

A holistic approach to balance energy renovation and aging-in-place needs for Dutch social housing

Willemijn Vos
18-6-2024

P5 presentation





Chapter 1 | **Introduction**

1.1 | Problem statement

1.2 | Research question



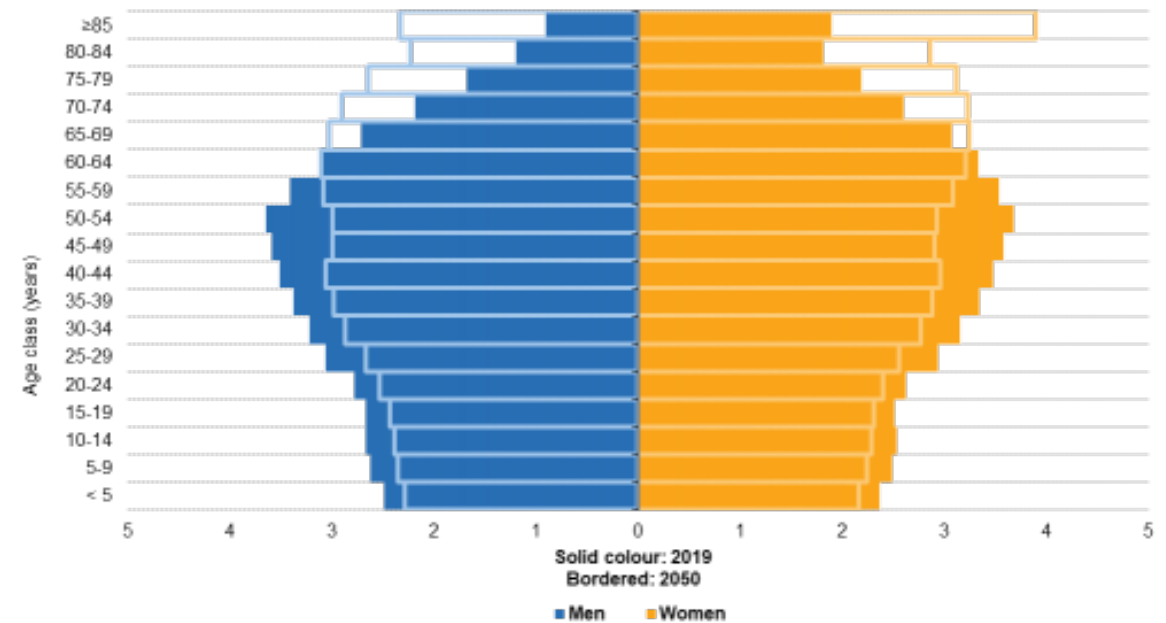
1.1 | Problem statement

Need for small scale houses with age friendly features for the elderly with a low to middle income

Aging population

- Vulnerable to climate change
- Challenges in health care
- Aging in place
- Improvement of quality of life

Population pyramids, EU-27, 2019 and 2050
(% share of total population)



Note: all data as of 1 January. 2019: estimates and provisional. 2050: population according to the 2019 projections, baseline variant (EUROPOP2019).

Source: Eurostat (online data codes: demo_pjangroup and proj_19np)



1.1 | Problem statement

Need for housing associations to address renovation requirements within constraints

Housing associations

- 35% of people above 65 years old
- Energy transition
- Attached to environment
- Standard design dwellings
- Relocation
- 70% approval of renovation plans

1.1 | Problem statement

Need for housing associations to
address renovation requirements
within constraints



Need for small scale houses with
age friendly features for elderly
with a low to middle income



1.2 | Research question

“How can aging-in-place features be integrated in energy renovations of social housing in The Netherlands?”

Sub-research questions

1. What are **opportunities and barriers to** integrating aging-in-place improvements in energy renovations of social housing in The Netherlands
2. What are the **preferences and needs of aging social tenants** regarding aging features blended in energy renovation?
3. What are the **key learnings from initiatives** to integrate aging-in-place improvements in energy renovations?
4. How to **overcome the barriers** when integrating aging-in-place improvements in energy renovations of social housing in The Netherlands?

Deliverable

- A holistic approach to integrating aging-in-place features in energy renovations for Dutch social housing

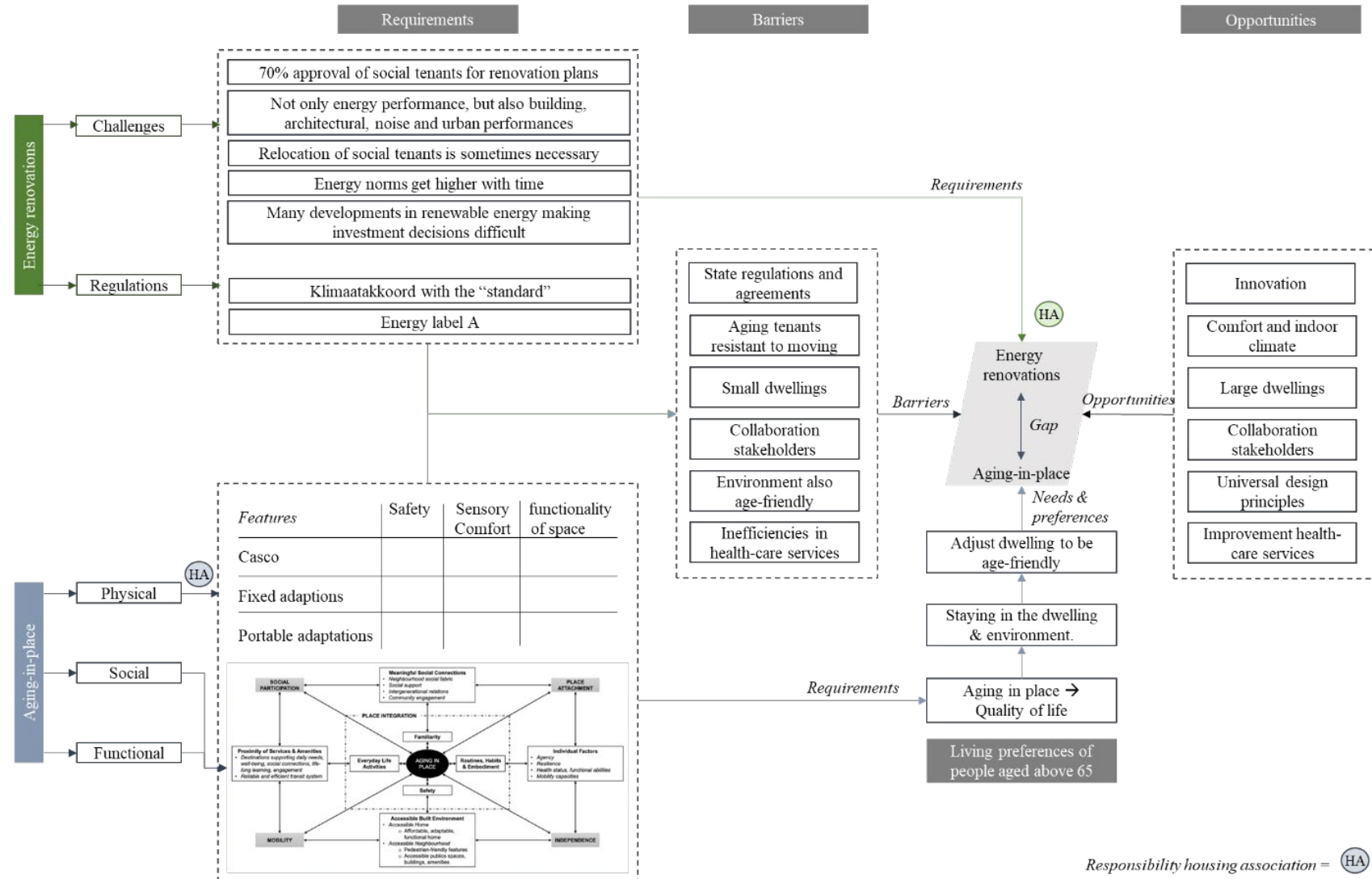


Chapter 2 | **Theoretical background**

2.1 | Integrated theoretical framework

2.1 | Integrated theoretical framework

Framework provides context around the research questions and their interrelationships





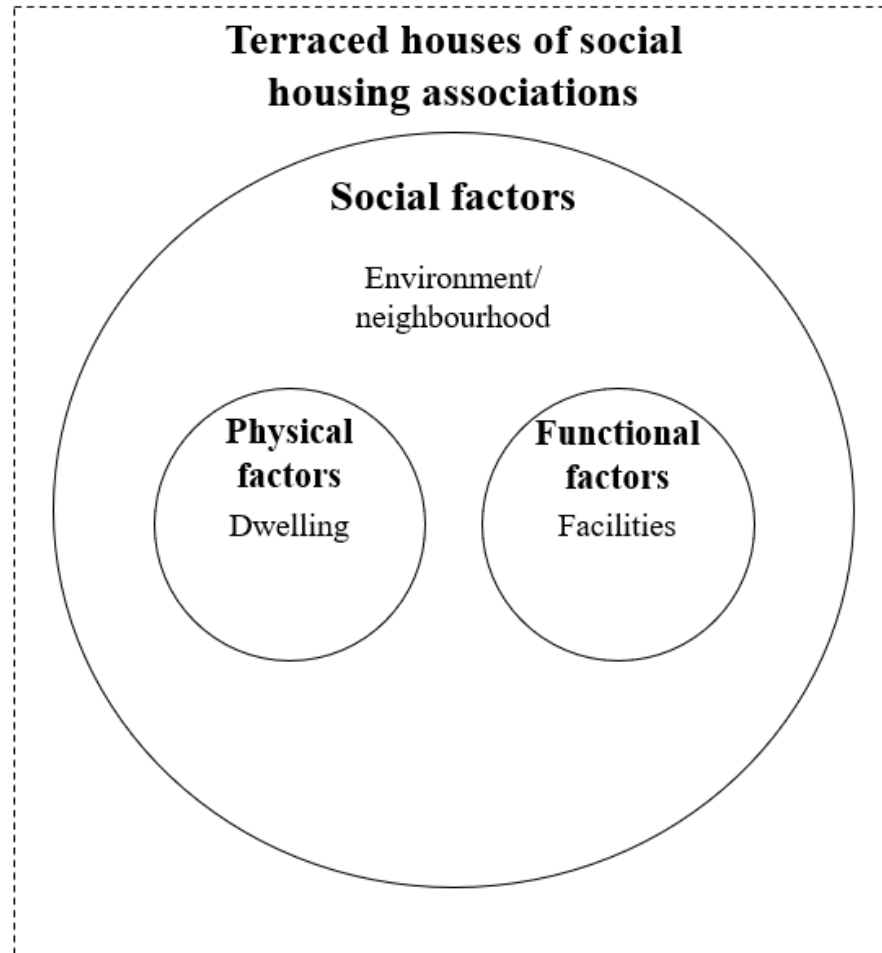
Chapter 3 | **Research design**

- 3.1 | Research design
- 3.2 | Qualitative research
- 3.3 | Research context

3.2 | Research context

The research is focussed on tenants aged over 65 in terraced social housing

Scope



Rationale

People aged 65 and above

- The age group 65-74 has 11% at least one ADL* disability and 18% IADL** disability
- People aged 75 and above is this percentage 31% and 44%

*ADL = General everyday living activities

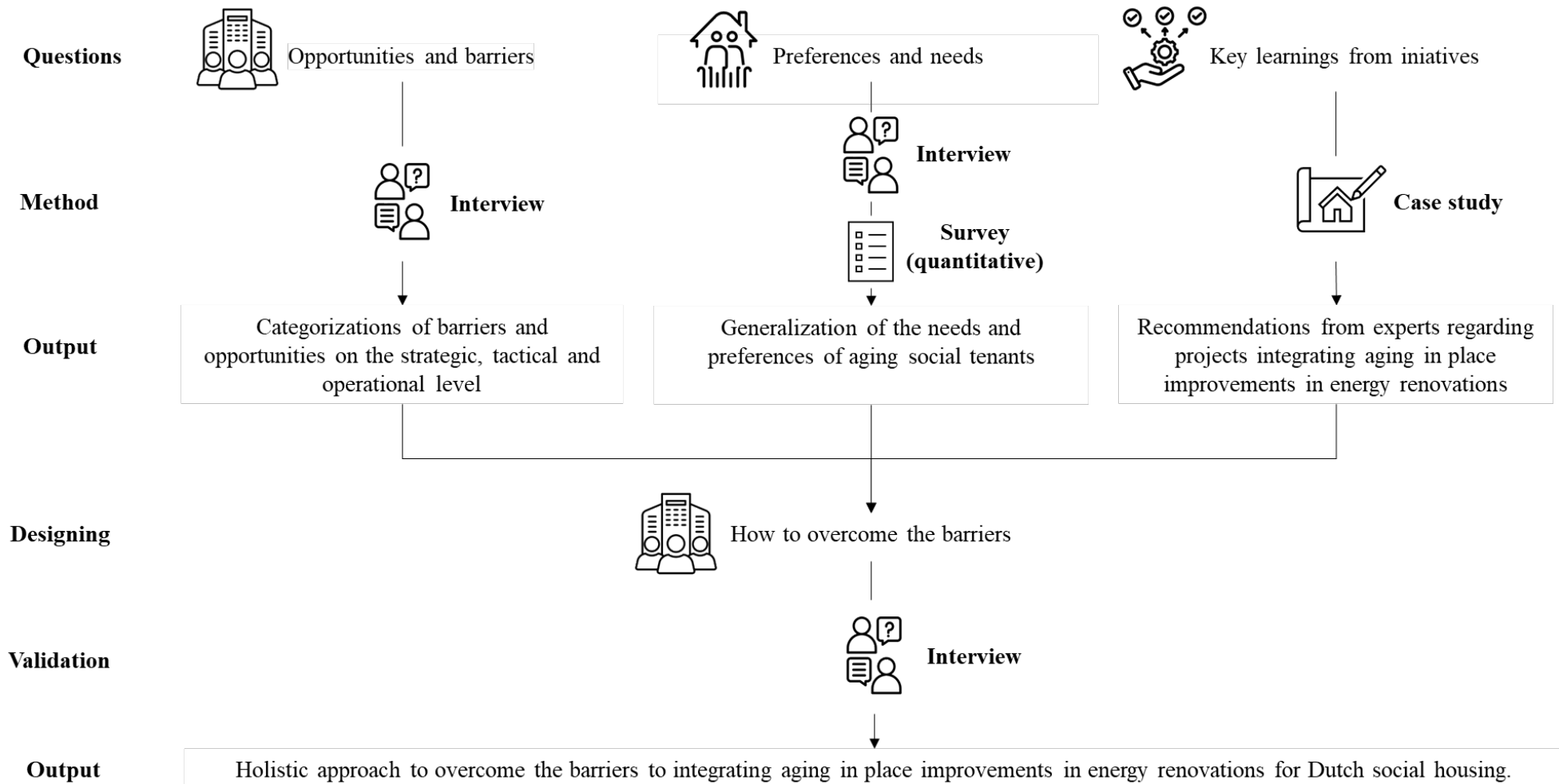
**IADL = Instrumental everyday living activities

Terraced housing

- 42% terraced housing in The Netherlands
- Major energy consumer
- Most people of the age group 65-75 live in non-senior terraced houses
- Tension housing associations and elderly in terraced houses

3.1 | Research design

Mixed-method research approach





3.2 | Qualitative research

3 explorative and 10 in-depth interviews have been conducted across stakeholder groups

Interview overview

Research question	Stakeholder	Organisation	Organisational level	Role
SRQ1: Barriers and opportunities	Housing association	Housing association: Alpha	Tactical level	Urban developer
		Housing association: Alpha	Operational level	Social management and living coach
		Municipality: Epsilon	Strategic level	Team manager Social Support
SRQ2: Preferences and needs of aging social tenants	Aging social tenants	Housing association: Beta		Aging social tenant
		Housing association: Beta		Aging social tenant
		Housing association: Alpha		Aging social tenant
		Housing association: Alpha		Aging social tenant
SRQ3: Key learnings from initiatives	Housing association	Housing association: Gamma	Strategic level	Real estate manager
	Living and care provider	Living and care provider: Delta	Strategic level	Real estate consultant
SRQ4: How to overcome the barriers	Municipality	Municipality: Epsilon	Strategic level	Team manager Social Support



Chapter 4 | **Empirical results**

4.1 | Barriers and opportunities



4.1 | Barriers and opportunities

Key requirements addressed by housing association managers focus on casco building features

Aging-in-place building features

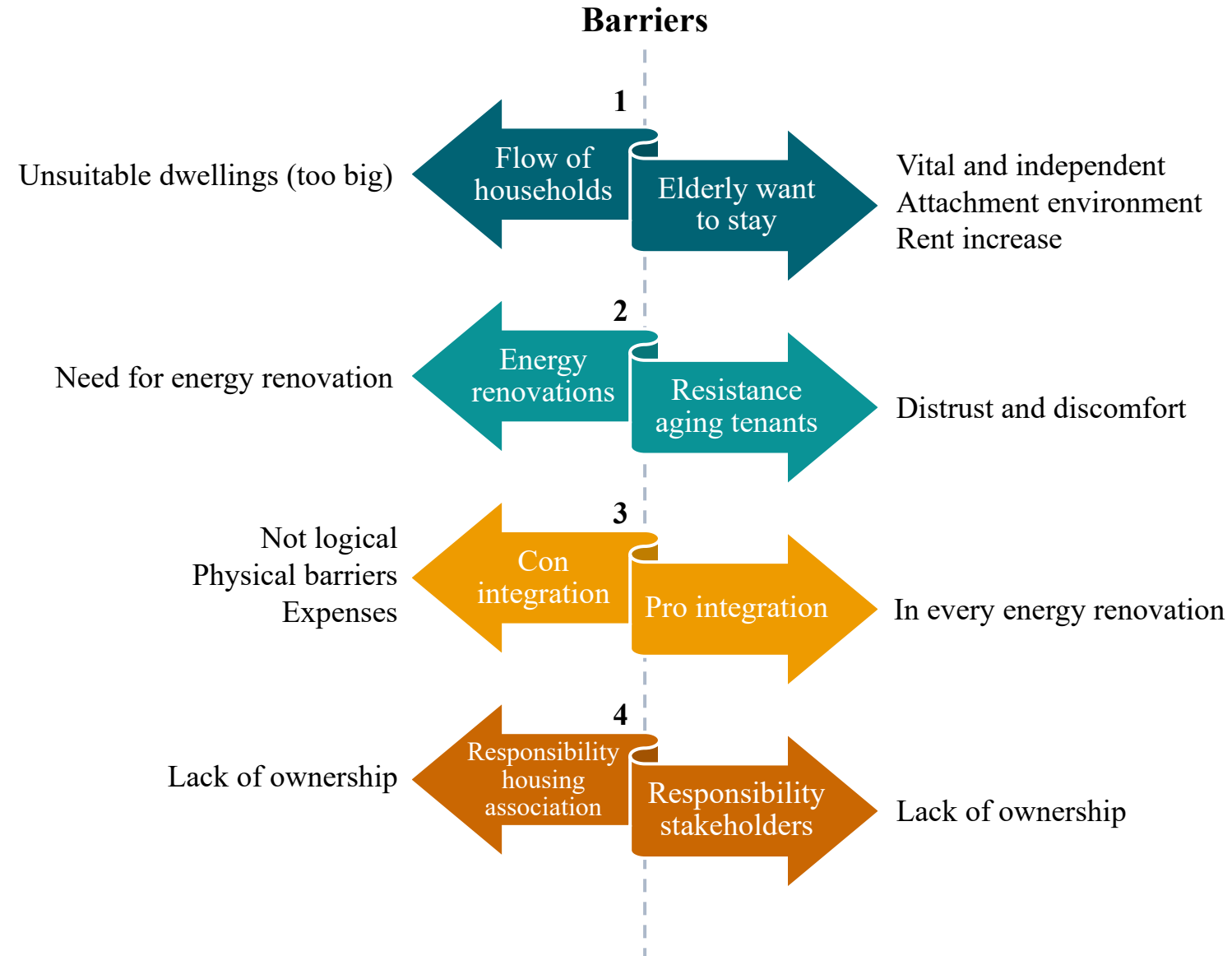
Degrees
Lorkeers et al. (2021)

	Dimensions <i>Feng et al. (2018)</i>		
	<i>Personal safety</i>	<i>Sensory comfort</i>	<i>Functionality of spaces</i>
<i>Casco</i>	No steps (4,5,8) Electrical sockets, HVAC control, and switches fixed at sitting height (8) Automatic door opening (5)	Ventilation system (4)	Wide doorways and stairs (4,5,8) Turning radius (4,5,8) Single-story dwelling (4,5) Extra bedroom or spare room (4) Mobility scooter parking (4, 5) Toilet near bedroom (4)
<i>Fixed adaptations</i>			Raised toilet (4, 8) Sliding doors (4)
<i>Portable home adaptations</i>	Grab bars, handrails, and vertical bars in the bathroom (4,8) Medicine dispenser (8) Lights on bedside (8)		Stairlift (5)

Aging in place features in dwellings according to managers of housing associations
4 = Interviewee 4 addressed the feature
5 = Interviewee 5 addressed the feature
8 = Interviewee 8 addressed the feature



4.1 | Barriers and opportunities





4.1 | Barriers and opportunities

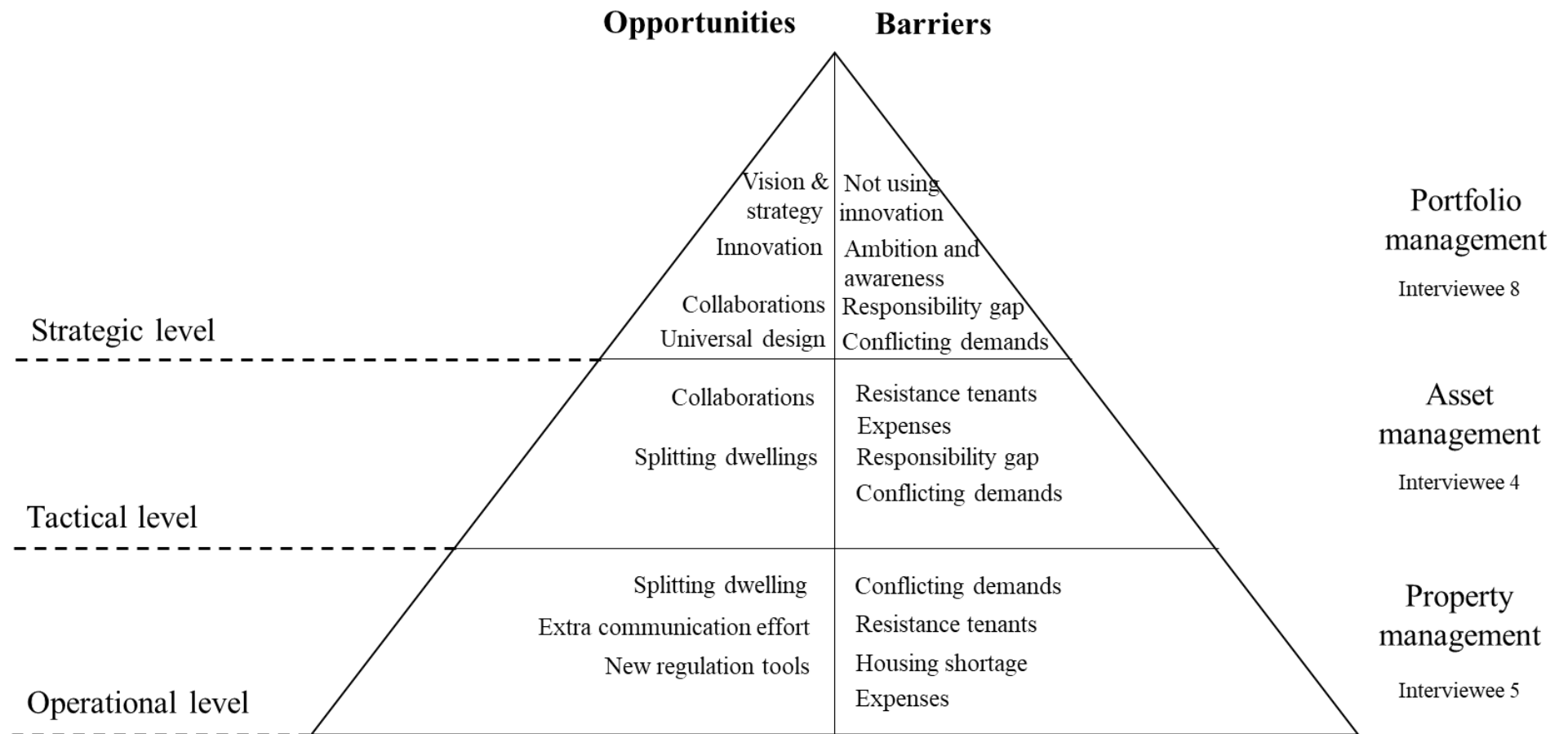
- | | | | |
|----|--------------------------------------|--|--|
| 1. | Splitting terraced houses | To provide functional and social benefits | |
| 2. | Universal design | To respond to the changing population | |
| 3. | Collaboration stakeholders | To align ambition levels | |
| 4. | Collaboration market parties | To foster innovations in environmental and social issues | |
| 5. | Change preconceived notions expenses | Cheap aging-in-place features | |
| 6. | Living coach | To prepare aging social tenants for future | |
| 7. | Extra communication effort | To mitigate resistance of tenants towards renovation | |



4.1 | Barriers and opportunities

Barrier 1 - Different ambition levels result in whether energy improvements and aging-in-place features are realized

Barriers and opportunities identified across organizational levels





Chapter 4 | **Empirical results**

4.2 | Needs and preferences aging social tenants



4.2 | Preferences and needs of aging social tenants

Key requirements addressed by aging social tenants focus on comfort and functionality of space

Building features for aging-in-place

Degrees
Lorkeers et al. (2021)

Dimensions <i>Feng et al. (2018)</i>			
	<i>Personal safety</i>	<i>Sensory comfort</i>	<i>Functionality of spaces</i>
<i>Casco</i>	No steps (<i>B</i>)	Warm dwelling (<i>A,B,D,F,M</i>) Sufficient insulation (<i>A, D,F,M</i>) Patio (<i>A</i>) No draught, good ventilation (<i>A</i>)	Wide doorways and stairs (<i>D,F,M</i>) Spacious dwelling (<i>A, B</i>) Spacious bathroom (<i>B, D,F,M</i>) Single-story dwelling (<i>B, D,F,M</i>) Extra spare room (<i>B, D,F,M</i>) Toilet near bedroom (<i>A, B</i>)
<i>Fixed adaptations</i>		Enough sunlight (<i>A</i>) No draft through cracks (<i>A,B,D,F,M</i>) Noise improvements (<i>A,B,C,D,F,M</i>)	
<i>Portable home adaptations</i>	Grab bars, handrails (<i>A</i>) Emergency bell for nurse (<i>D,F,M</i>)		Stairlift (<i>B, D,F,M</i>)

Aging in place features in dwellings according to aging social tenants

A = Interviewee A addressed the feature

B = Interviewee B addressed the feature

C = Interviewee C addressed the feature

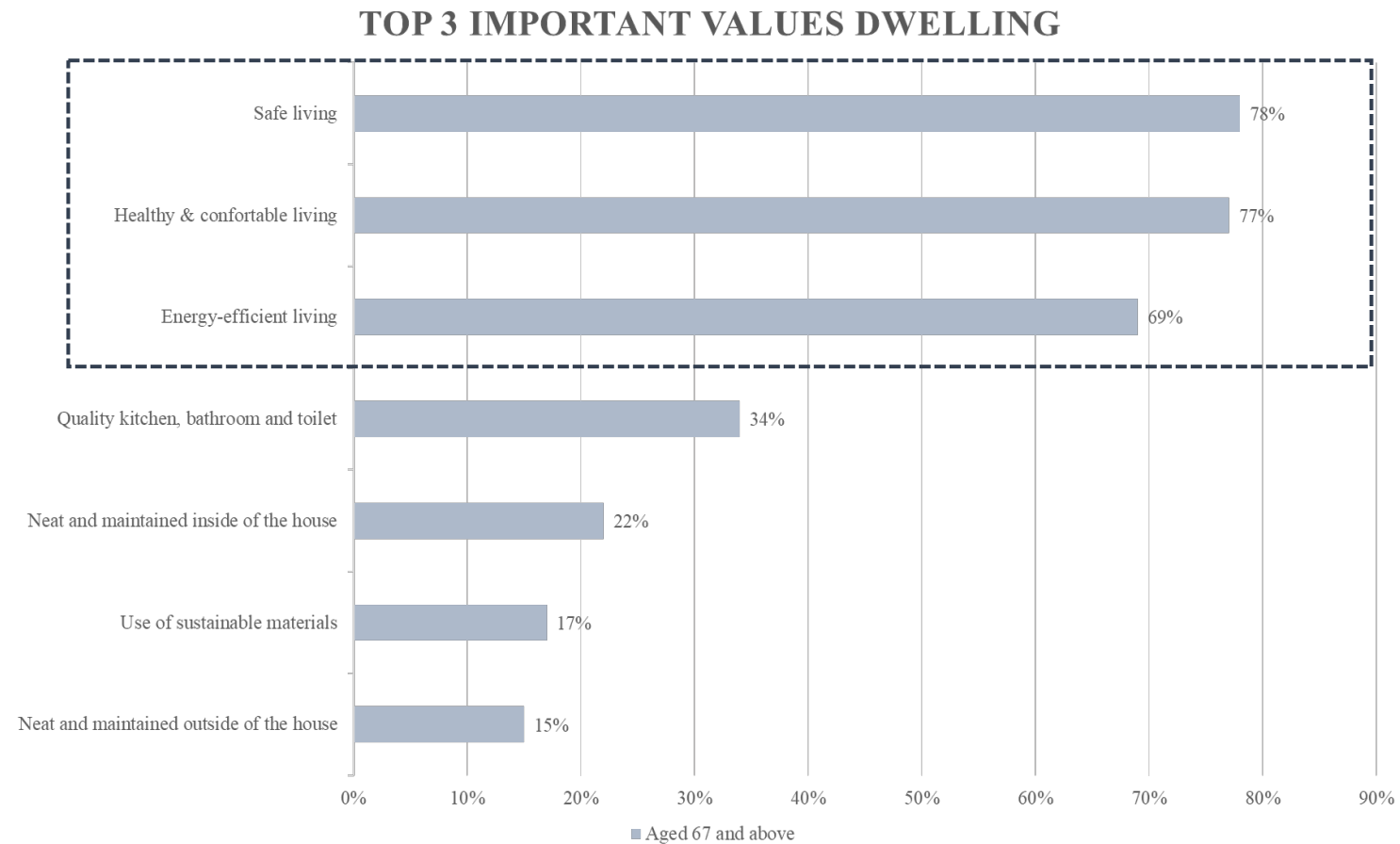
D,F,M = Interviewees D.F and D.M addressed the feature



4.2 | Preferences and needs of aging social tenants

Aging social tenants value safe-, health & comfortable-, and energy-efficient-living the most

Aging-in-place



(N=245)



4.2 | Preferences and needs of aging social tenants

***Barrier 2** - Aging social tenants are unprepared for the future causing conflict with flow of households and their homes not being prepared for aging in place*

Aging-in-place

Stay in dwelling

- 82% no adjusted dwelling
- Vital and independent
- Attached to single-family dwelling
- Attached to environment
- Insufficient supply of senior dwellings

(N=245)

Unprepared for the future

- Difficulty describing future needs
- Vital, mobile, independent

Comfort

- Noise nuisance (35%)
- Draught (25%)
- Warm house (18%)

(N=245)

Splitting dwelling

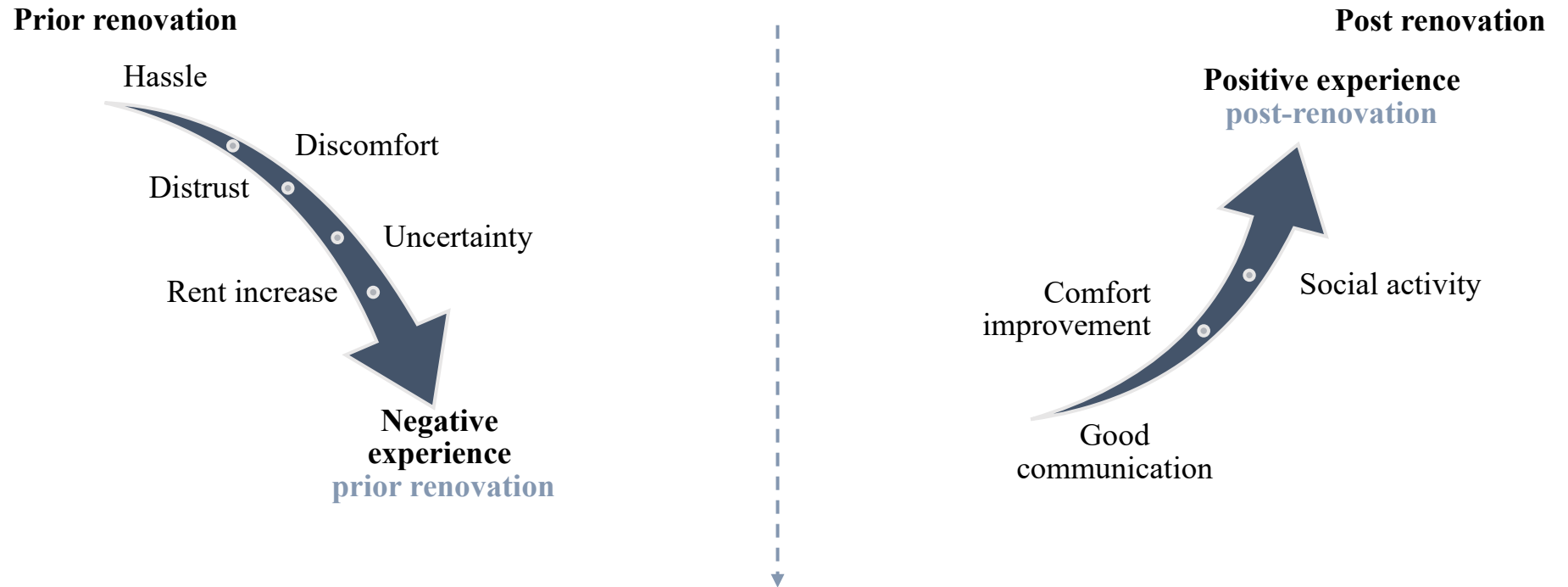
- Noise and households
- Less privacy and freedom



4.2 | Preferences and needs aging social tenants

Barrier 3 - *Preconceptions and uncertainty impact aging social tenants' openness to home renovation*

Process response



Interviewee C – “I dreaded it terribly, oh terribly. I dreaded it for a whole year. But it actually turned out to be not so bad. Yes, they were decent workers, and we made good agreements.”



Chapter 4 | **Empirical results**

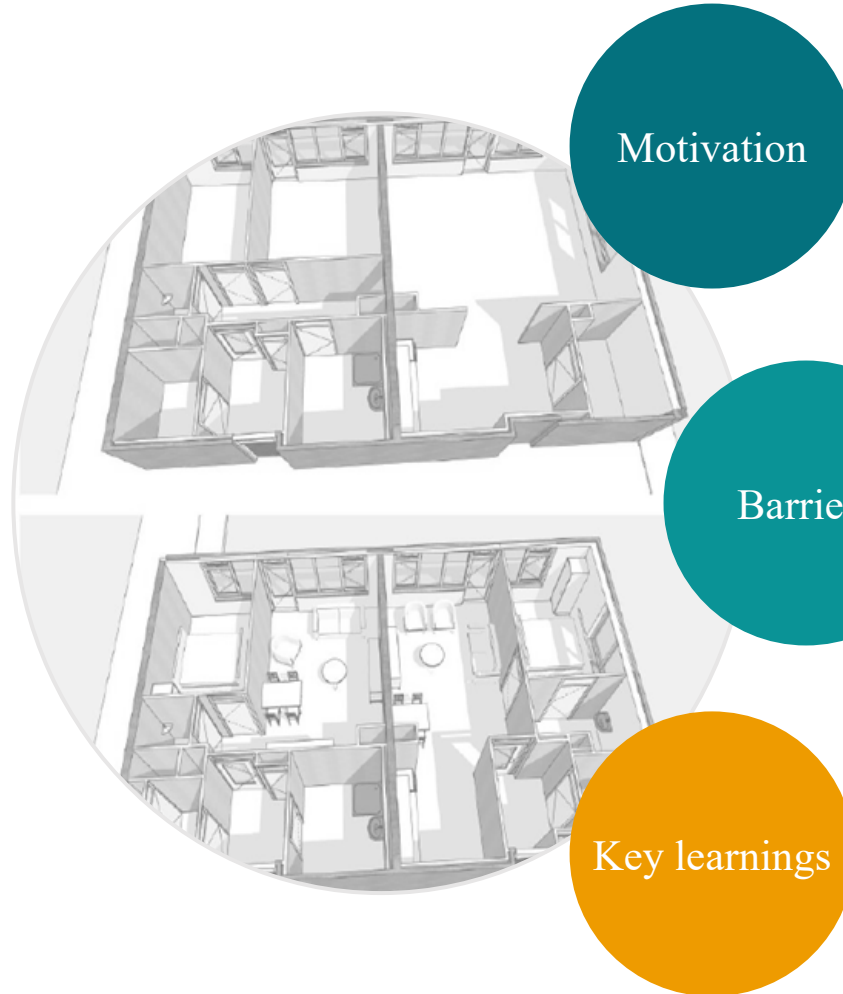
4.3 | Key learnings from practice

4.3 | Key learnings from initiatives

Case 1 | Splitting dwellings



**Elderly housing
association**



Motivation

- Social and functional benefits
- Rent decrease
- Enough living space
- Terraced houses

Barriers

- Regulations and permit procedures
- Technical difficulties
- Disturbance residents

Key learnings

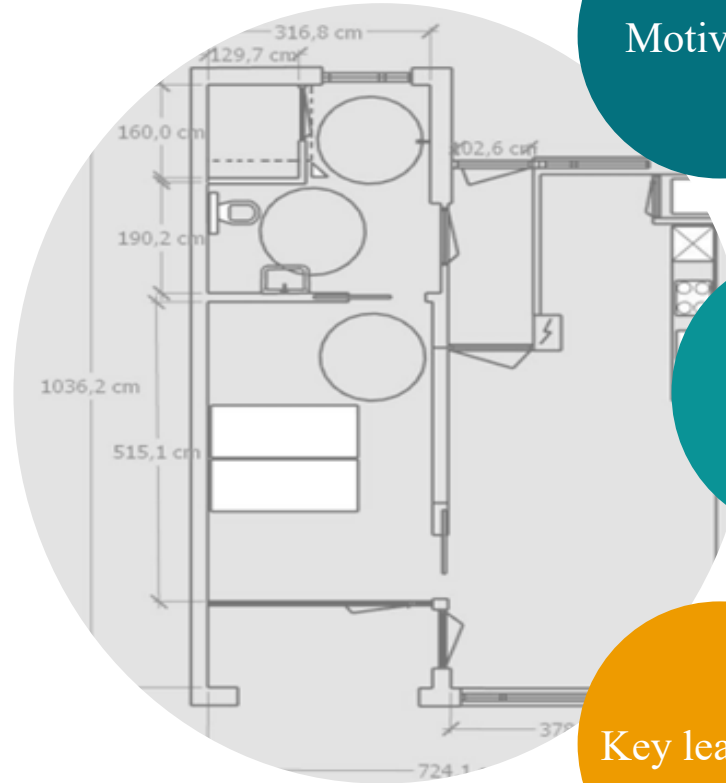
1. Collaboration municipality
2. Communication residents
3. Preparation phase

4.3 | Key learnings from initiatives

Case 2 | Studios to apartments



**Housing and care
provider**



Motivation

- Demand elderly changed

Barriers

- Lack of knowledge of dwelling design for the elderly
- Disturbance residents

Key learnings

1. Collaboration between housing associations and healthcare providers
2. Urgency municipality and housing associations
3. Align ambition levels



4.3 | Key learnings from initiatives

Key requirements addressed by strategic managers focus on portable home adaptations and functionality of space

Aging-in-place building features

Degrees
 Lorkeers et al. (2021)

	Dimensions <i>Feng et al. (2018)</i>		
	<i>Personal safety</i>	<i>Sensory comfort</i>	<i>Functionality of spaces</i>
<i>Casco</i>	No steps (7)	Privacy, no shared bathroom and living room (7)	Wide doorways and stairs (7) Turning radius (6, 7) Mobility scooter parking (6) Bathroom near bedroom (7) Spacious dwelling (6)
<i>Fixed adaptations</i>	Orientation lights(7)	Temperature control (7)	Bidet toilet (7) Sliding doors (7)
<i>Portable home adaptations</i>	Smart smoke detector (7) Front door control (7)	Curtain control (7) Sunshade control (7) Light control (7)	Shower blow dryer (7)

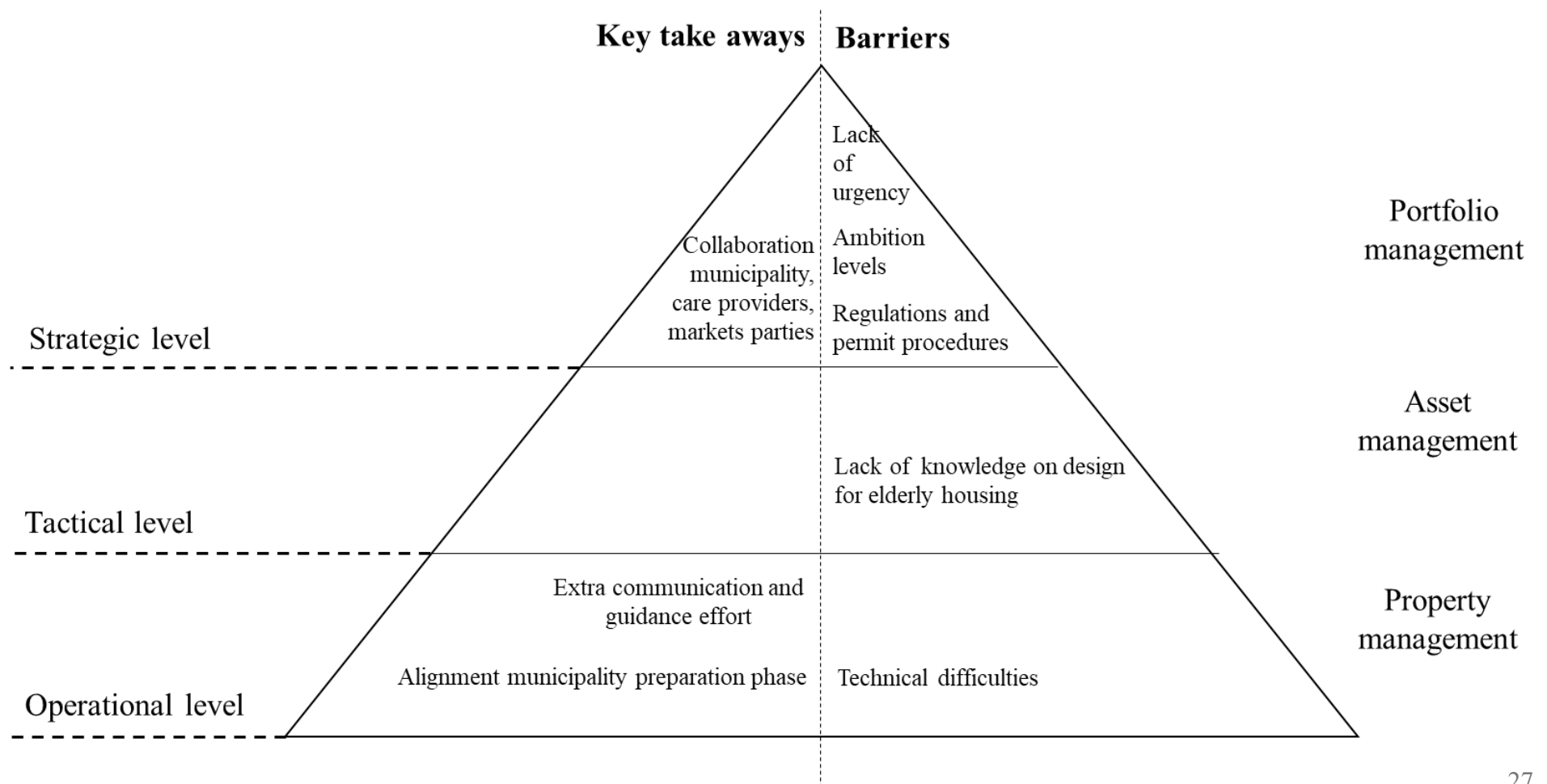
Aging in place features in dwellings according to real estate managers
 6 = Interviewee 6 addressed the feature
 7 = Interviewee 7 addressed the feature



4.3 | Key learnings from initiatives

Barrier 4 - Innovations are overlooked and initiatives to integrate aging-in-place features in renovation projects are delayed due to regulations and permit procedures of the municipality

Barriers and opportunities identified across organizational levels





Chapter 4 | **Empirical results**

4.4 | How to overcome the barriers

4.4 | How to overcome the barriers

Main barriers

***Different ambition levels** result in whether energy improvements and aging-in-place features are realized*

***Aging social tenants are unprepared for the future** causing conflict with the flow of households and their homes not being prepared for aging in place*

***Preconceptions and uncertainty** impact aging social tenants' openness to home renovation*

***Innovations are overlooked** and initiatives to integrate aging-in-place features in renovation projects are delayed due to **regulations and permit procedures** of the municipality*

1



2



3



4



Barriers to integration

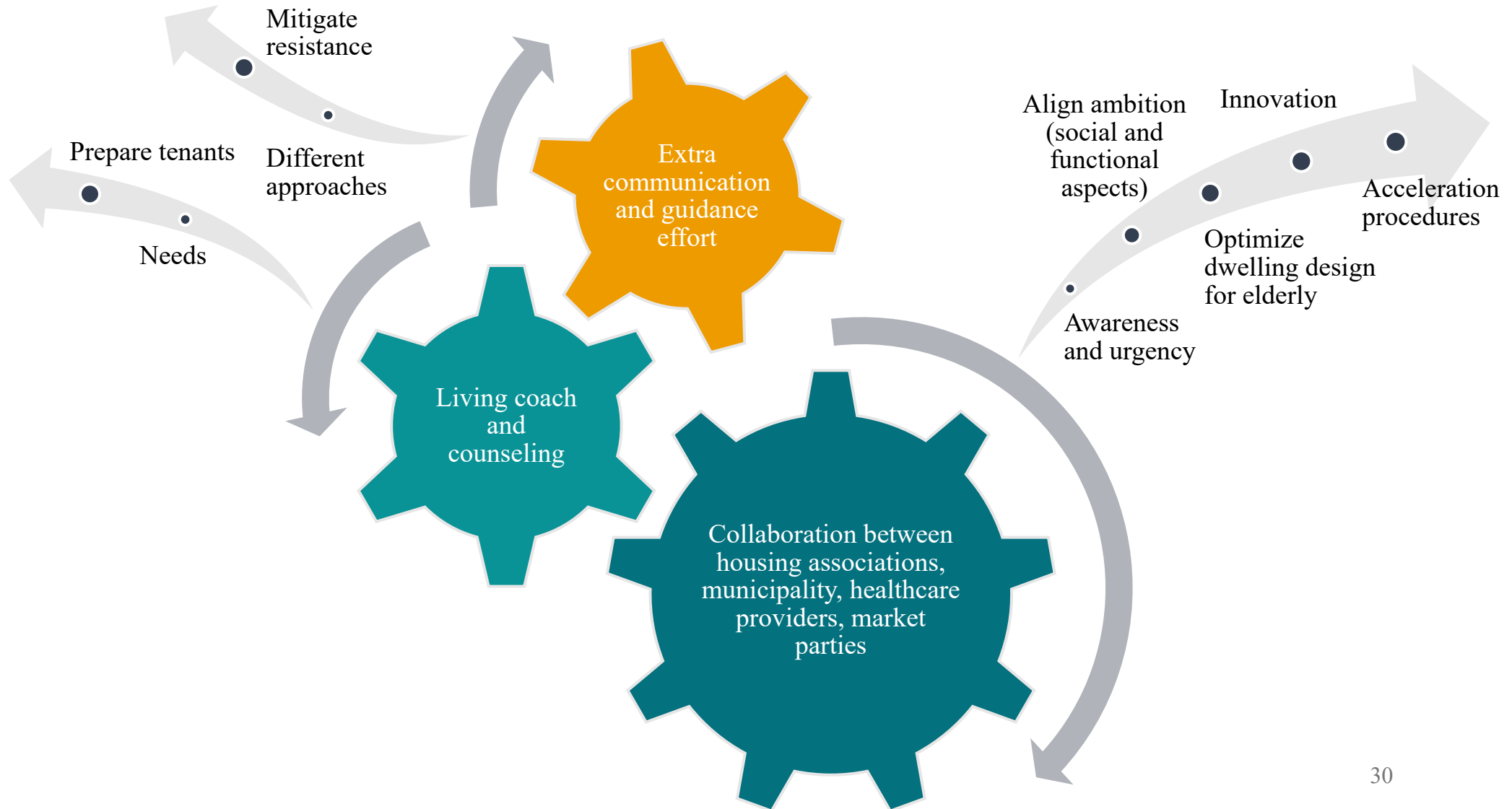


How to overcome?



4.4 | How to overcome the barriers

Holistic approach

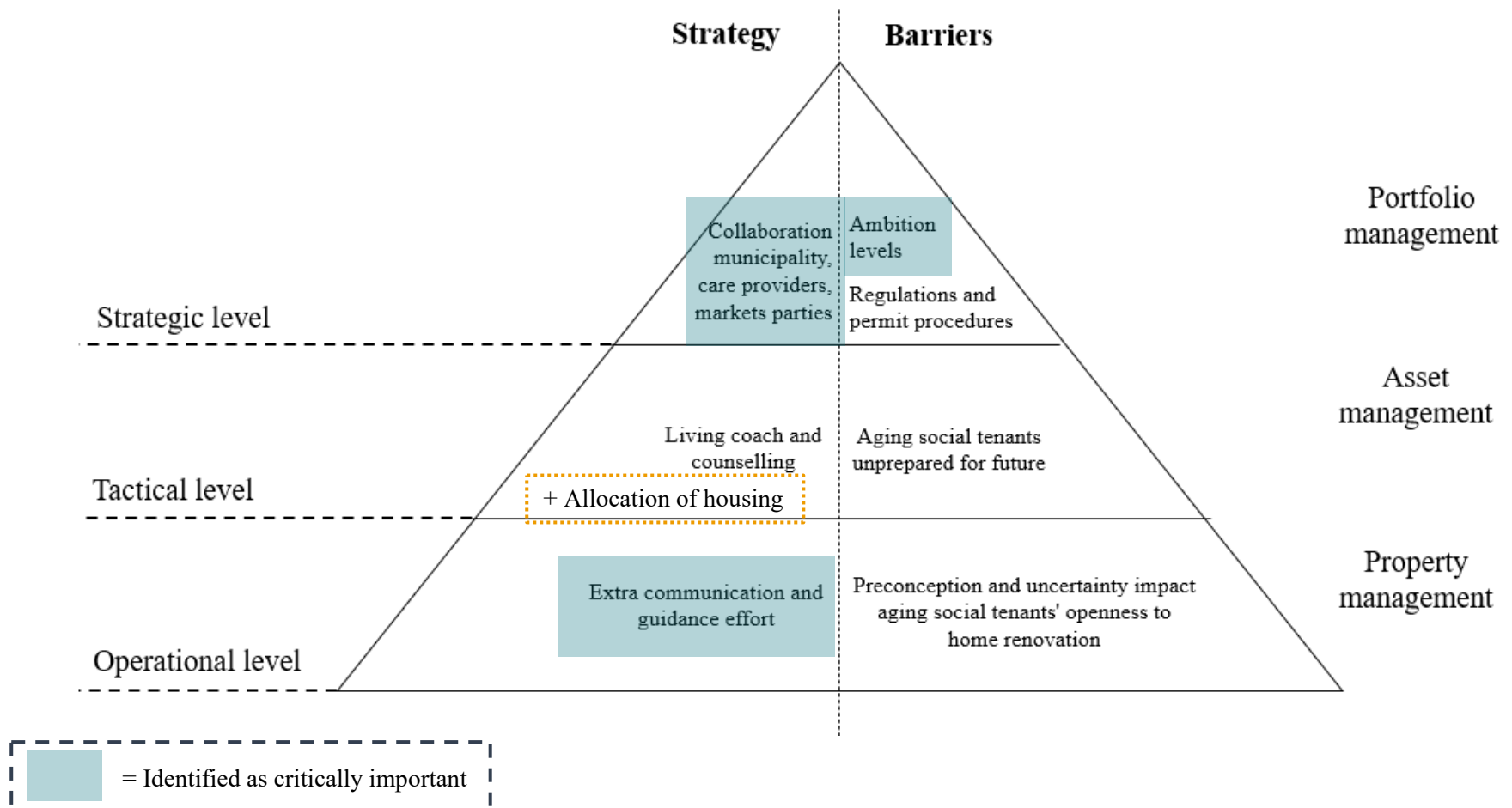




4.4 | How to overcome the barriers

Bridging the gap requires action across organizational levels

Validation on holistic approach





Chapter 5 | **Discussion and conclusion**

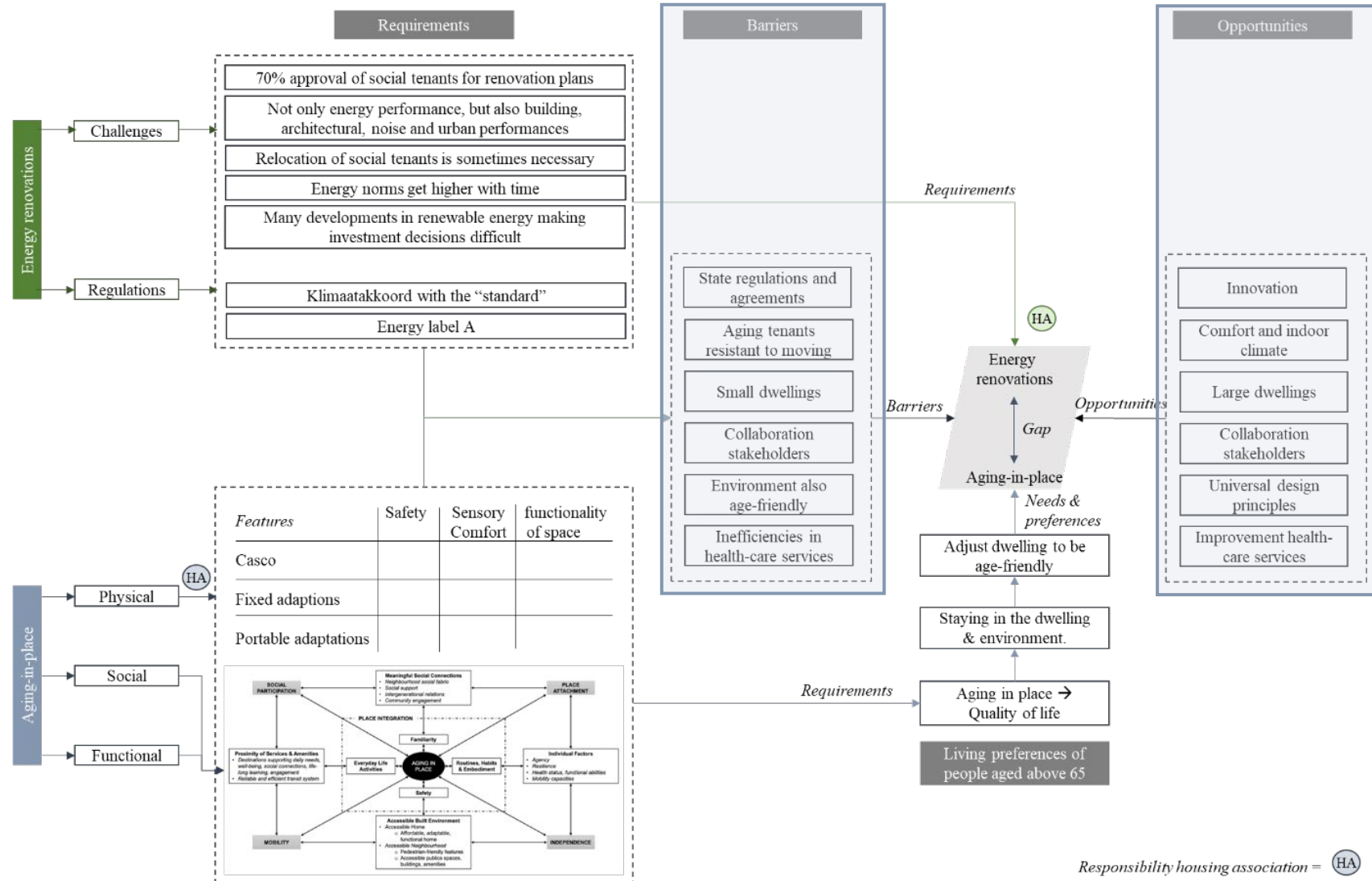
5.1 | Discussion

5.2 | Conclusion



5.1 | Discussion

Barriers and opportunities to integrating energy renovations and aging-in-place

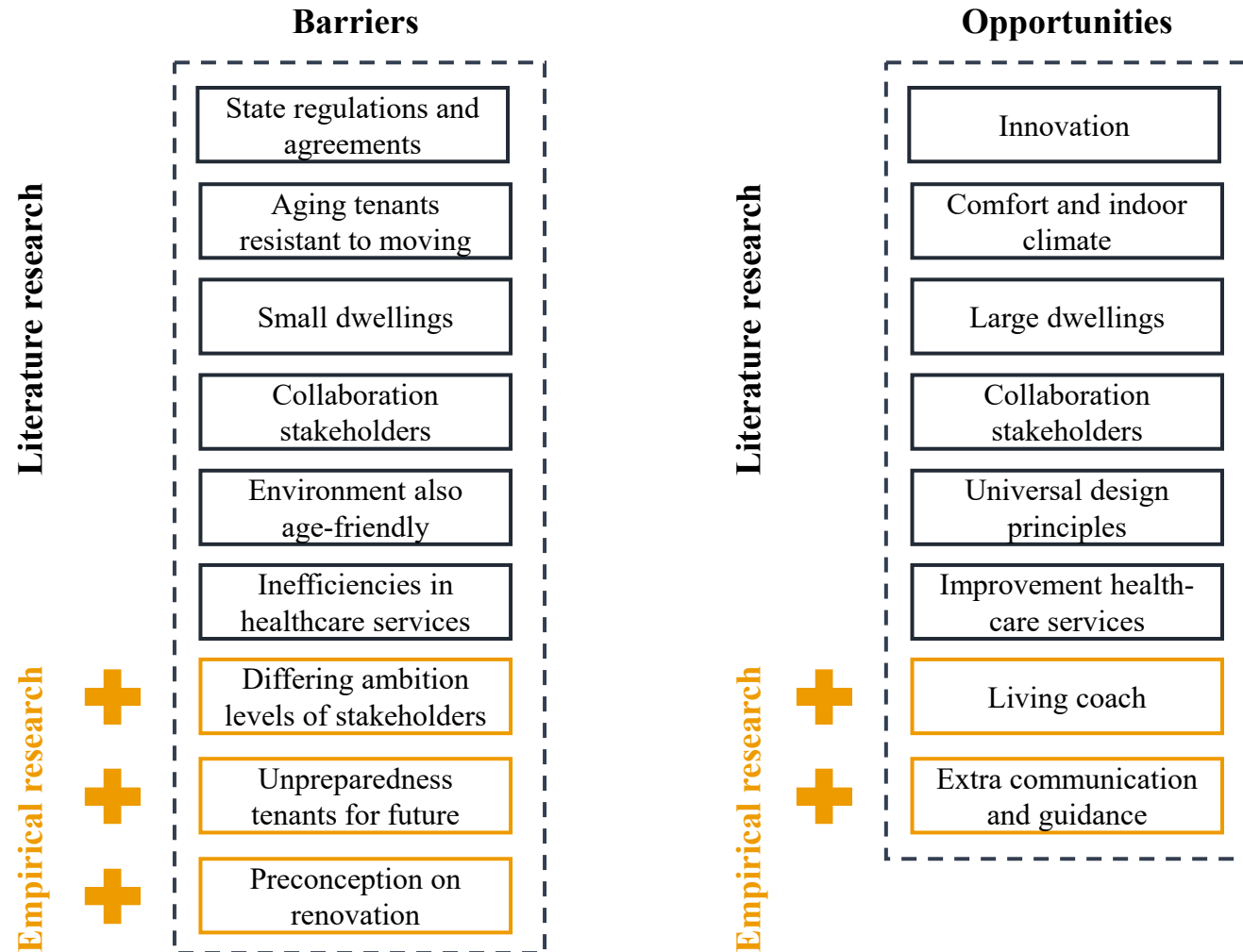




5.1 | Discussion

Empirical confirm barriers and opportunities identified by literature and adds barriers and opportunities in the Dutch social housing context

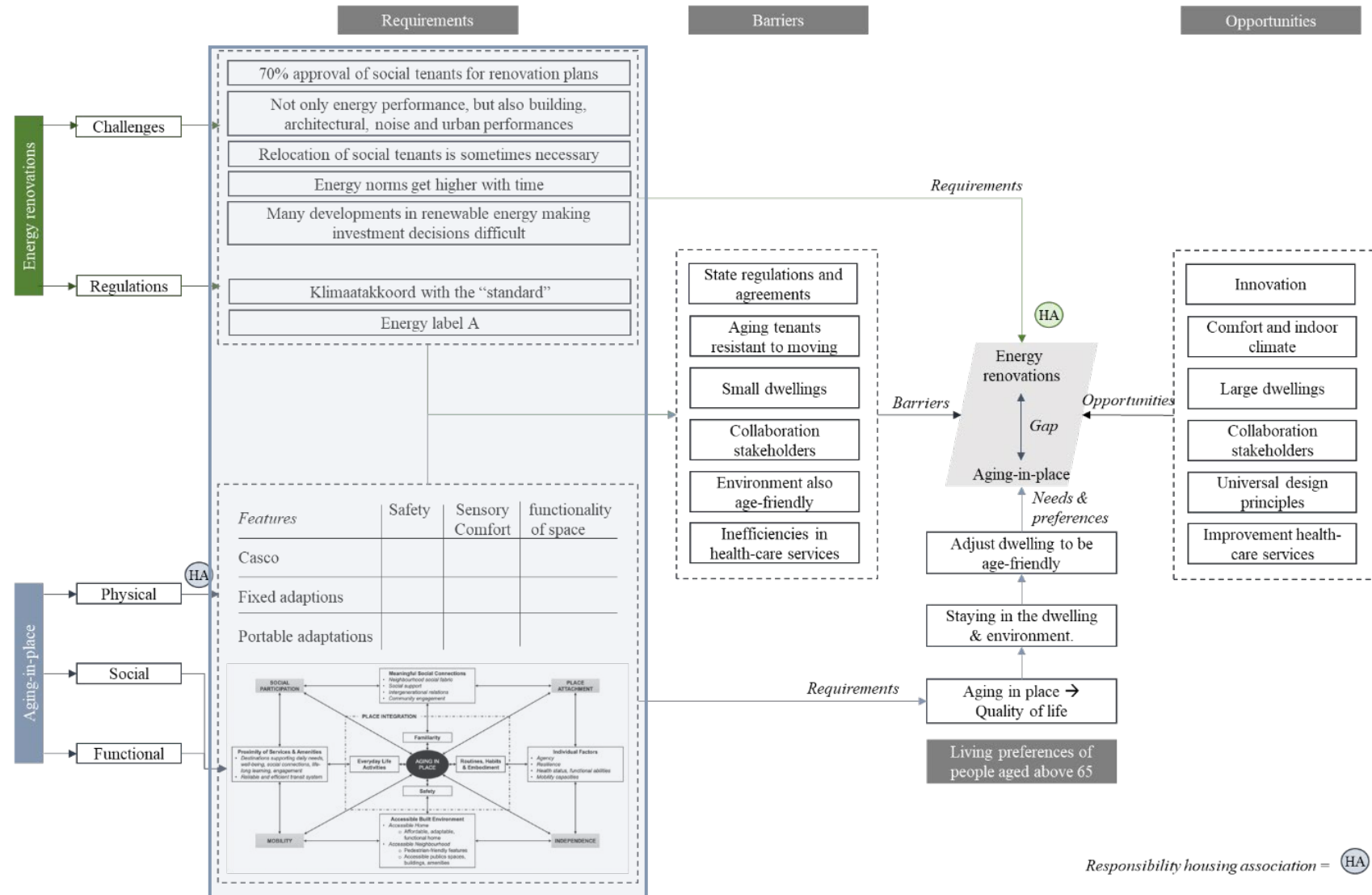
Barriers and opportunities to integrating aging in place in energy renovations





5.1 | Discussion

Requirements for energy renovations and aging-in-place





5.1 | Discussion

Empirical results confirm the requirements for aging-in-place in the theoretical framework

Confirmation framework

Degrees
Lorkeers et al. (2021)

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<i>Fixed adaptations</i>		Enough sunlight (A) No draft through cracks (A,B,D,F,M) Noise improvements (A,B,C,D,F,M)	Raised toilet (4, 8) Bidet toilet (7) Sliding doors (4) (7)
<i>Portable home adaptations</i>	Grab bars, handrails (A) (4,8) Emergency bell for nurse (D,F,M) Front door control (7) Smart smoke detector (7) Orientation light (8) (7)	Curtain control (7) Sunshade control (7) Light control (7)	Stairlift (B, D,F,M) (5) Shower blow dryer (7)

Aging in place features in dwellings addressed by the interviewees

Aging social tenants:

A = Interviewee A

B = Interviewee B

C = Interviewee C

D,F,M = Interviewees D.F and D.M

Managers housing associations:

4 = Interviewee 4

5 = Interviewee 5

8 = Interviewee 8

Real estate manager:

6 = Interviewee 6

7 = Interviewee 7



5.1 | Discussion

Comfort

Degrees
Lorkeers et al. (2021)

		Dimensions <i>Feng et al. (2018)</i>	
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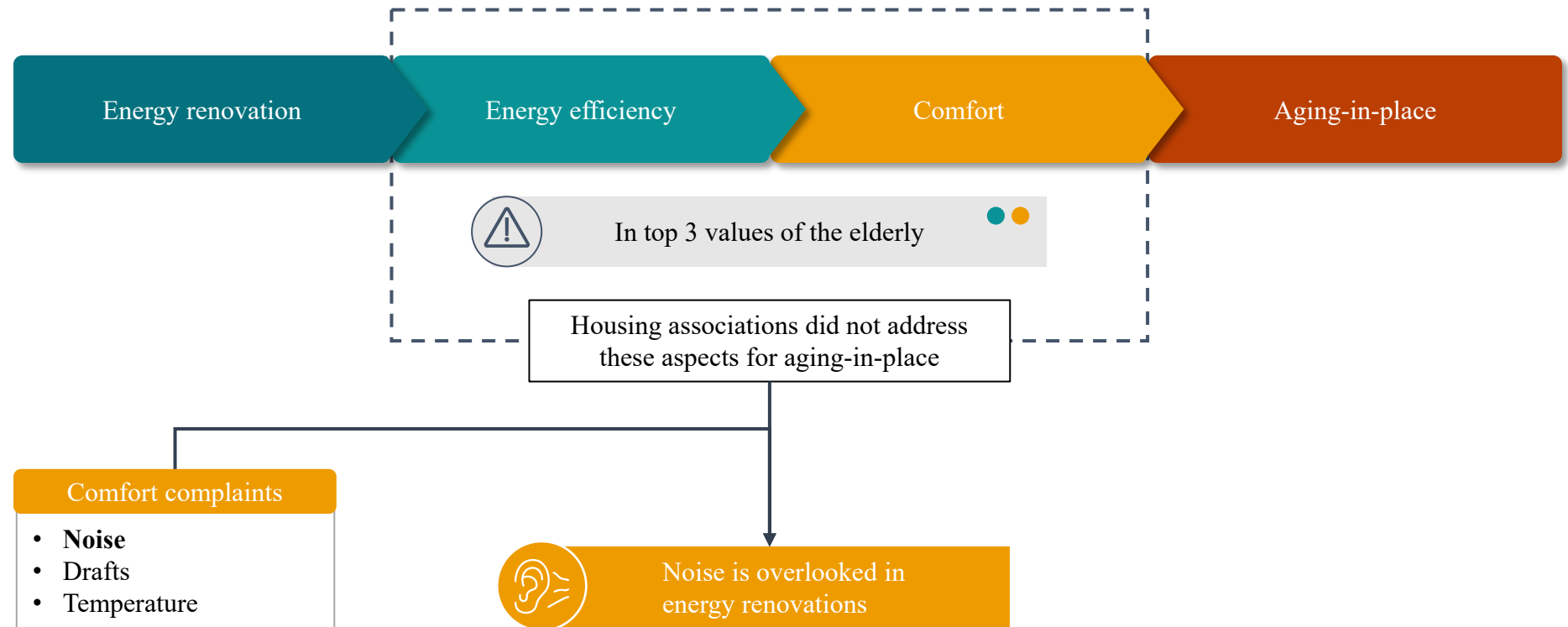
6 = Interviewee 6

7 = Interviewee 7

5.1 | Discussion

Improving energy efficiency not only has environmental gain but also enhances aging-in-place, however, housing associations are unaware and noise improvements are overlooked in renovation

Synergy energy renovations and aging-in-place





5.1 | Discussion

Most identified features relate to casco

Building features for aging-in-place

Degrees
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Aging in place features in dwellings addressed by the interviewees

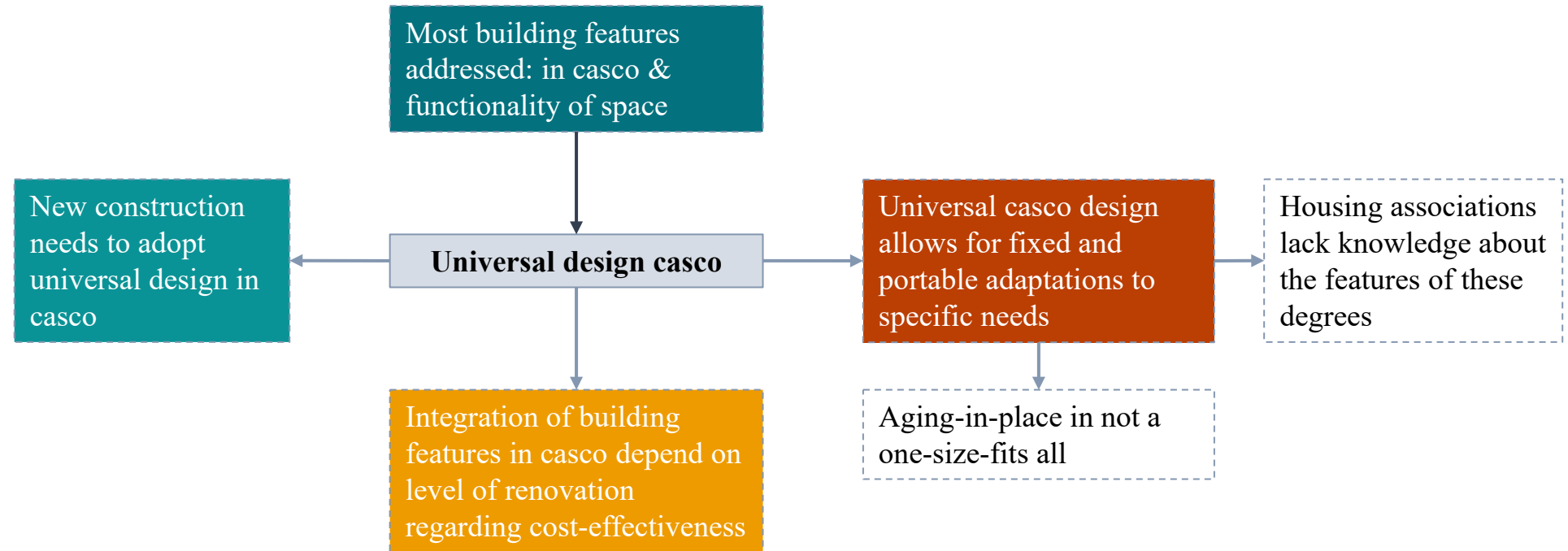
Aging social tenants:	Managers housing associations:	Real estate manager:
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D,F,M = Interviewees D.F and D.M		



5.1 | Discussion

Casco design should be universal to which additional fixed and portable adaptations can be implemented to the specific needs

Universal design casco





5.1 | Discussion

Suggestion for research

- Innovative aging-in-place tools
- Design of environment for aging-in-place
- Coordination among stakeholders to ensure age-friendly environment
- How universal design can become a standard practice for residential design

Approach lacks detail

- Organization of collaboration
- Living coach implementation
- Effective communication and guidance with a larger sample size

Advice to practice

- Adopt universal design principles on national level
- Other stakeholders, architects and contractors, should become aware of the urgency of universal design
- Collaboration including knowledge sharing, best practices



5.1 | Discussion

The research is limited by the context-specific nature, small sample size of housing associations and aging social tenants, secondary quantitative dataset, and descriptive analysis

Limitations

1. Context

Context-specific

2. Small sample size

The dataset didn't capture all the aspects of the research topic

3. Secondary dataset

Limited control data collection and variability in interpretation

4. Descriptive analysis

Insufficient data to establish meaningful correlations between variables



5.2 | Conclusion

Strategies to overcome barriers include developing universal design principles, enhancing collaboration between stakeholders, counseling and guidance for aging social tenants, and raising awareness of the importance of these issues.

Barrier and corresponding approach per sub-research question

				
Barrier	Different ambition levels	Preconceived notion renovation and unpreparedness	Innovation overlooked and delays regulations	Confirmation barriers
Approach	Collaboration stakeholders	Tailored communication and guidance, living coach	Collaboration stakeholders	Allocation suitable dwellings to needs



Questions