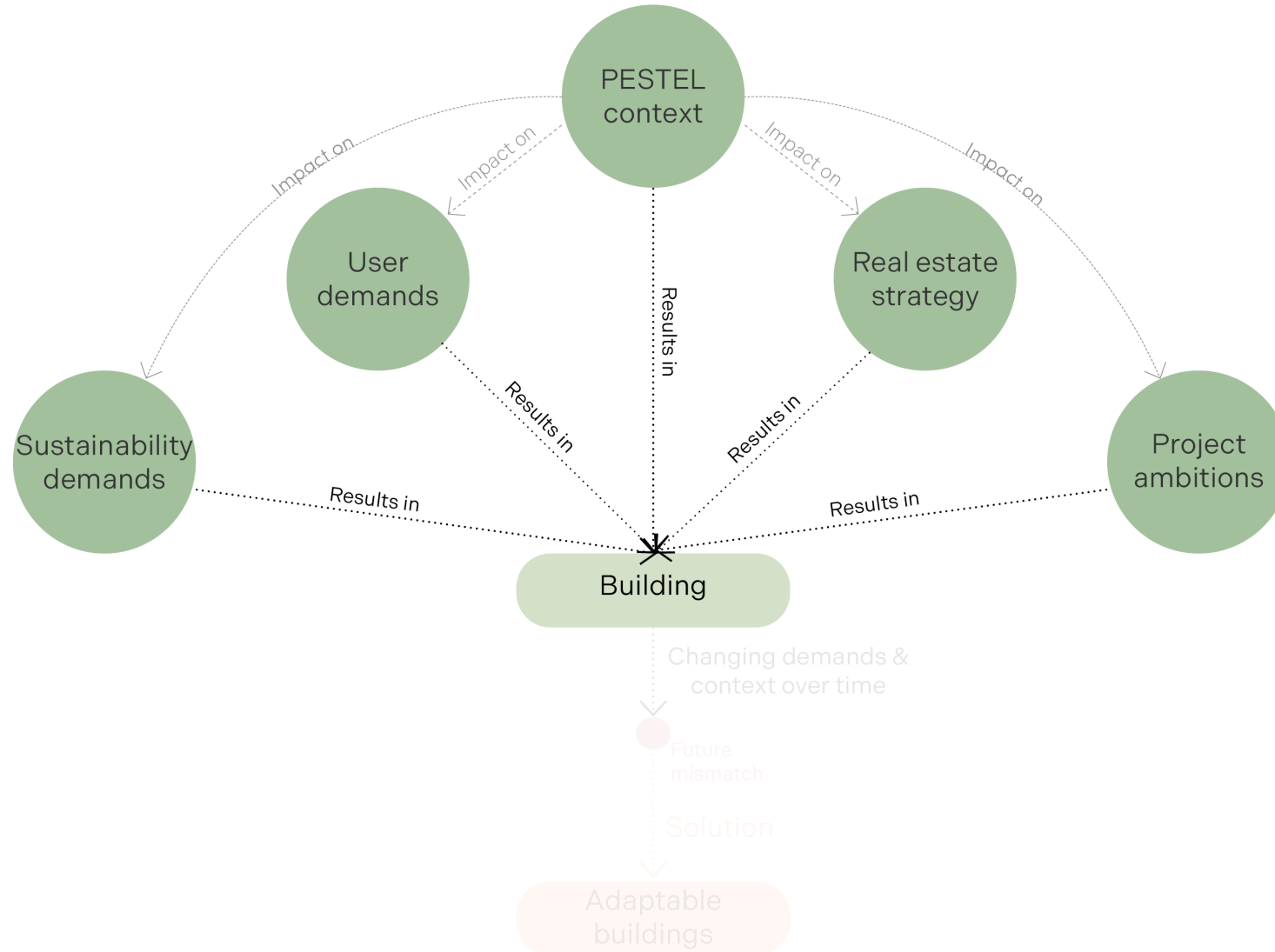
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(Own figure)

Problem.

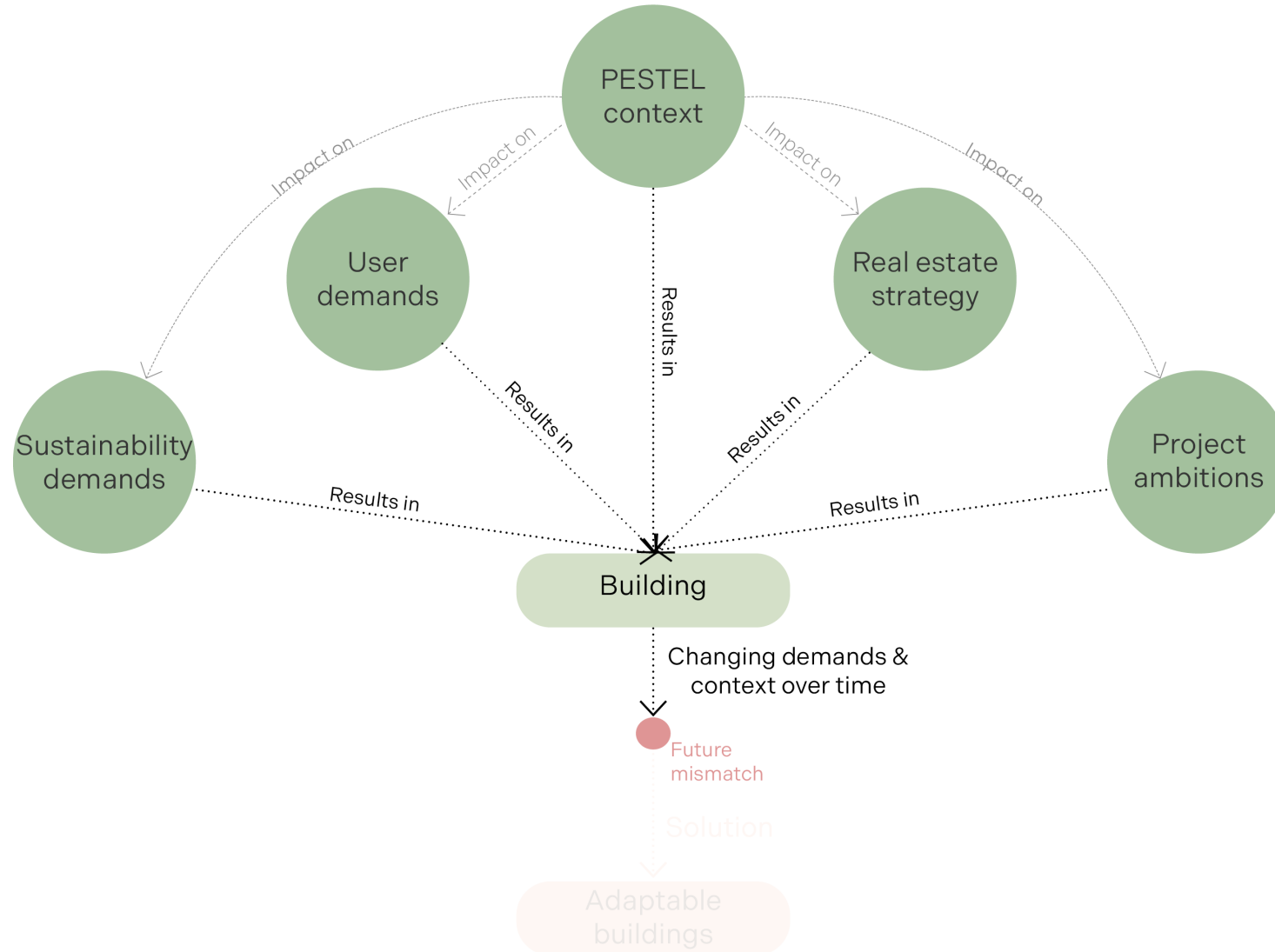
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(Own figure)

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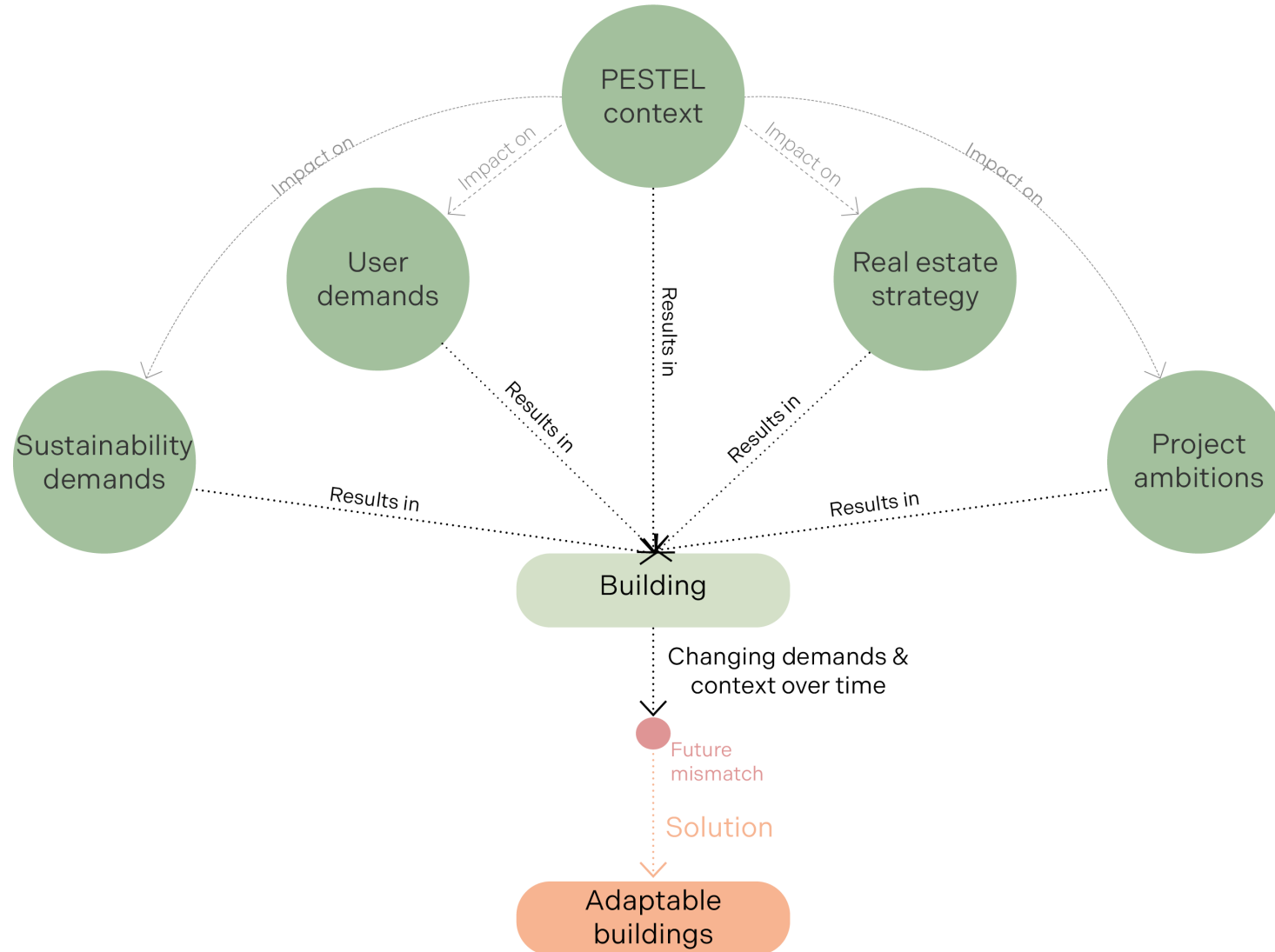
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(Own figure)

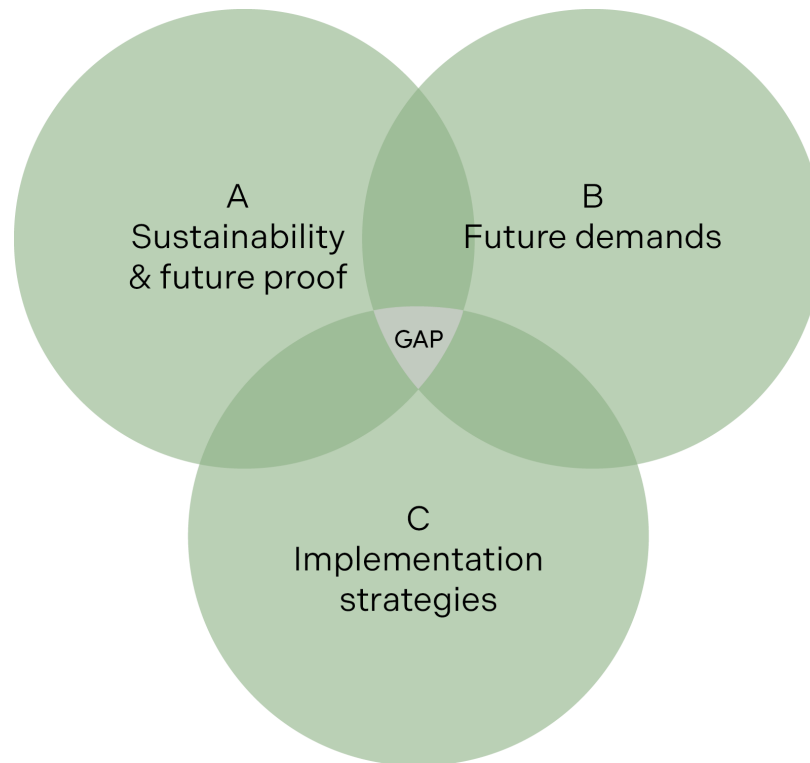
Problem.

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(Own figure)

Challenge.



(Own figure)

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03 | Theory

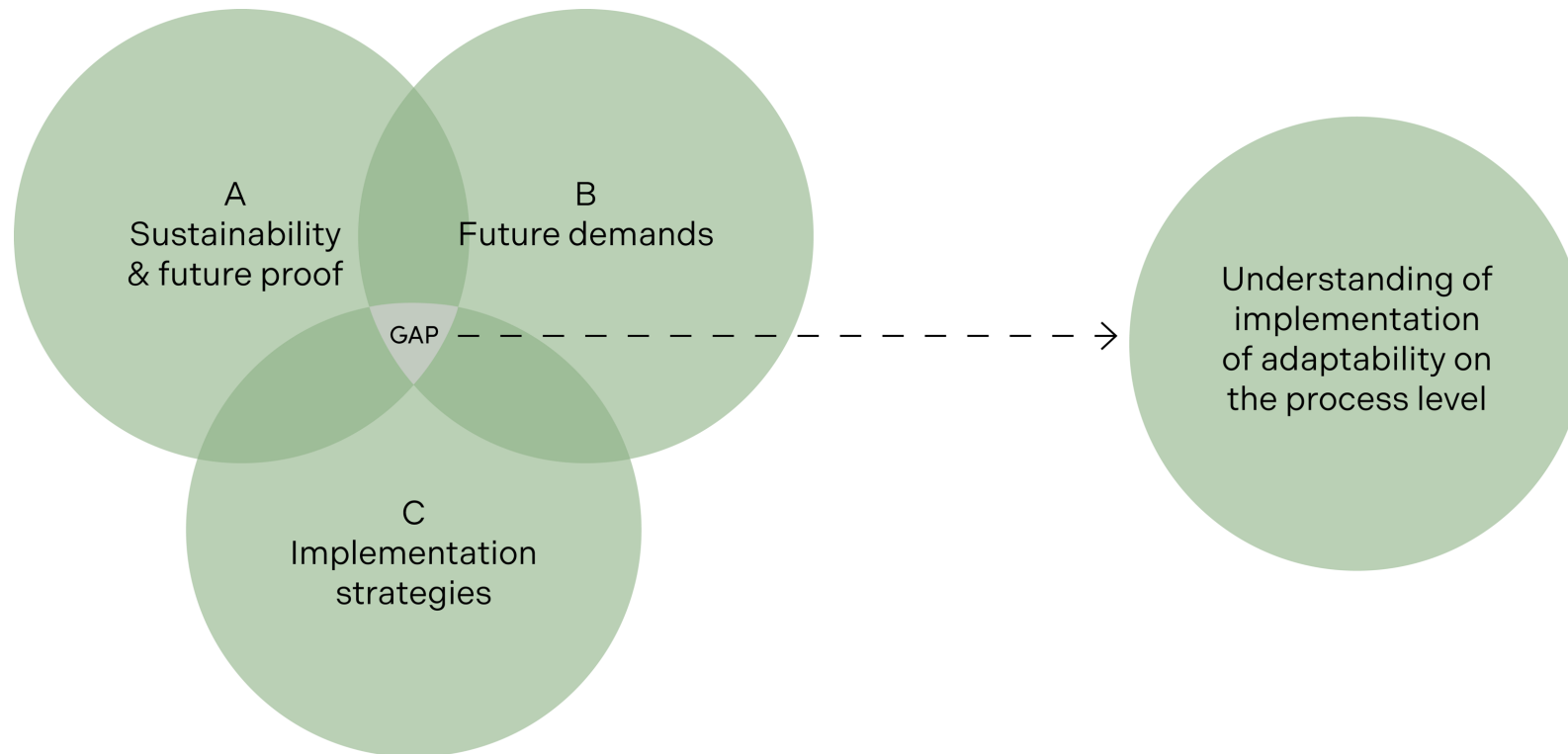
04 | Practice

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Challenge.

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(Own figure)

Main research question.

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Main research question.

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*“What are the **criteria** for developing an **adaptable building**, and how can **clients** influence the **implementation** of these criteria in development projects?”*

Sub-questions.

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Sub-questions.

1. How can **adaptability** in buildings be described?

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Sub-questions.

1. How can adaptability in buildings be described?
2. What are existing **adaptability strategies**?

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Sub-questions.

1. How can adaptability in buildings be described?
2. What are existing adaptability strategies?
3. How can existing adaptability strategies be combined into **adaptability criteria**?

01 | Introduction

02 | Methodology

03 | Theory (critical research)

04 | Practice (real research)

05 | Proposal tests

06 | Discussion & conclusion

Sub-questions.

1. How can adaptability in buildings be described?
2. What are existing adaptability strategies?
3. How can existing adaptability strategies be combined into adaptability criteria?
4. How do the adaptability criteria compare to **cases in practice**?

01 | Introduction

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03 | Theory (critical research)

04 | Practice (real research)

05 | Proposal (real)

06 | Discussion & conclusion

Sub-questions.

1. How can adaptability in buildings be described?
2. What are existing adaptability strategies?
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4. How do the adaptability criteria compare to cases in practice?
5. What are the **roles of the stakeholders** involved in the development of adaptable buildings?

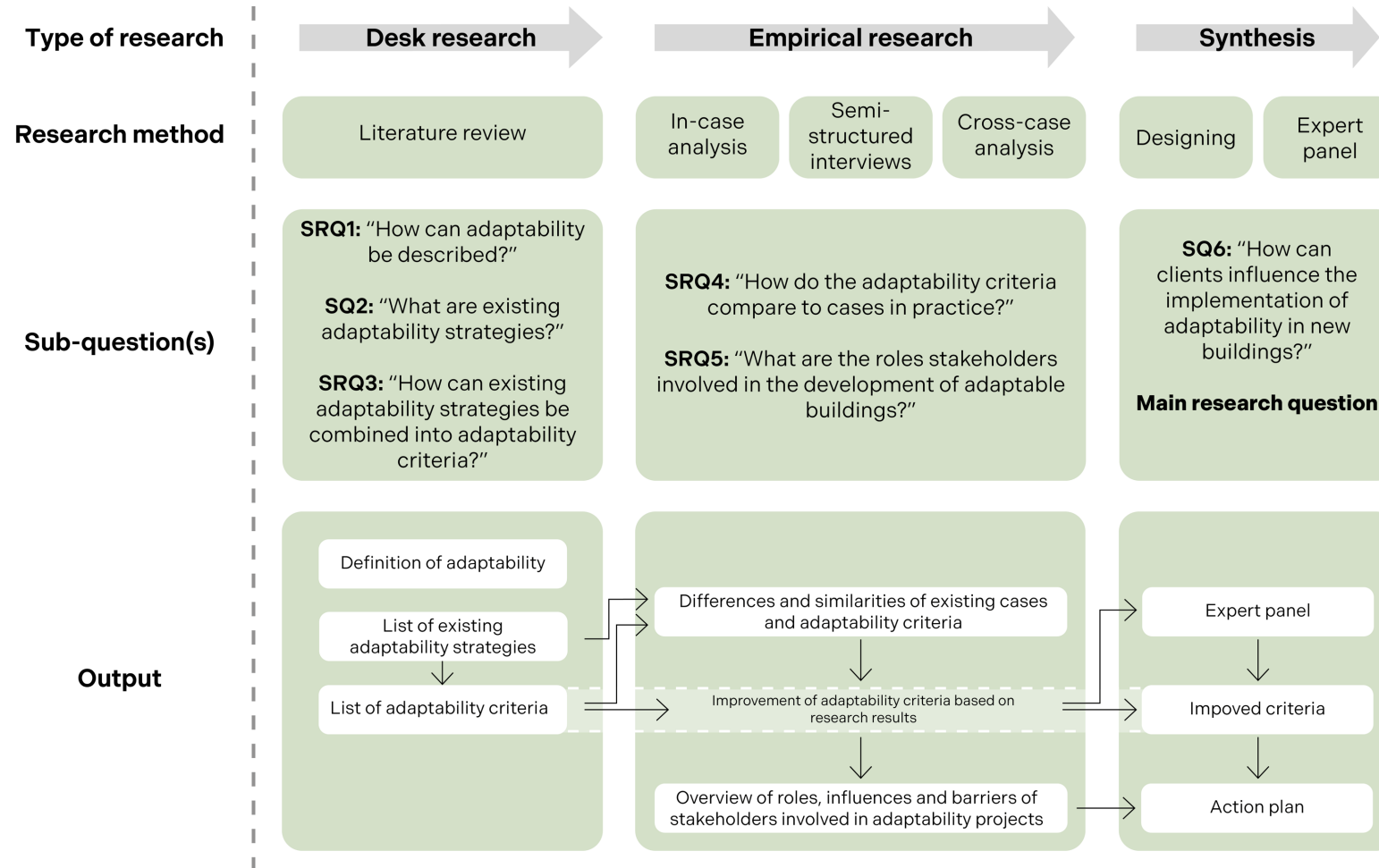
Sub-questions.

1. How can adaptability in buildings be described?
2. What are existing adaptability strategies?
3. How can existing adaptability strategies be combined into adaptability criteria?
4. How do the adaptability criteria compare to cases in practice?
5. What are the roles of the stakeholders involved in the development of adaptable buildings?
6. How can **clients influence** the implementation of adaptability in new buildings?

02

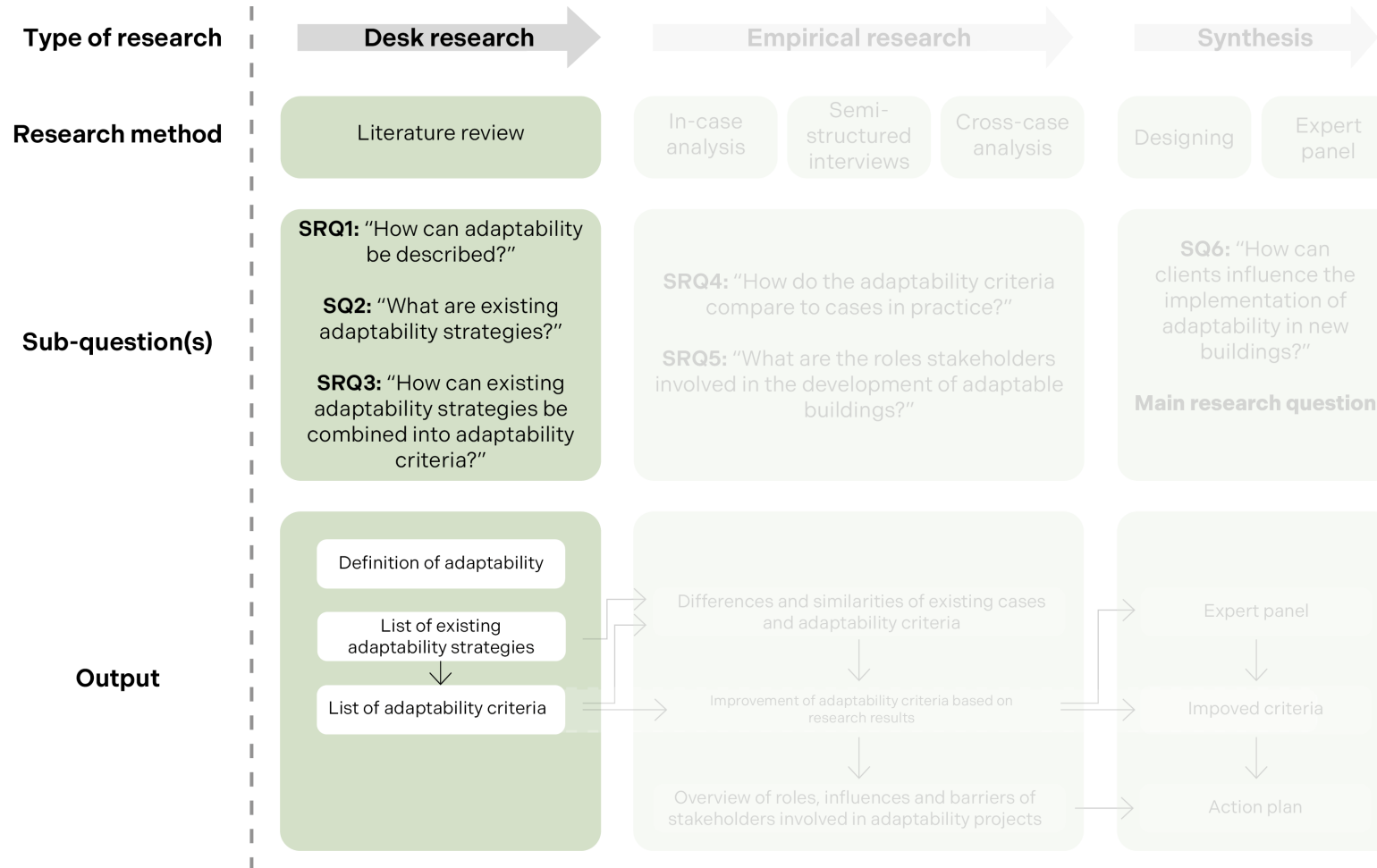
Methodology

Method.



(Own figure)

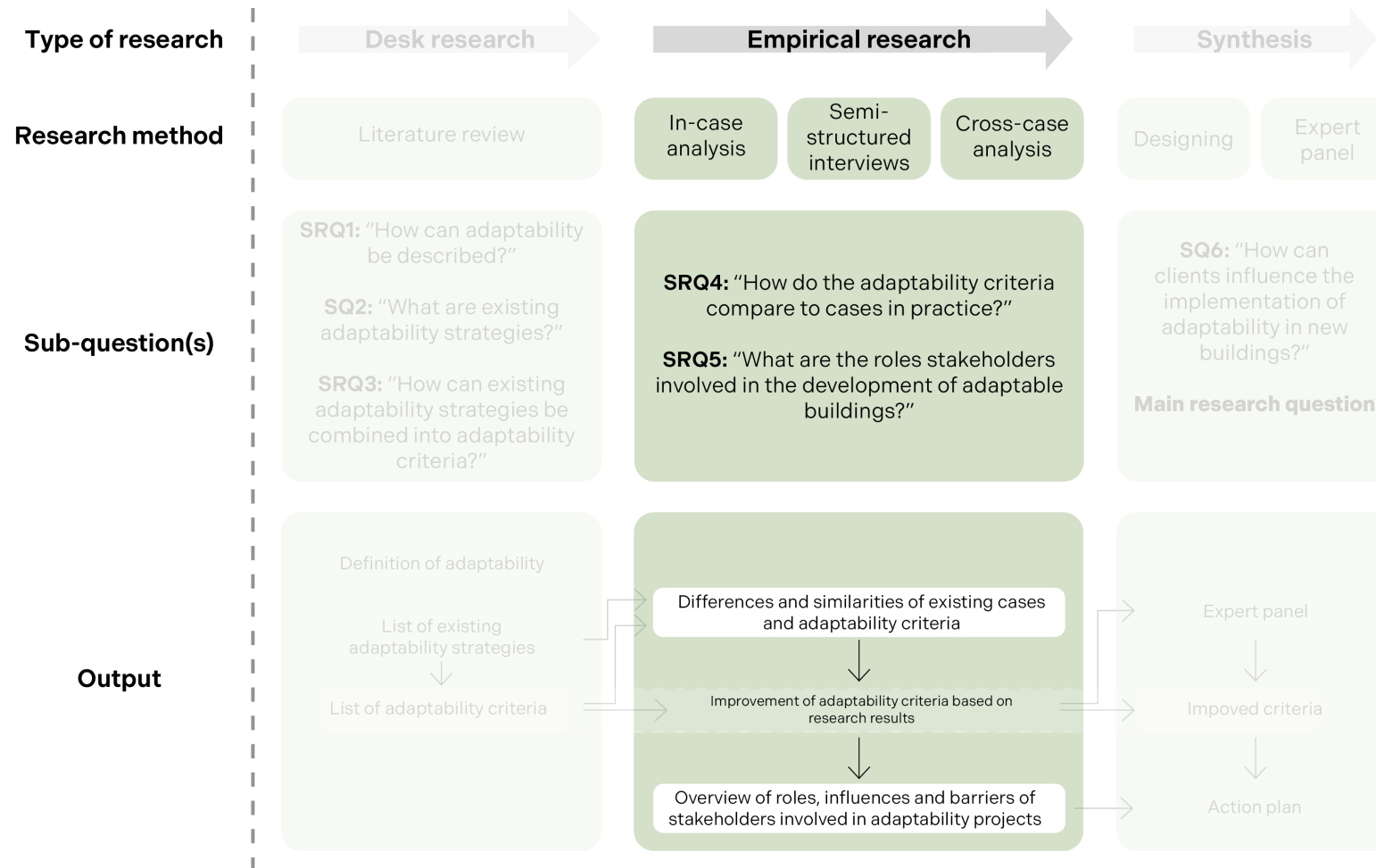
Method.



(Own figure)

Method.

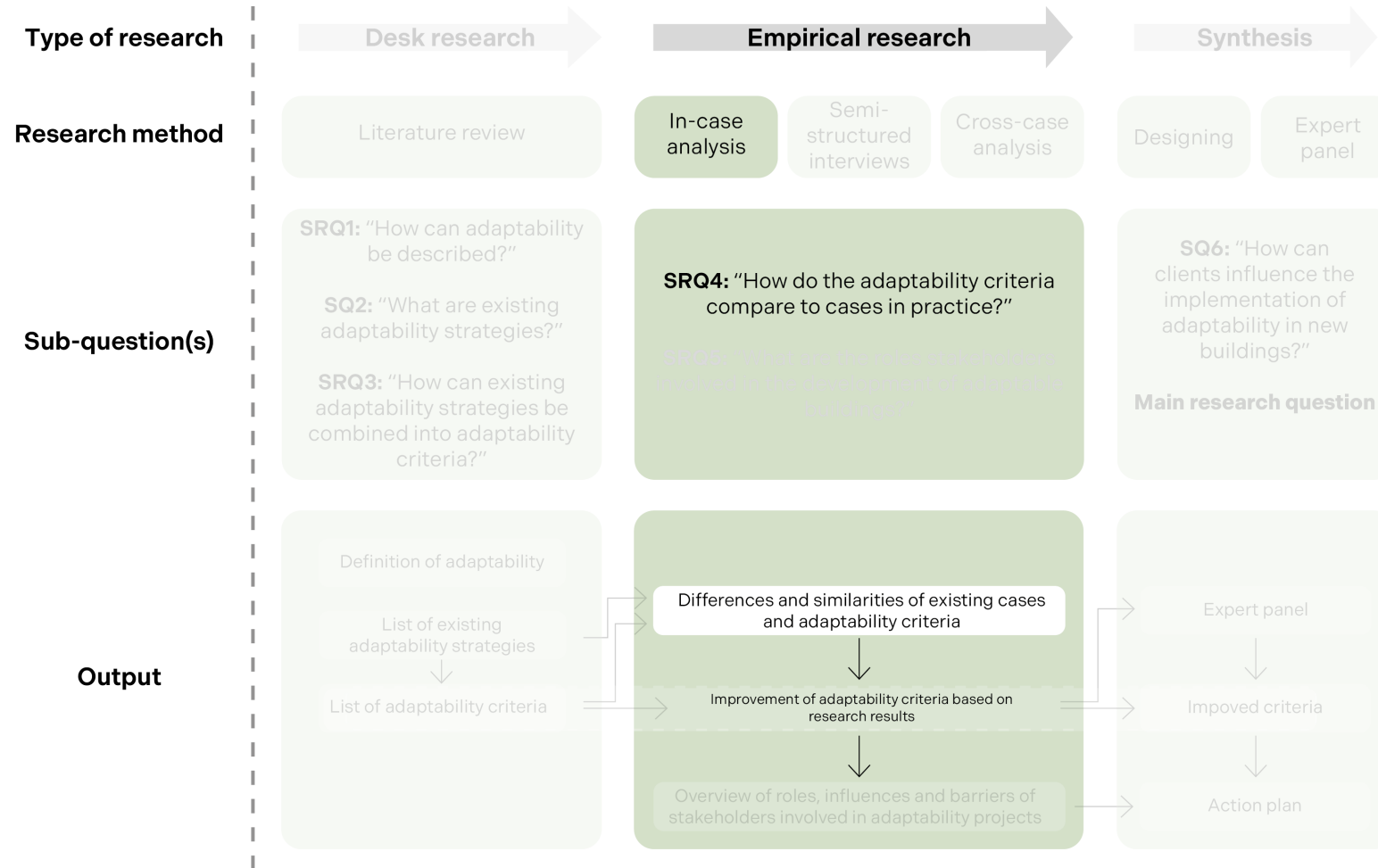
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(Own figure)

Method.

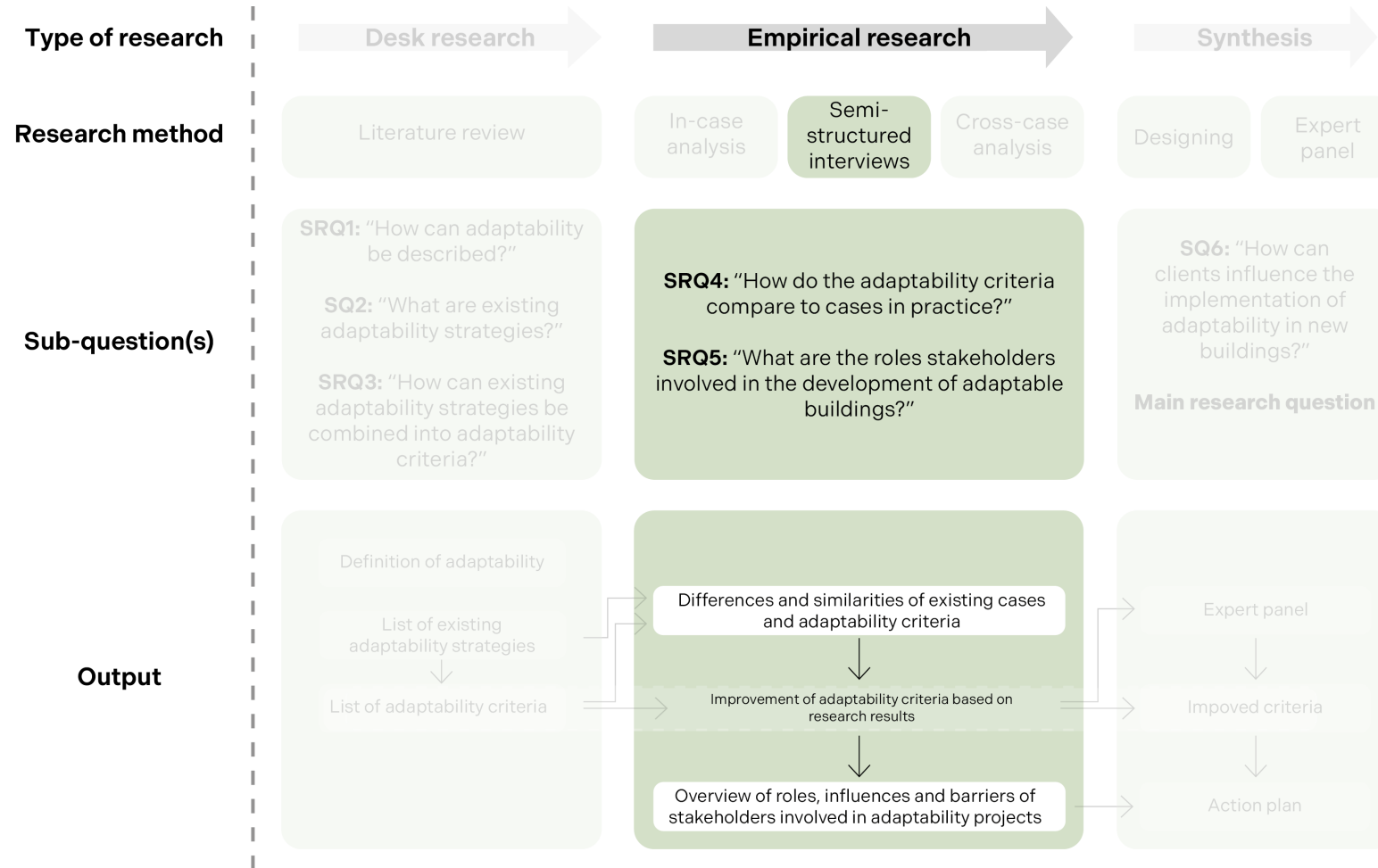
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(Own figure)

Method.

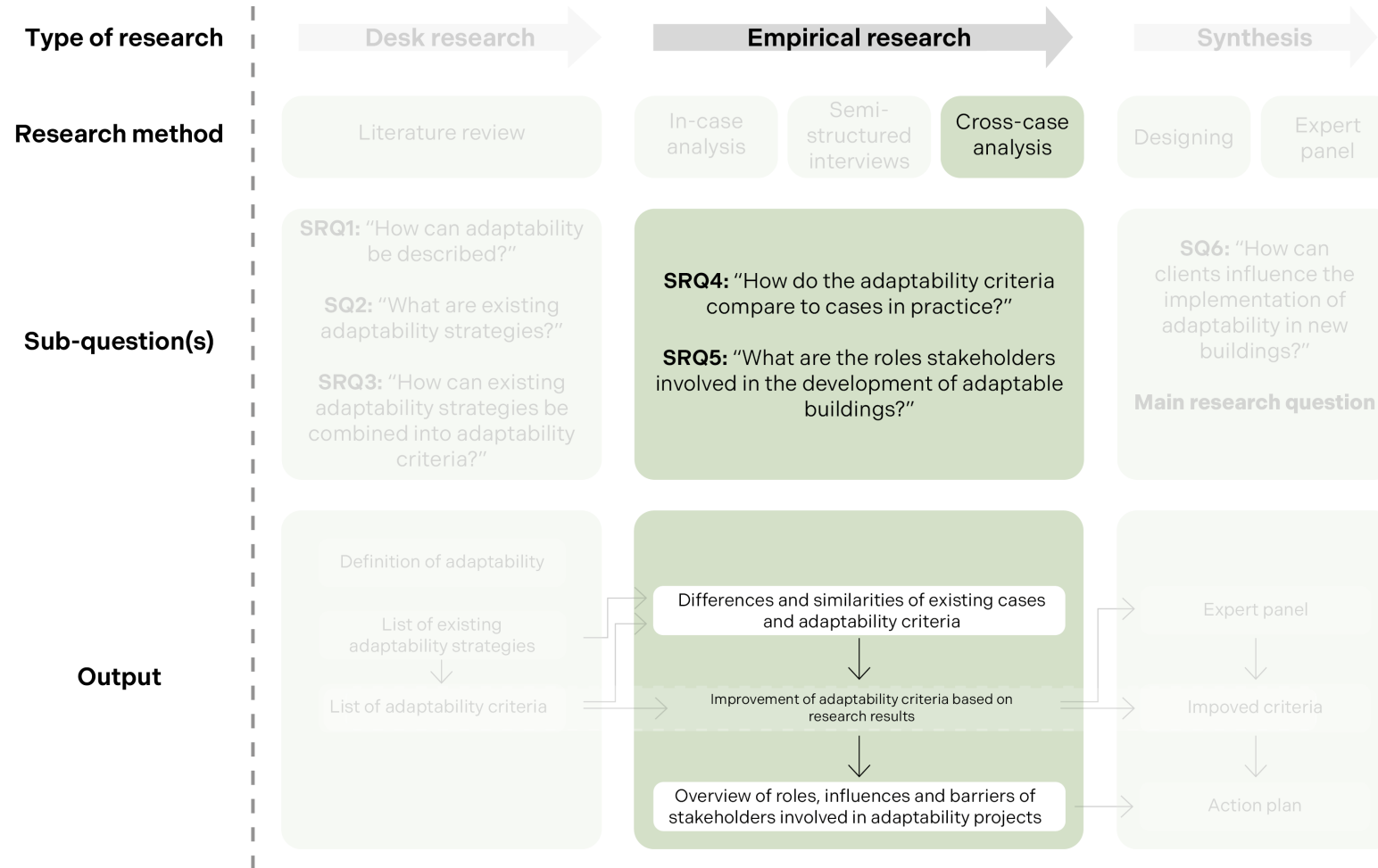
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(Own figure)

Method.

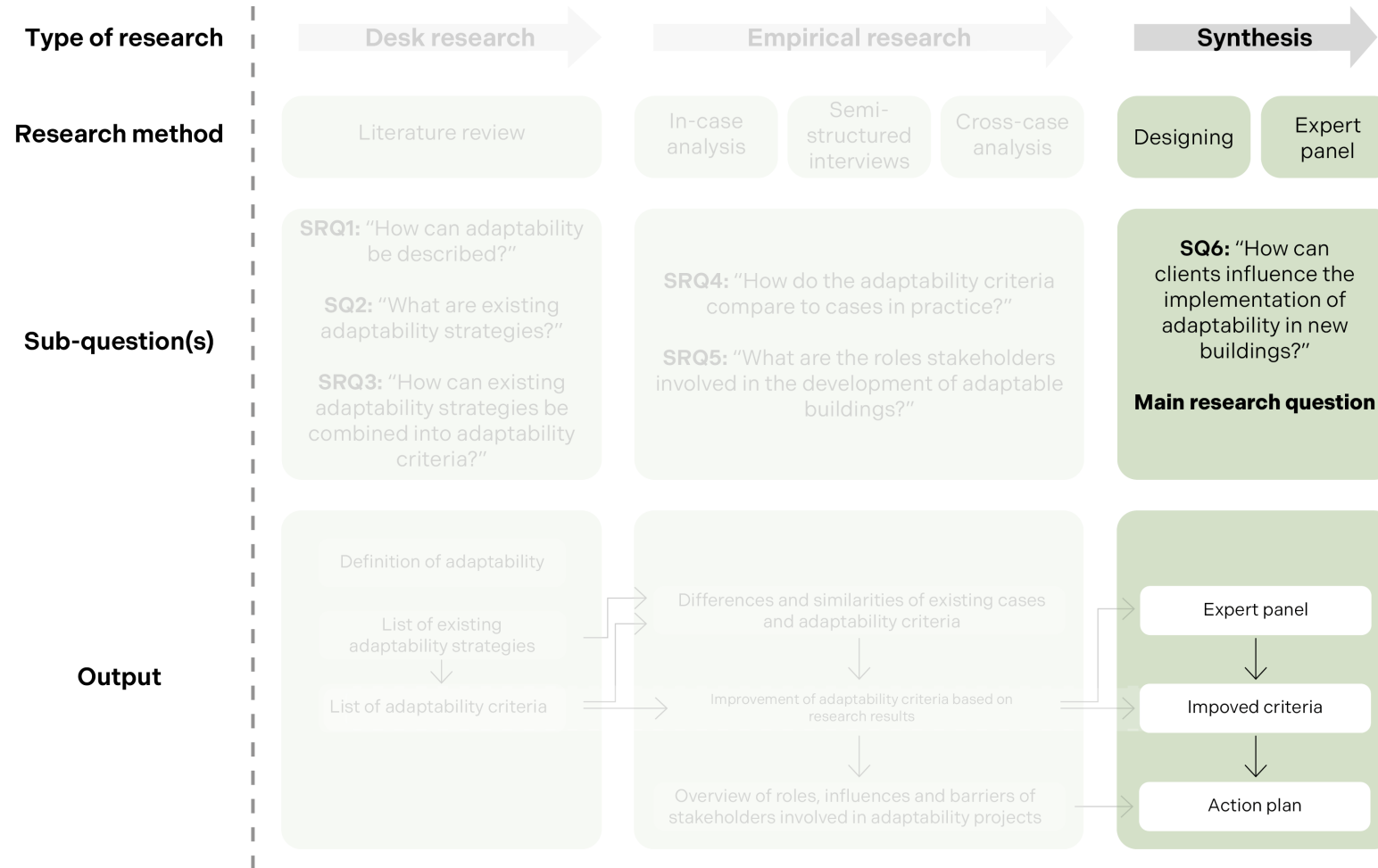
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(Own figure)

Method.

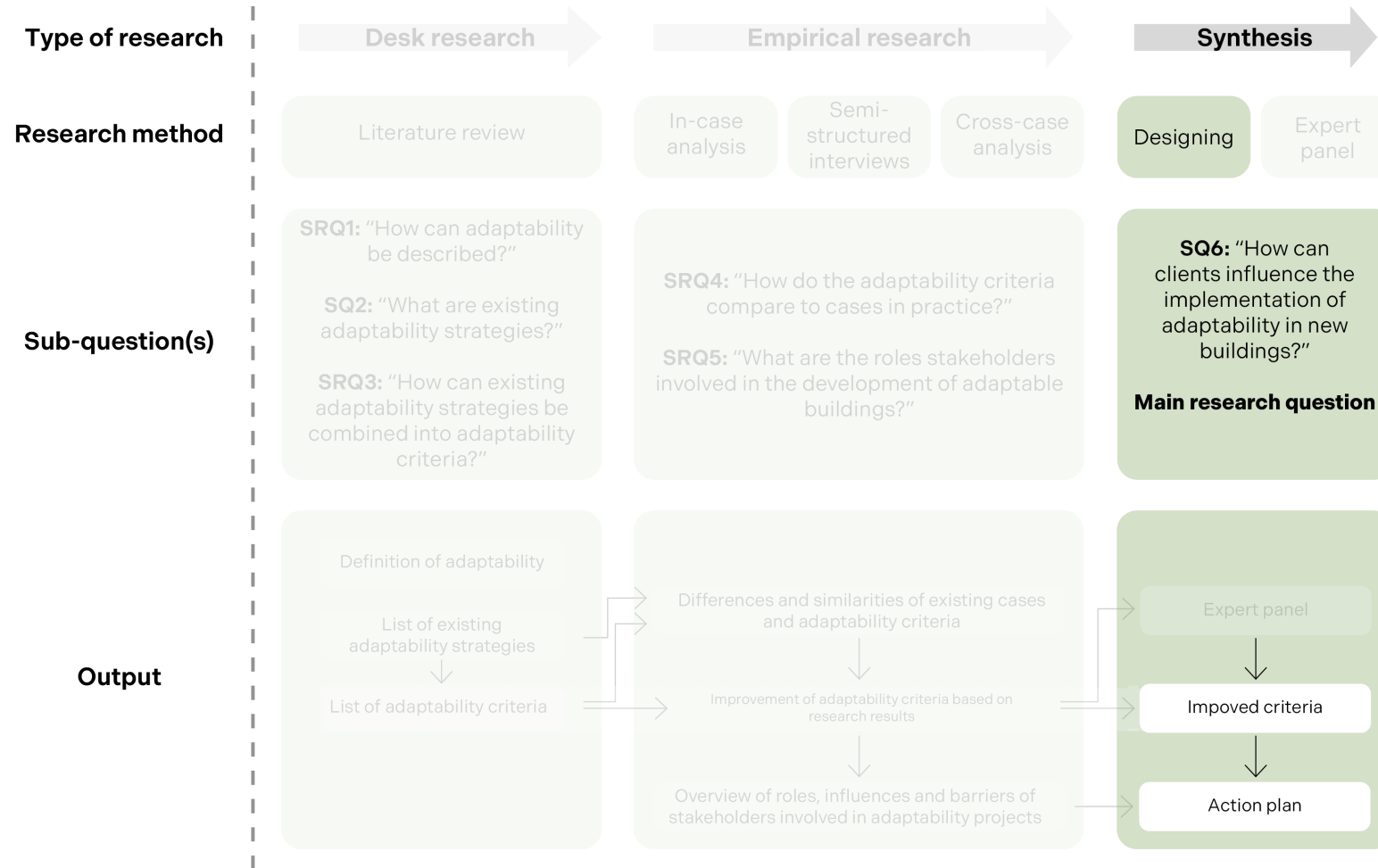
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(Own figure)

Method.

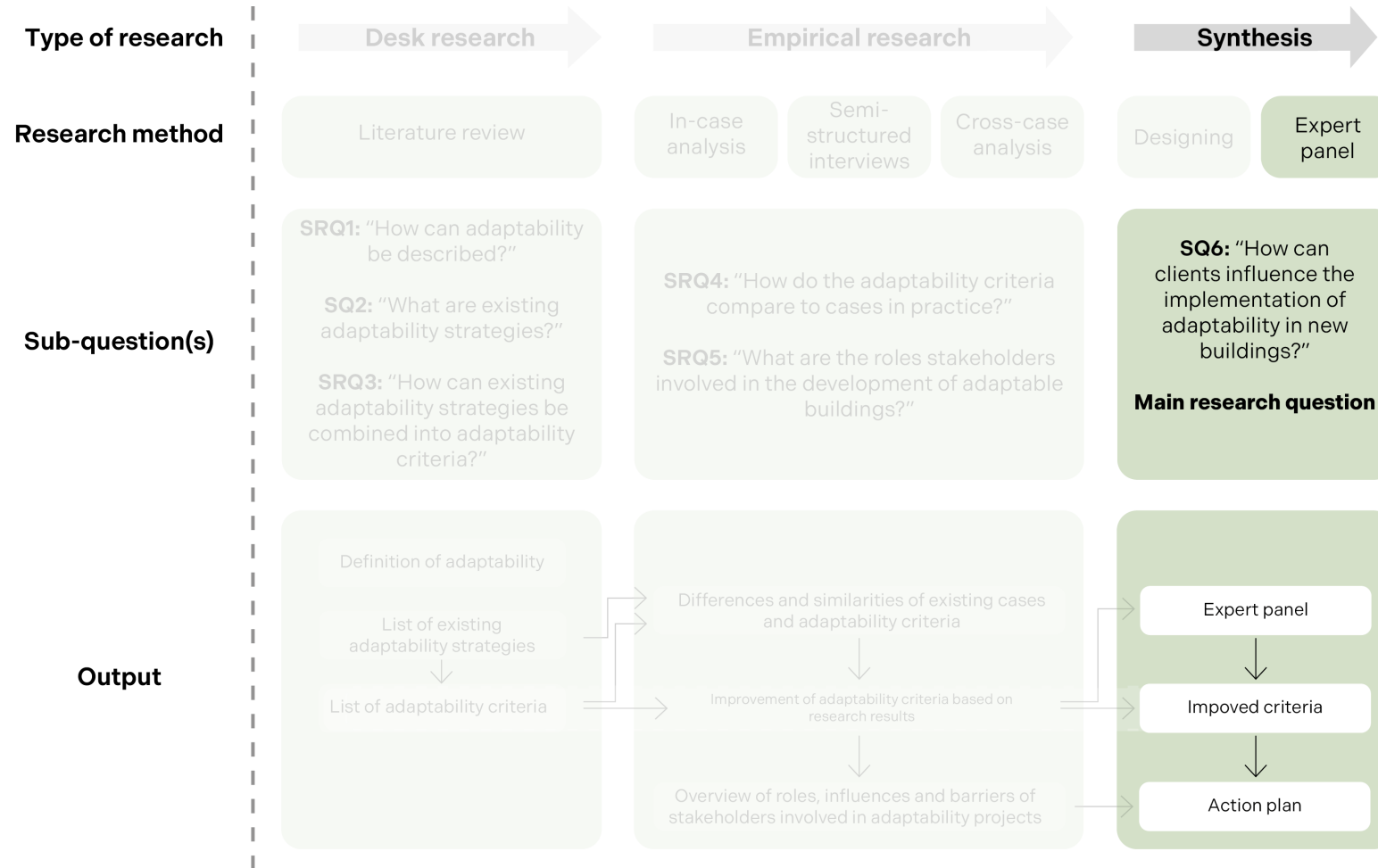
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(Own figure)

Method.

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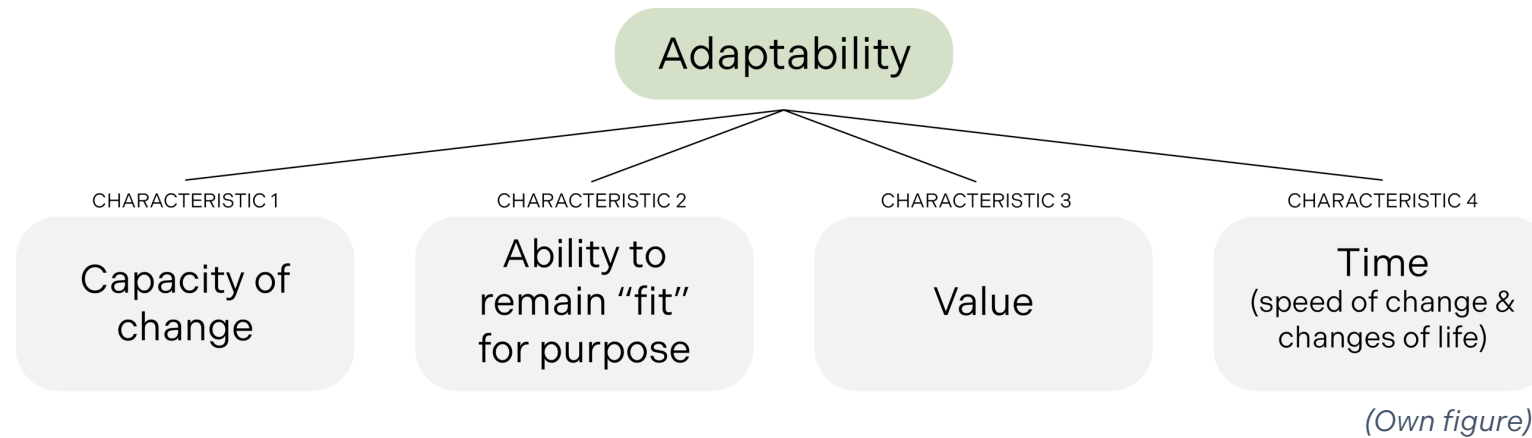


(Own figure)

03

Theory

Defining adaptability.



Defining adaptability.

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*“The **capacity to change** the building’s built-environment in order to respond and **fit to the evolving demands** of its users/environment **maximizing value** throughout its lifecycle.”*

(Schmidt III et al., 2009)

Adaptability strategies.

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(Brand, 1994)

Adaptability criteria.

1

**Collecting
adaptability
strategies and
criteria**

2

**Categorizing
all elements**

3

**Comparing and
combining into
adaptability
criteria**

Adaptability criteria.

Building aspects

- Characteristics of the building
- Over-dimensioning
- Fluid spaces & buffer zones
- Demountable, modular & independent
- Lay-out of the building & zoning
- Rearrangeable

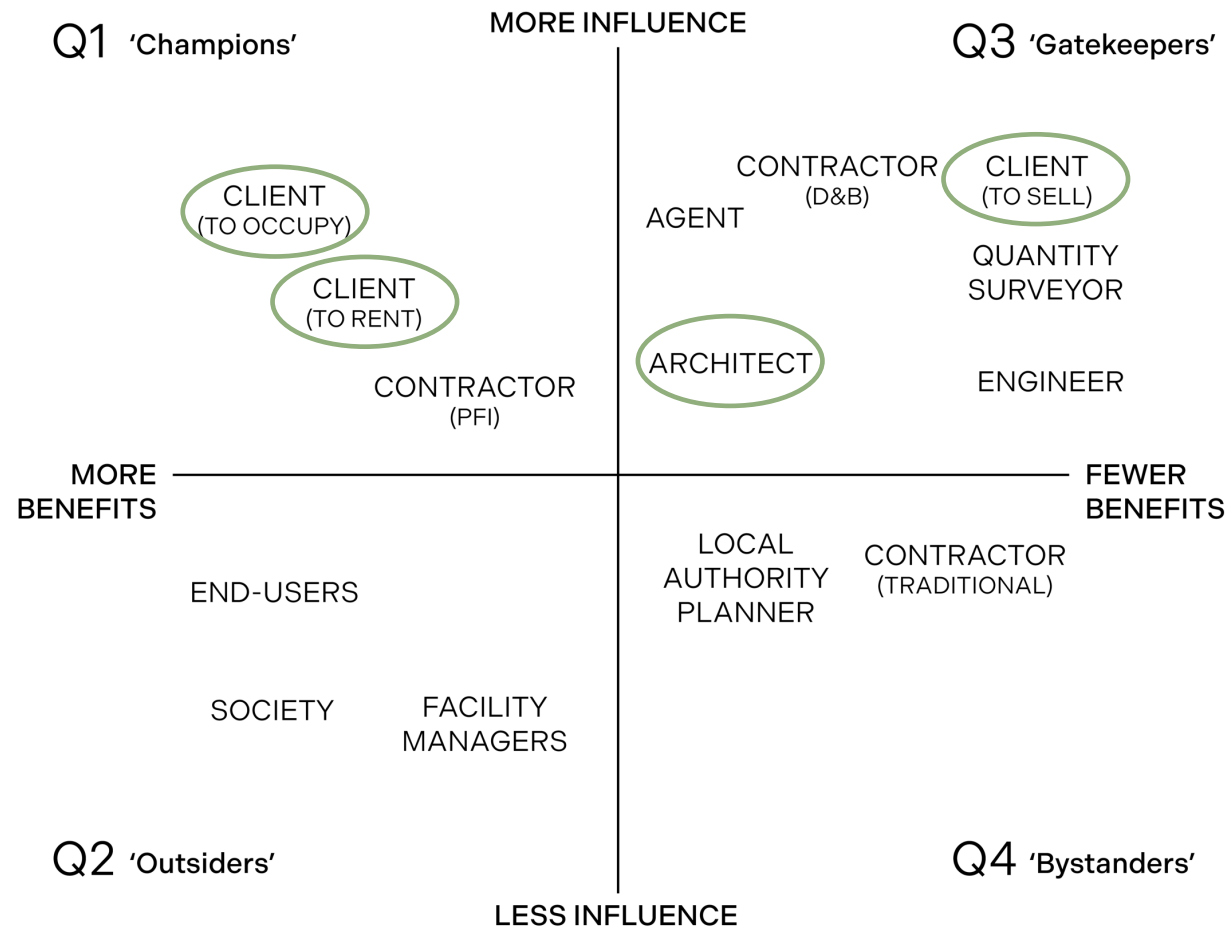
Location & context

- The right location
- Multifunctional
- Non-physical context

Mindset & team

- Flexible thinking

Stakeholders.



(Pinder et al., 2013)

04

Practice

Multiple case study.



Laan van NOI
The Hague



Slotervaart CVZ
Amsterdam



Zoutmanstraat
The Hague



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Laan van NOI



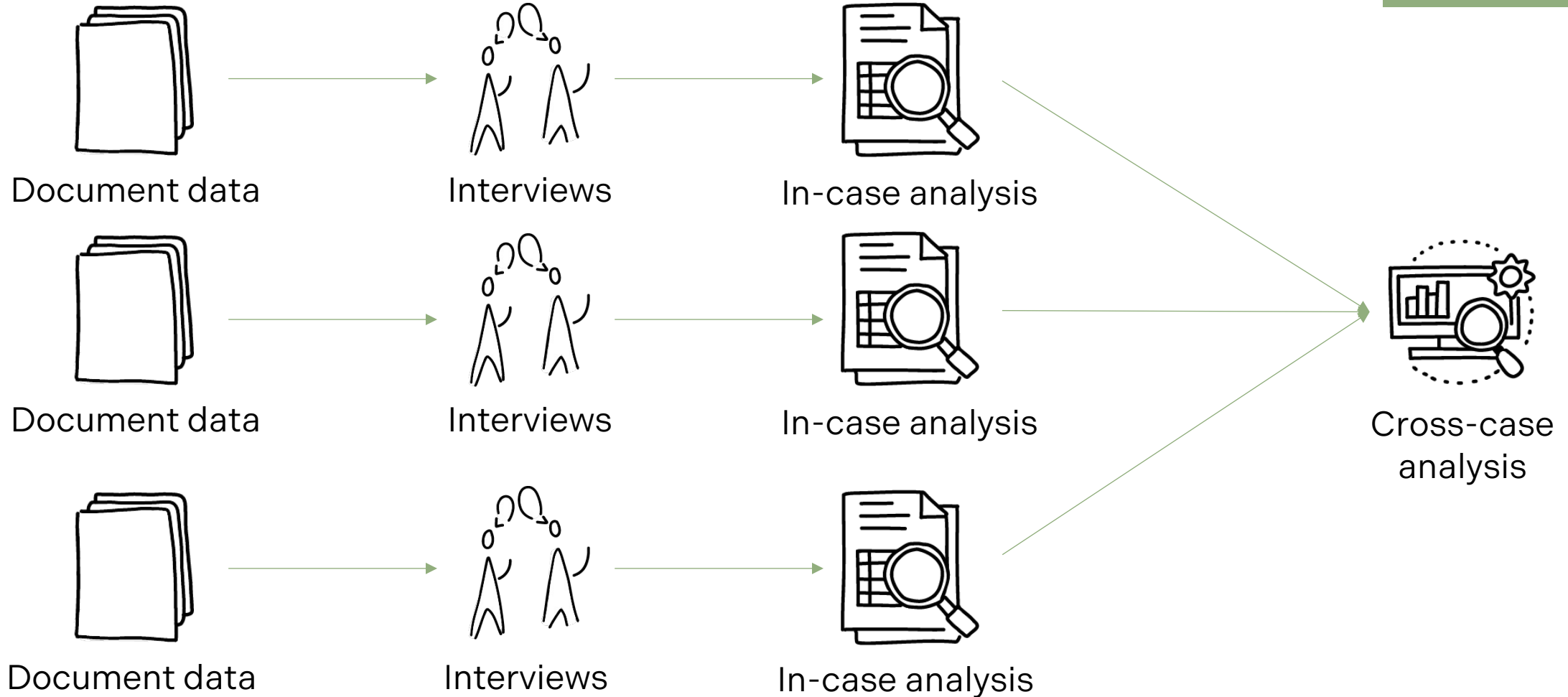
Slotervaart CVZ



Zoutmanstraat



Case analysis



Multiple case study.

Adaptability criteria

Building aspects

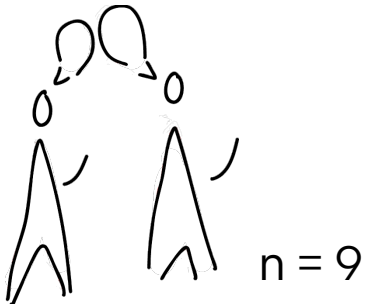
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Location & context

- The right location
- Multifunctional
- Non-physical context

Mindset & team

- Flexible thinking



Multiple case study.

Adaptability criteria

Building aspects

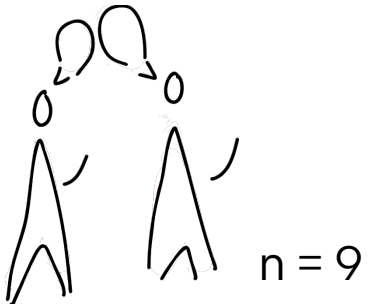
- Characteristics of the building
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Location & context

- The right location
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- Non-physical context

Mindset & team

- Flexible thinking



Multiple case study.

Adaptability criteria

1 Over-dimensioning

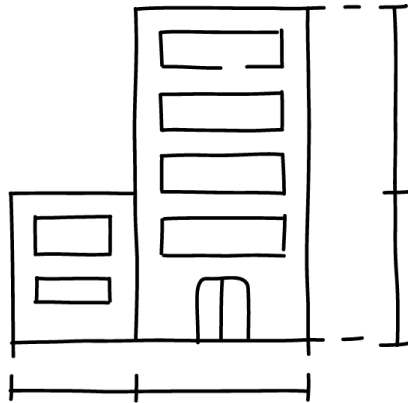
2 Demountable, modular & independent

3 Architectural character

4 Flexible thinking

Multiple case study.

Adaptability criteria



1 Over-dimensioning

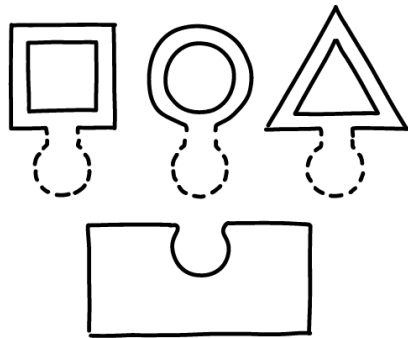
2 Demountable, modular & independent

3 Architectural character

4 Flexible thinking

Multiple case study.

Adaptability criteria



1 Over-dimensioning

2 Demountable, modular & independent

3 Architectural character

4 Flexible thinking

Multiple case study.

Adaptability criteria



1 Over-dimensioning

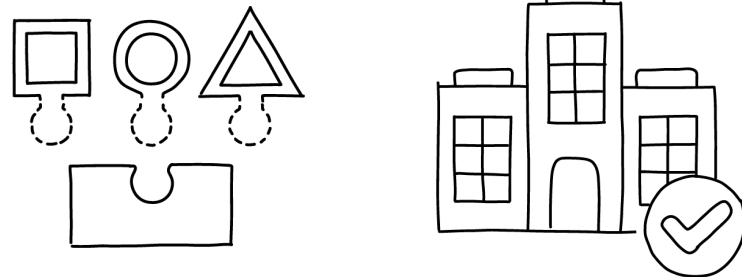
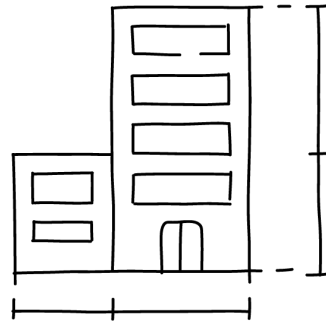
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Multiple case study.

Adaptability criteria



1 Over-dimensioning

2 Demountable, modular & independent

3 Architectural character

4 Flexible thinking

Multiple case study.

Adaptability criteria



1 Over-dimensioning

2 Demountable, modular & independent

3 Architectural character

4 Flexible thinking

Multiple case study.

Success factors

Success factors for adaptability

1. Develop a future-proof design
2. Create a document with clear ambitions & goals
3. Translate ambitions to measurable KPIs
4. Ensure good municipal collaboration
5. Ensure knowledge about adaptability within project
6. Early involvement of project team
7. Create a balance between ambitions and business case
8. Select a designer with experience and expertise
9. Select stakeholders with a “Can Do” mentality
10. Find innovative financial resources
11. Keep reflecting on progress and process

Multiple case study.

Roles of stakeholders

1 Client

2 Project manager

3 Design team

4 Municipality

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Multiple case study.

Roles of stakeholders

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1 Client

2 Project manager

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Multiple case study.

Roles of stakeholders

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Multiple case study.

Roles of stakeholders

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Multiple case study.

Roles of stakeholders

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1 Client

2 Project manager

3 Design team

4 Municipality

Multiple case study.

Main findings

- 1 Drivers for adaptability
- 2 Clear & measurable ambitions
- 3 All adaptable building aspects are nice-to-haves
- 4 Collaboration & mentality is key
- 5 Initiative phase & design phase
- 6 Role of municipality
- 7 Knowledge about adaptability

05

Proposal

Shaping the action plan.

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Goal

Create understanding about the implementation of adaptability in development projects on the process level.

Shaping the action plan.

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Goal

Create understanding about the implementation of adaptability in development projects on the process level.

Subgoal

Create the clarity that is needed to make the influence clear and manageable for the client and give insights on specific actions.

Shaping the action plan.

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Goal

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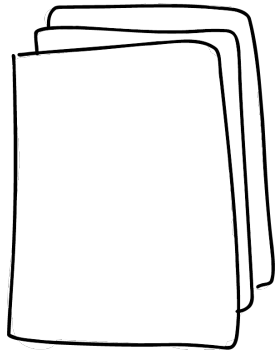
Through

Overcoming barriers, creating clarity about the direct and indirect influence a client has on the process and focus on stakeholder collaboration.

Shaping the action plan.

/theory

/practice

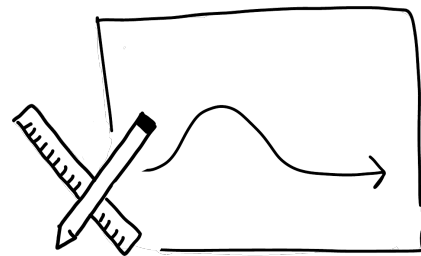
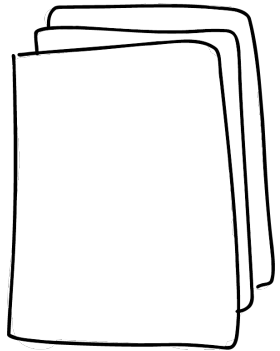


- Adaptability criteria from theory & practice
- Success factors from practice
- Lessons learned from practice

Shaping the action plan.

/theory
/practice

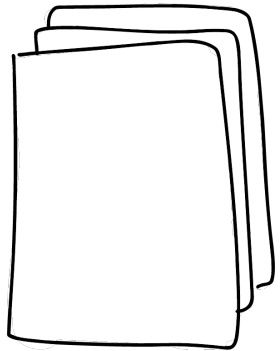
/draft design



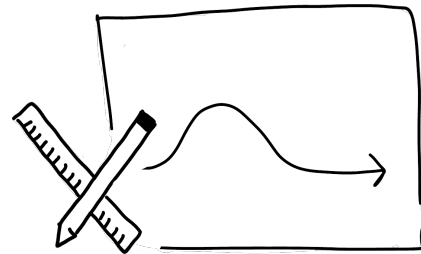
- To **understand**
- To **steer**
- To **motivate**

Shaping the action plan.

/theory
/practice



/draft design

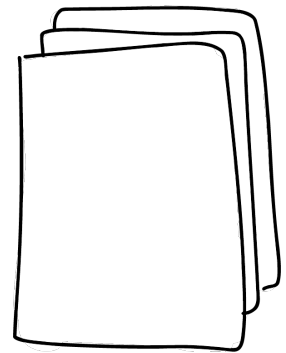


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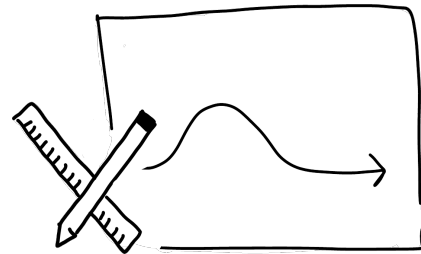


Shaping the action plan.

/theory
/practice



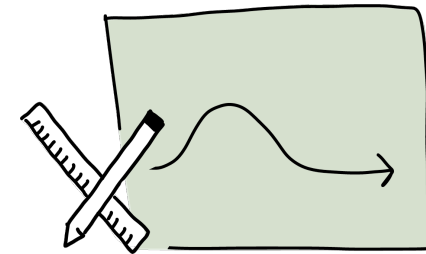
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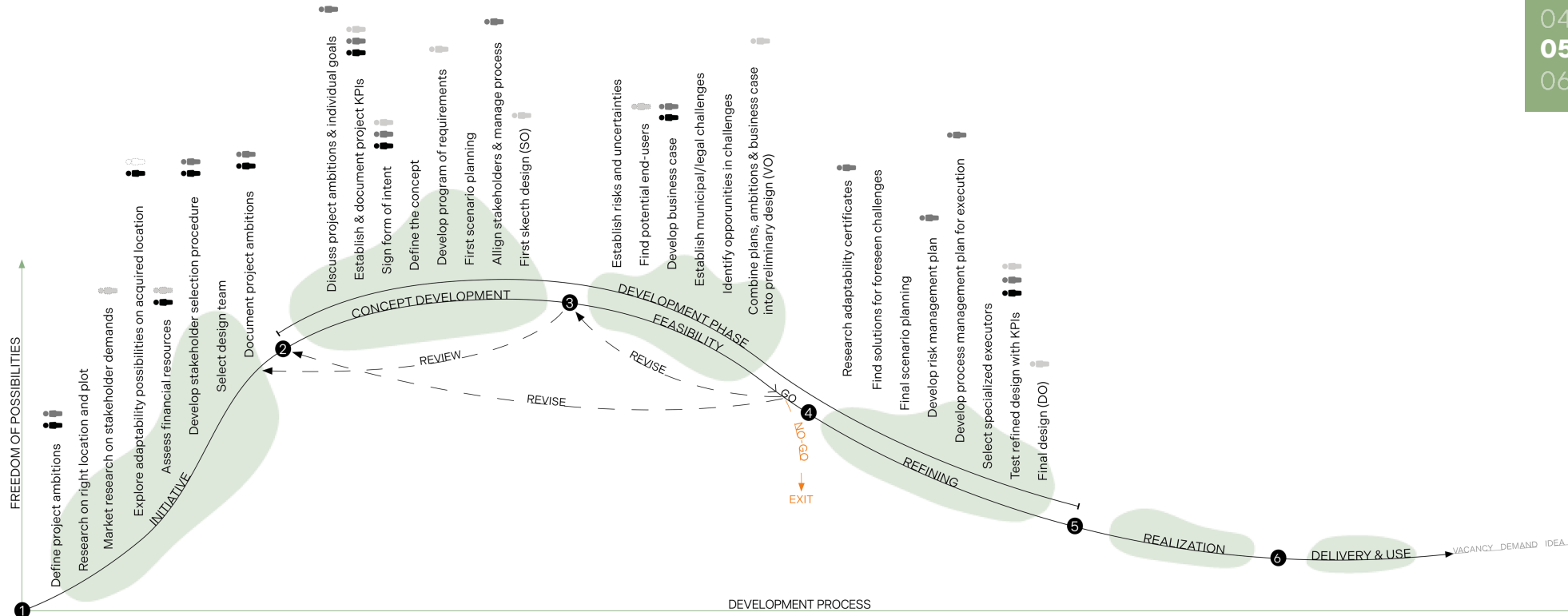


/final design



THE ACTION PLAN

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LEGEND

↑ y-axis: freedom
perceived amount of influence (schematic):
low high

→ development process phases
stakeholder:
client
project manager
investor
design team
municipality

ADAPTABILITY CRITERIA

Building aspects

- Over-dimensioning
- Characteristics of the building
- Demountable, modular & independent
- Fluid spaces & buffer zones
- Lay-out of the building & zoning
- Rearrangeable

Location & context

- The right location
- Multifunctional
- Non-physical context

Mindset & team

- Flexible thinking

SUCCESS FACTORS

- A. Develop a future-proof design
- B. Create a document with clear ambitions & goals
- C. Translate ambitions to measurable KPIs
- D. Ensure good municipal collaboration
- E. Ensure knowledge about adaptability within project team
- F. Early involvement of project team
- G. Create a balance between ambitions and business case
- H. Select a designer with experience and expertise
- I. Select stakeholders with a "Can Do" mentality
- J. Find innovative financial resources
- K. Keep reflecting on progress and process

THE ACTION PLAN

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THE ACTION PLAN

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THE ACTION PLAN

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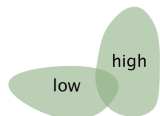
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THE ACTION PLAN

LEGEND

↑ y-axis: freedom
perceived amount of influence (schematic):



→ development process phases

stakeholder:



ADAPTABILITY CRITERIA

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SUCCESS FACTORS

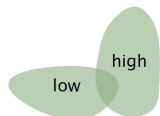
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THE ACTION PLAN



LEGEND

↑ y-axis: freedom
 perceived amount of influence (schematic):



→ development process phases

stakeholder:

- client
- project manager
- investor
- design team
- municipality

ADAPTABILITY CRITERIA

Building aspects

- Over-dimensioning
- Characteristics of the building
- Dismountable, modular & independent
- Fluid spaces & buffer zones
- Lay-out of the building & zoning
- Rearrangeable

Location & context

- The right location
- Multifunctional
- Non-physical context

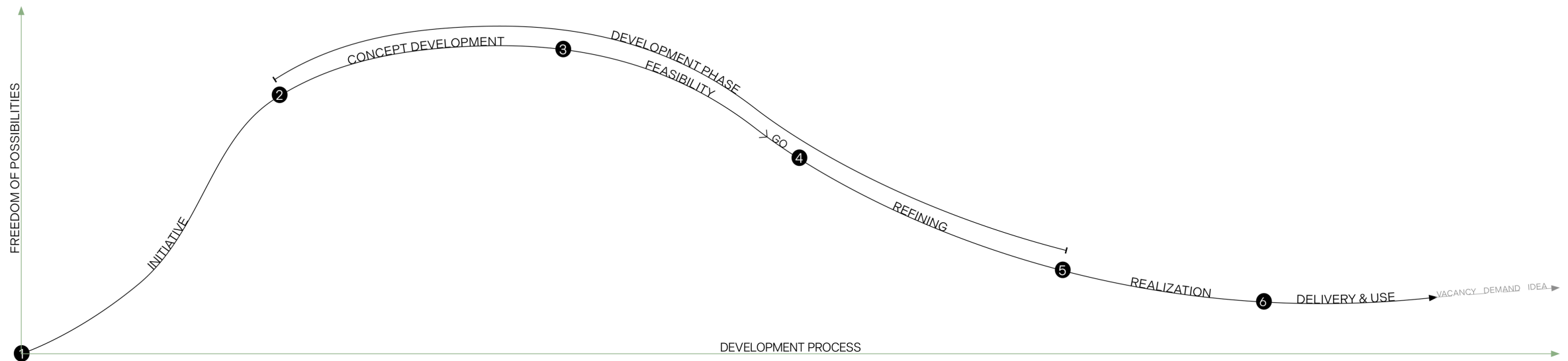
Mindset & team

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SUCCESS FACTORS

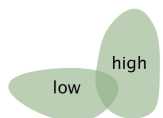
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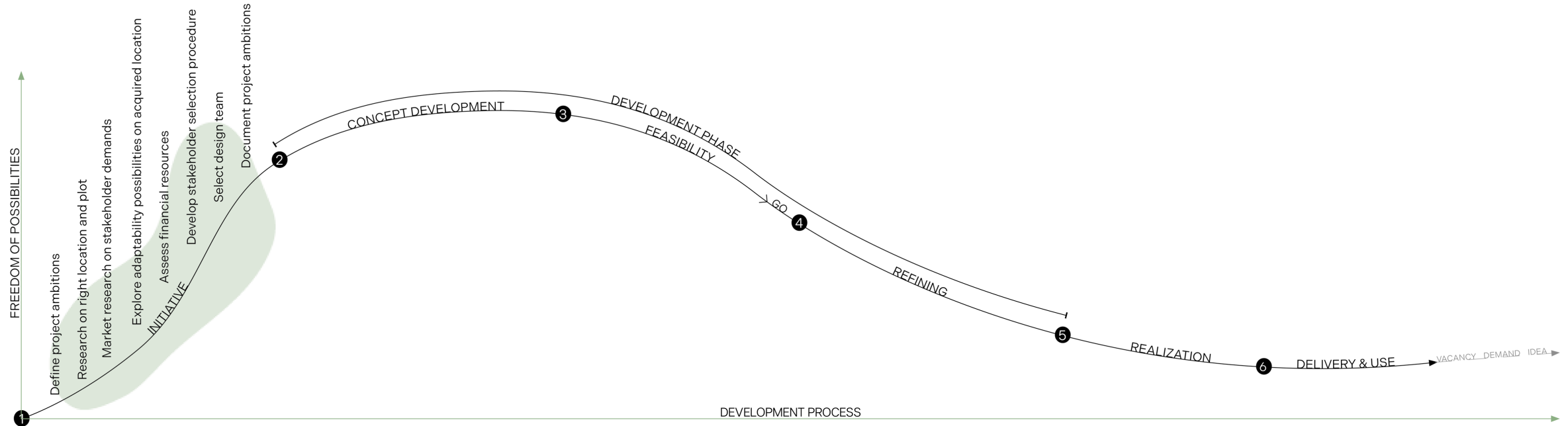
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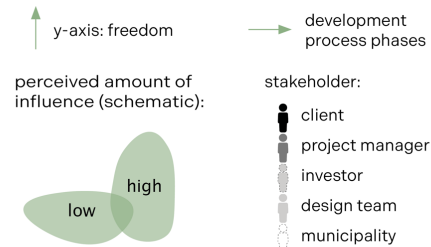
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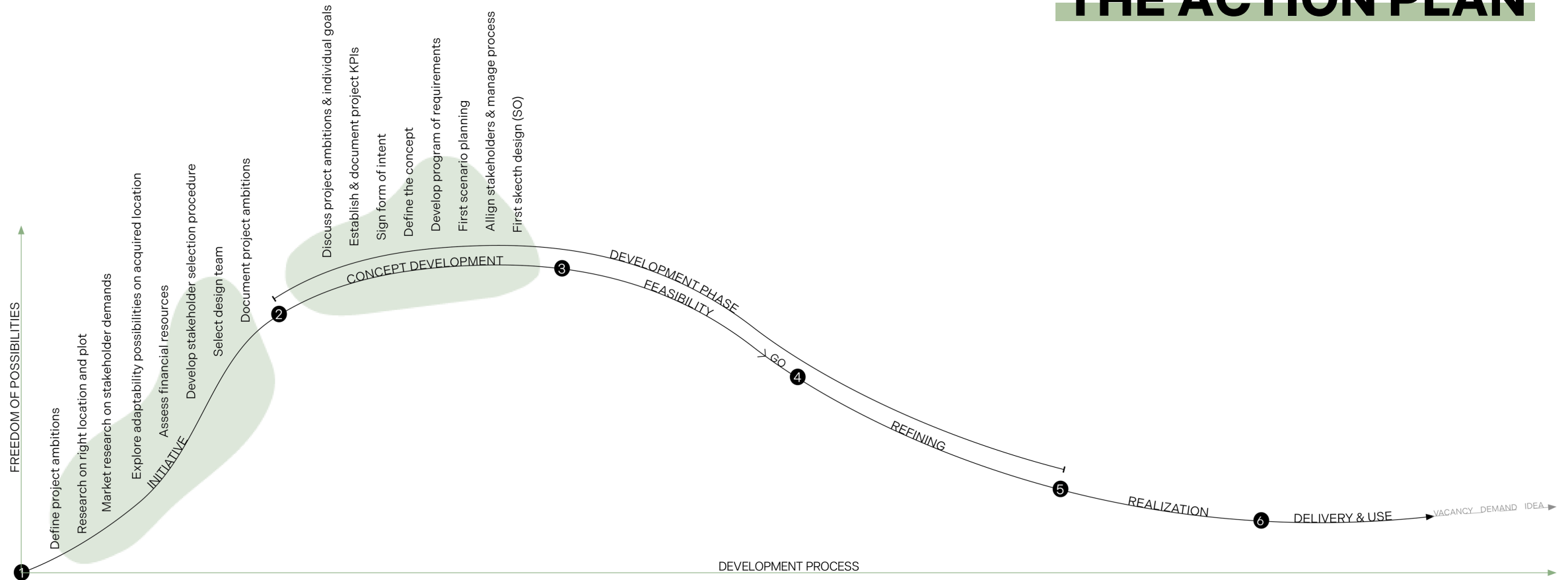
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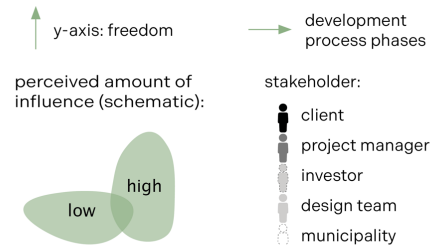
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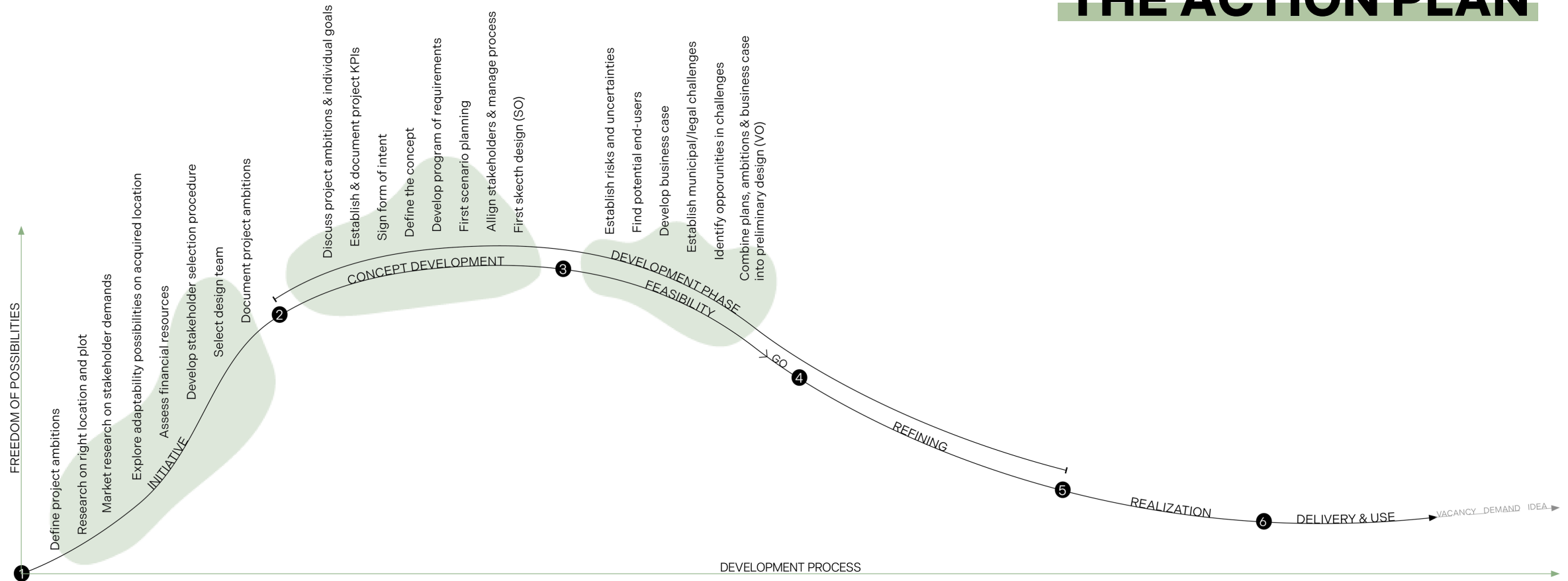
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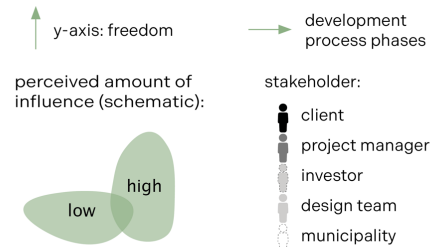
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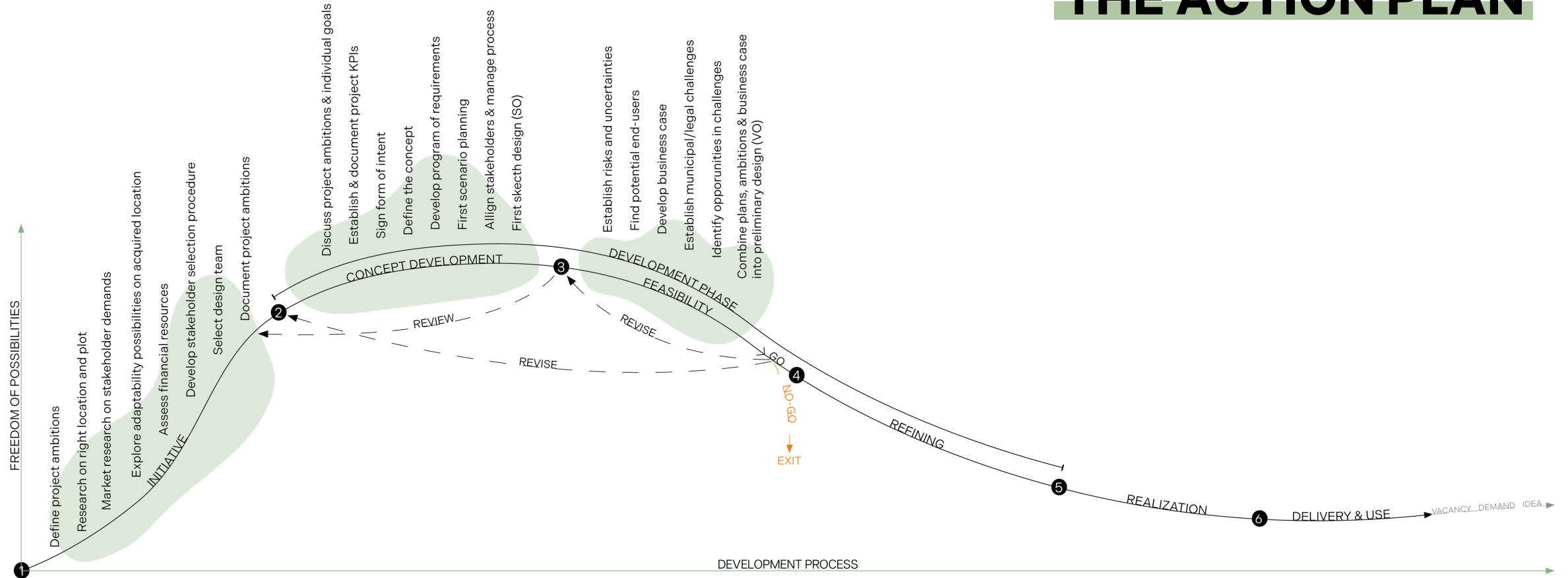
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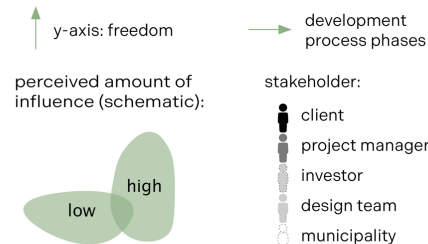
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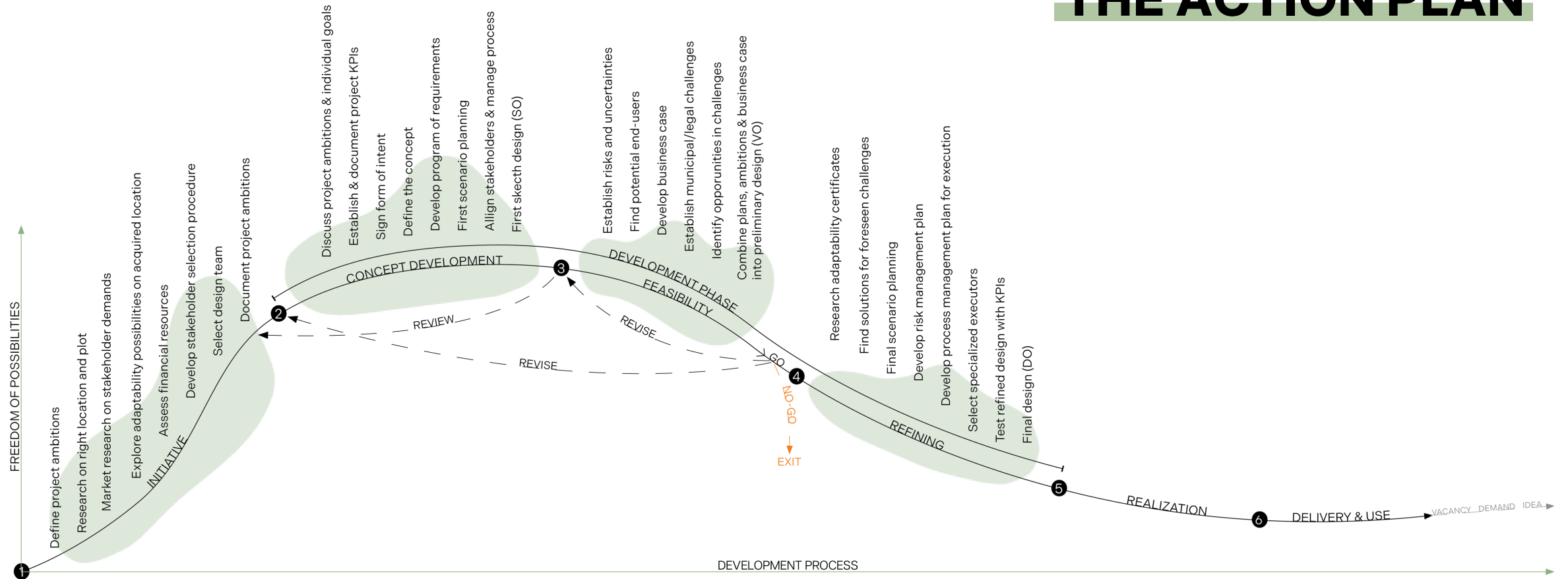
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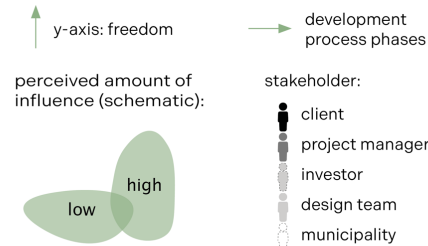
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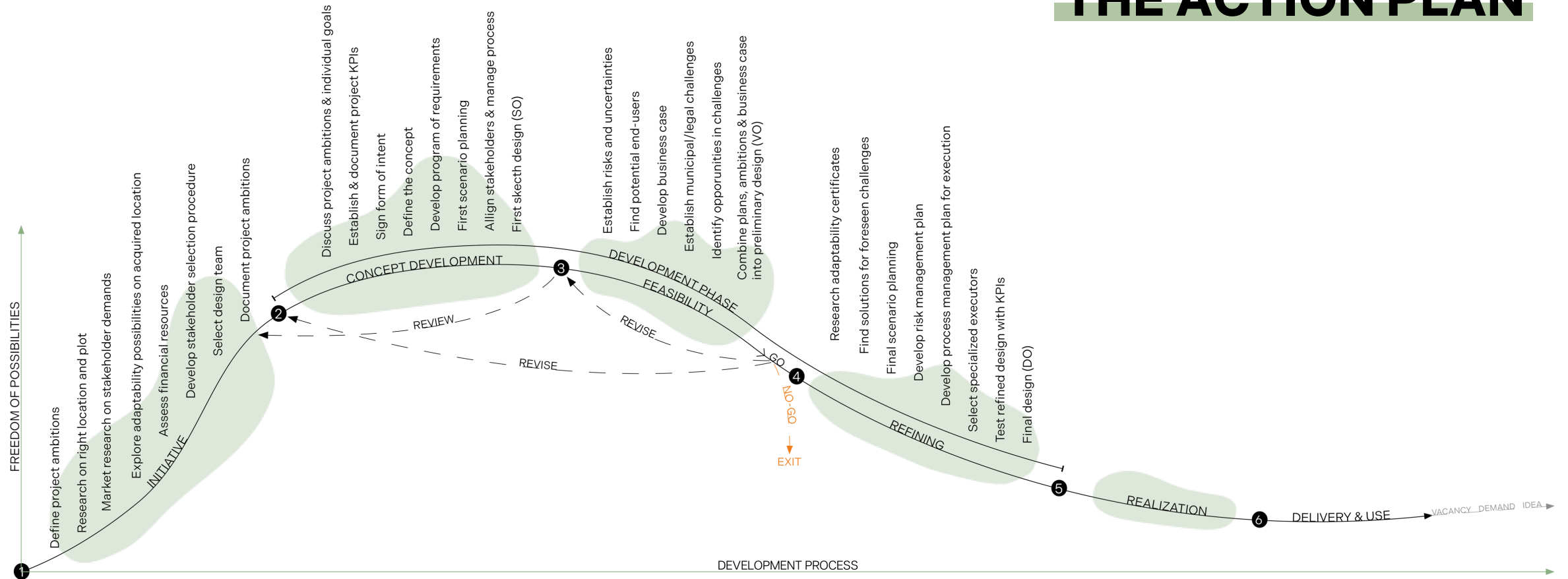
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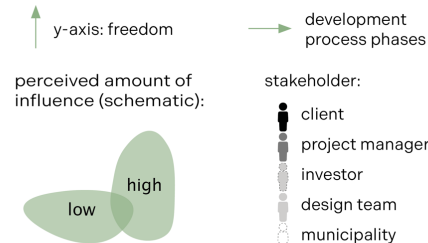
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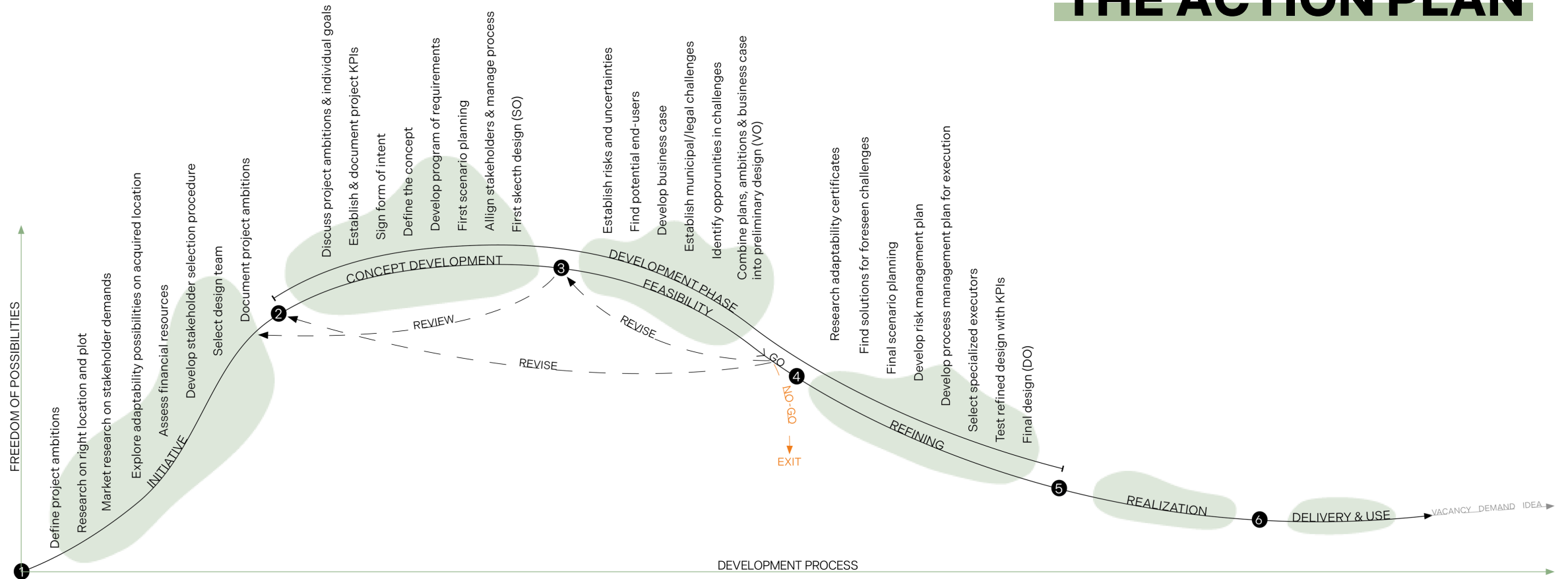
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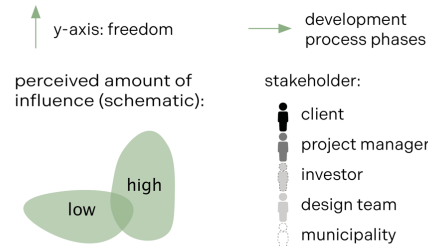
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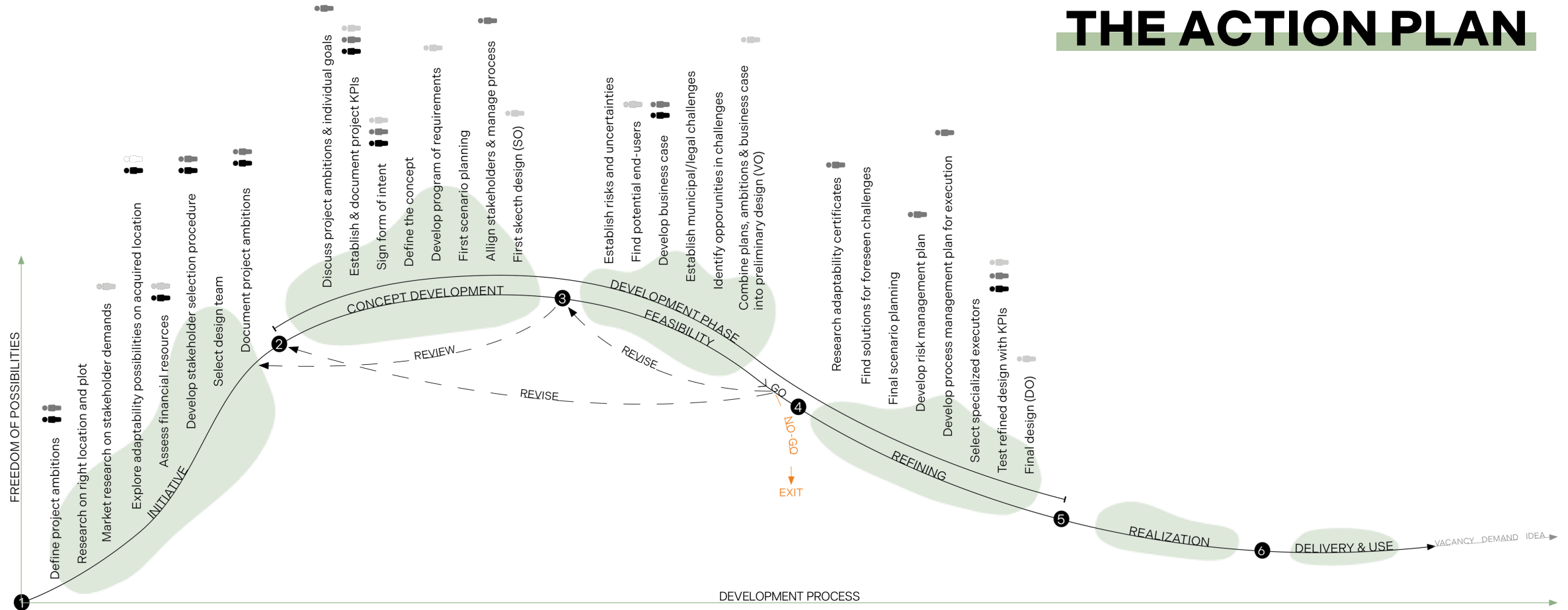
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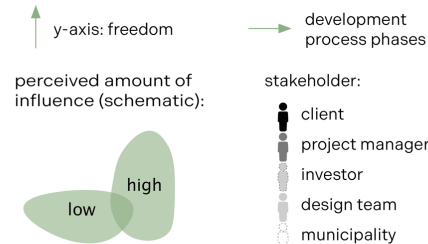
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06

Discussion & conclusion

Discussion

- 01 | Introduction
- 02 | Methodology
- 03 | Theory
- 04 | Practice
- 05 | Proposal
- 06 | Discussion & conclusion**

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Theory

Roles of
stakeholders

Role of
municipality

Discussion

Theory

Roles of
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Role of
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Practice

Collaboration
structure

Lack of
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Discussion

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Theory

Roles of stakeholders

Role of municipality

Practice

Collaboration structure

Lack of knowledge

Proposal

Focus on collaboration of stakeholders

Researchers own interpretation

Conclusion

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*“What are the **criteria** for developing an **adaptable building**, and how can **clients** influence the **implementation** of these criteria in development projects?”*

Conclusion

Physical aspects of adaptability are crucial, but focus must lie on **“human side”**;



Adaptability criteria

- Building aspects
- Location & context
- Mindset & team
- All nice-to-haves



Success factors

- Ambitions & KPIs
- Mentality
- Team selection
- Sharing knowledge

Conclusion

Physical aspects of adaptability are crucial, but focus must lie on **“human side”**;

The physical aspects are familiar to most, but the **how** and **by whom** is unclear to many;

Conclusion

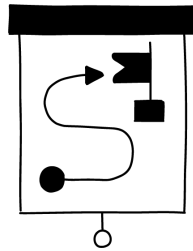
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Several **(inter)actions** can be distinguished from success factors and adaptability criteria to make the influence of the client clear and improve the implementation of adaptability in development projects;

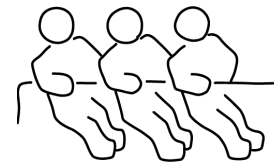
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Initiative & design phase

- Set project KPIs
- Select the right team
- Monitor progress



Collaboration

- Entire chain
- Shared ambitions
- 'Can Do' mentality



Overcome barriers

- Translate barriers to opportunities
- Influence on all phases

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The action plan focuses on creating the **clarity** that is needed to make the (inter)actions **clear** and **manageable** for the client.

Recommendations

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Recommendations

For further research

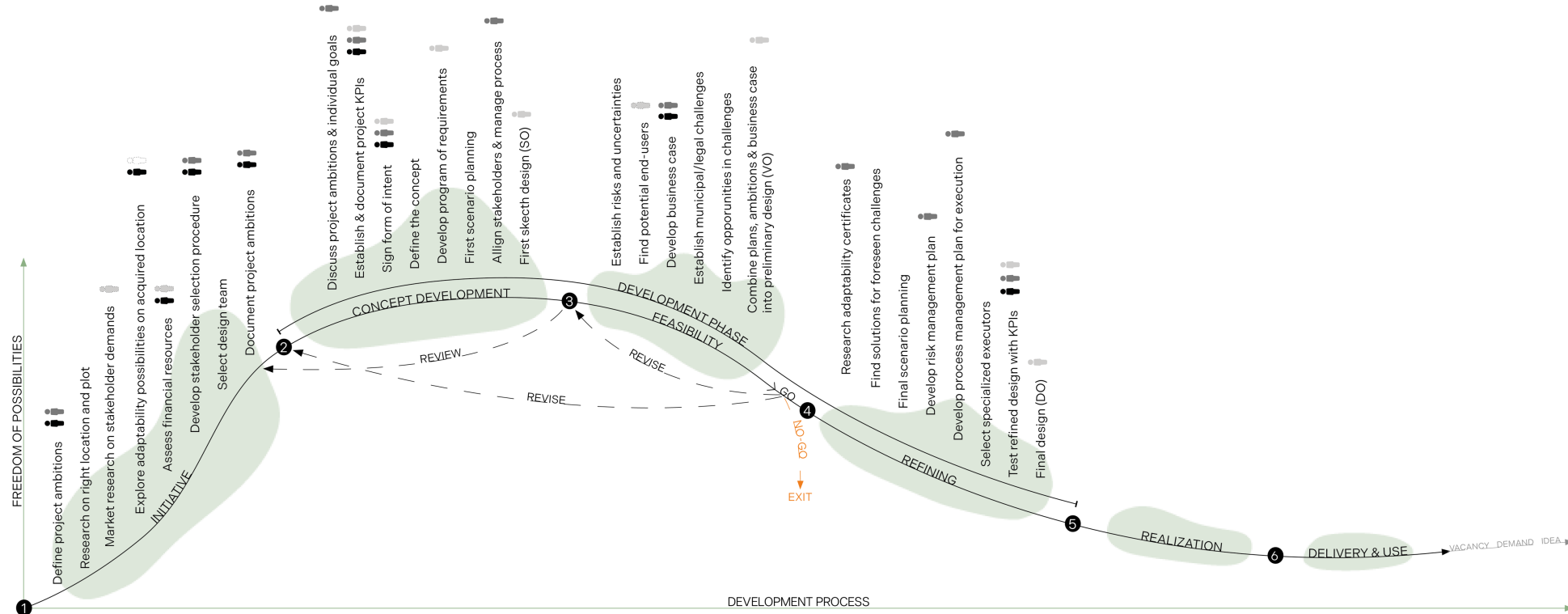
- Different stakeholders
- Role of the municipality
- Value of adaptability
- Context of adaptability
- Collaboration structures

Recommendations

For practice

- Sharing knowledge
- Involve the municipality
- Understand that challenges might be relative
- Updating the action plan

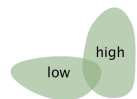
ACTION PLAN FOR ADAPTABLE BUILDING DEVELOPMENT



LEGEND

↑ y-axis: freedom

perceived amount of influence (schematic):



→ development process phases

stakeholder:

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Action plan for adaptability

What is it?

Adaptable buildings are a unique and innovative way of developing buildings. An adaptable building development process requires a different approach in comparison to traditional buildings. This guideline shows an action plan for the development of adaptable buildings. In this action plan different elements can be found from the process of adaptability with corresponding actions, the amount of influence, different stakeholders and adaptability criteria to success factors and the indirect influence on the implementation of adaptability.

At the bottom of the action plan, you can find the ten adaptability criteria focusing on the physical aspects, and the eleven success factors focusing on the process and collaboration side. Those elements are perceived as most important focus points in developing adaptable buildings. Information about the adaptability criteria can be found in the research report. Information about the success factors is described on the following page.

The goal of this action plan is to make the implementation of adaptability more tangible and clear. Not just for you but also as a tool to motivate and steer others. With this model you can start the discussion and develop a succesful adaptable building.

How to use it.

This action plan can be used during the entire process of the project. However, when you are planning on using it, make sure you use it from the very beginning of the process. Use it as a tool to understand the process or to steer and motivate other stakeholders.

The action plan is read from left to right, starting at the initiative phase.

1 Phase: Each phase represents a part of the process with certain set of activities.

Influence: The (schematic) amount of influence the client has on the process.

Y-axis: (Schematic) amount of freedom in possibilities.

X-axis: Development process phases.

Stakeholder: Some actions are appointed to a stakeholder. This role is responsible for this action. When there is no role appointed to an action, the team must discuss the expectations and a plan.

Activity: The phase related tasks that influence the project success for adaptability.

Define project ambitions
Research through location
Market research

For and by whom?

The client

I am the initiator of the project. I establish the project ambitions and make the final decisions.

I want:

- Profit
- To reach the goals
- Competitive position

The project manager

I realize and manage the project. I make sure all stakeholders are aligned and the goals are reached.

I want:

- Good collaboration
- Efficient process
- Time, budget & quality

The design team

We design and construct the building in line with the ambitions and business case of the client.

We want:

- Future-proof building
- Improved well-being of users
- Brand appraisal

The investor

I have the financial resources for this project. I use or rent the building and monitor the demand.

I want:

- Profit
- Reduced future mismatch
- Improved well-being of users
- Low-risks

The municipality

We facilitate municipal collaboration and enforce compliance of regulations.

I want:

- Reduced future mismatch
- Allignment with environment
- Future-proof & sustainable building

Success factors for adaptability

1. Develop a future-proof design

A future-proof design where adaptability criteria are implemented helps to reduce the future mismatch. It also helps to reduce the large changes that must be made to the building in the future to match the demand.

2. Create a document with clear ambitions & goals

The goals and ambitions of the client must be translated into an ambition document. This document consists of demands, ambitions, goals and wishes, and must be used to keep everyone on the same track.

3. Translate ambitions to measurable KPIs

Translating the ambitions from the ambition document into measurable KPIs can help to monitor the progress and steer the process.

5. Ensure knowledge about adaptability

Stakeholders must understand the impact of adaptability on the development process and associated actions. Knowledge about the concept is important. When knowledge is lacking, this must be acquired.

4. Ensure good municipal collaboration

Municipal support is important because the process of adaptability differs from traditional buildings. Good collaboration with the municipality helps with permit applications and assessments of the design.

6. Early involvement of project team

Early involvement of the project team helps to reduce and manage risks & uncertainties. It also improves the available knowledge within the team during concept development.

7. Create a balance between ambitions and business case

Many adaptability criteria can be implemented in an adaptability project. However, because the payback period of adaptability is different and not all criteria are required in the first functional life-cycle, a balance between ambitions and the business case is needed.

8. Select a designer with experience and expertise

Developing an adaptable building requires a different mindset. An innovative designer with experience and expertise in adaptability, that is willing to start the discussion with the client about the feasibility of its ambitions, is preferred.

9. Select stakeholders with a "Can Do" mentality

Stakeholders involved in the project must have a different mindset. They must see opportunities where others see barriers and challenges. Stakeholders must be open, and willing to think outside of the box.

10. Find innovative financial resources

Adaptability requires a different type of investment. Innovative financial resources that either understand the differences and see the project potential, or are open to innovative ideas are needed.

11. Keep reflecting on progress and process

An ongoing process of monitoring the progress and reflecting on the process helps to detect challenges in early stages. Sharing 'lessons learned' within the project team also improves the project success.

Indirect influence on the implementation of adaptability

The development of adaptable buildings can, next to direct influence, indirectly be influenced by the client or other stakeholders. The indirect influence mostly relates to the stakeholders outside the project team, and external factors influencing the project success of developing adaptable buildings.

1. Communication and contracting with municipality.

- Start a conversation with the municipality about their vision on developing adaptable buildings and point out that their role is crucial for project success. It is important to gather information about how they assess multifunctional building designs.
- Talk about flexibility in regulations for adaptable buildings, the building envelope, and the zoning plan.
- Start a conversation about incentives for the development of adaptable buildings and look for common ground.
- Make sure that agreements made with the municipality are recorded in contract documents.

2. Communication and contracting with the government.

- Start a conversation with the government about the lack of guidance and support for developing adaptable buildings in laws, regulations, and certificates.

3. Communication with companies in sustainability certification.

- Create awareness at certification companies for the need of including adaptability in sustainability certificates. Point out that it is difficult to motivate and convince stakeholders to develop adaptable buildings when it does not have a direct incentive through certificates.
- There is a need for a certificate for adaptable building to create incentives and to assign (financial) value to adaptability.

4. Communication with investors and banks.

- Start a conversation with investors about the demand for adaptable buildings and the benefits for their building portfolio.
- Make them aware of the different type of investment they will make and the positive effect of adaptability on the market risk of their building.