

— THIJS VAN AMELSFORT - 4988922

MASS TIMBER SOCIAL HOUSING

15 September 2021

1st mentor

2nd mentor

External examiner

Dr. J.L. (John) Heintz

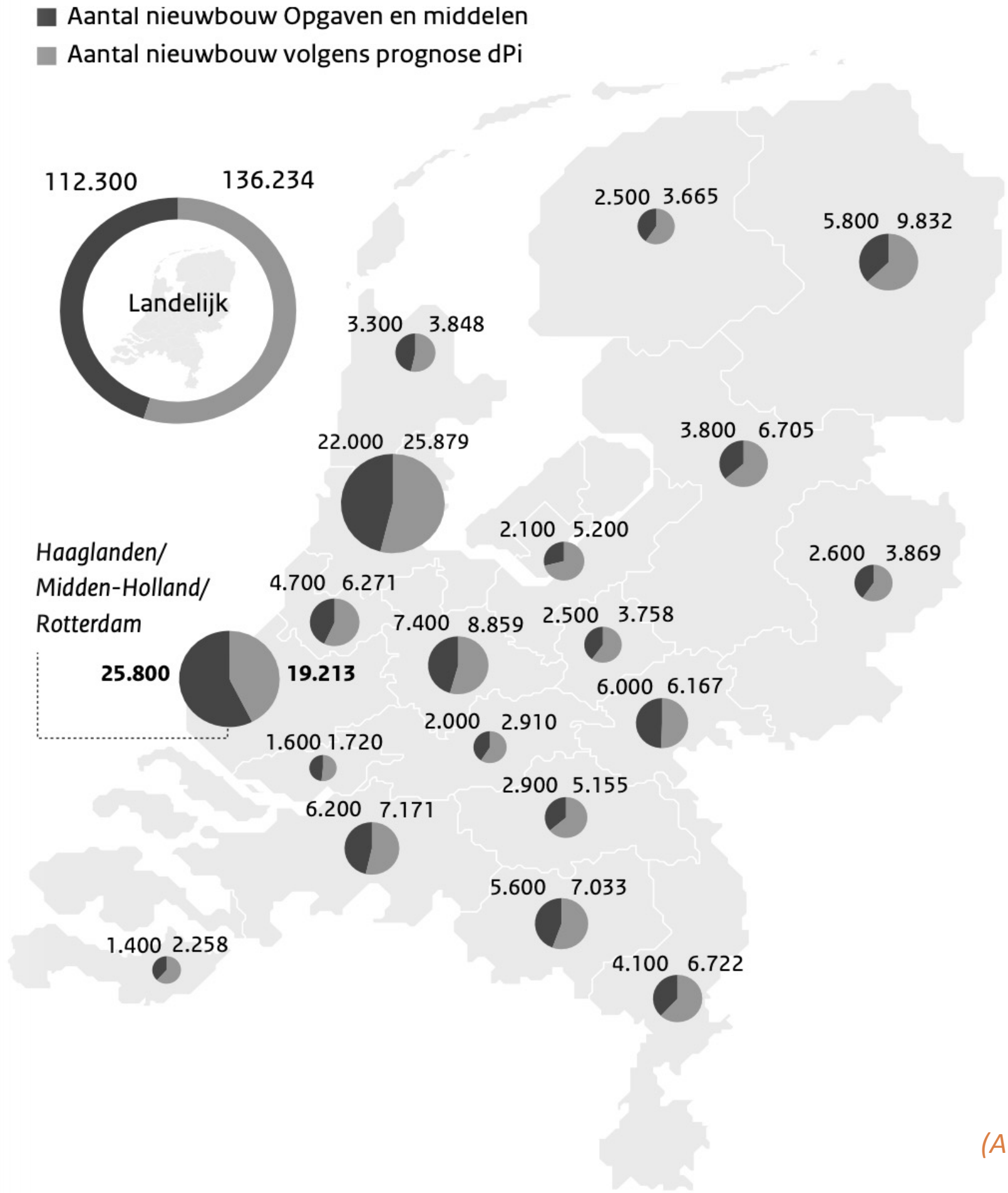
Ing. P. (Peter) de Jong

Ir. J. (Jurjen) Zeinstra



Social housing

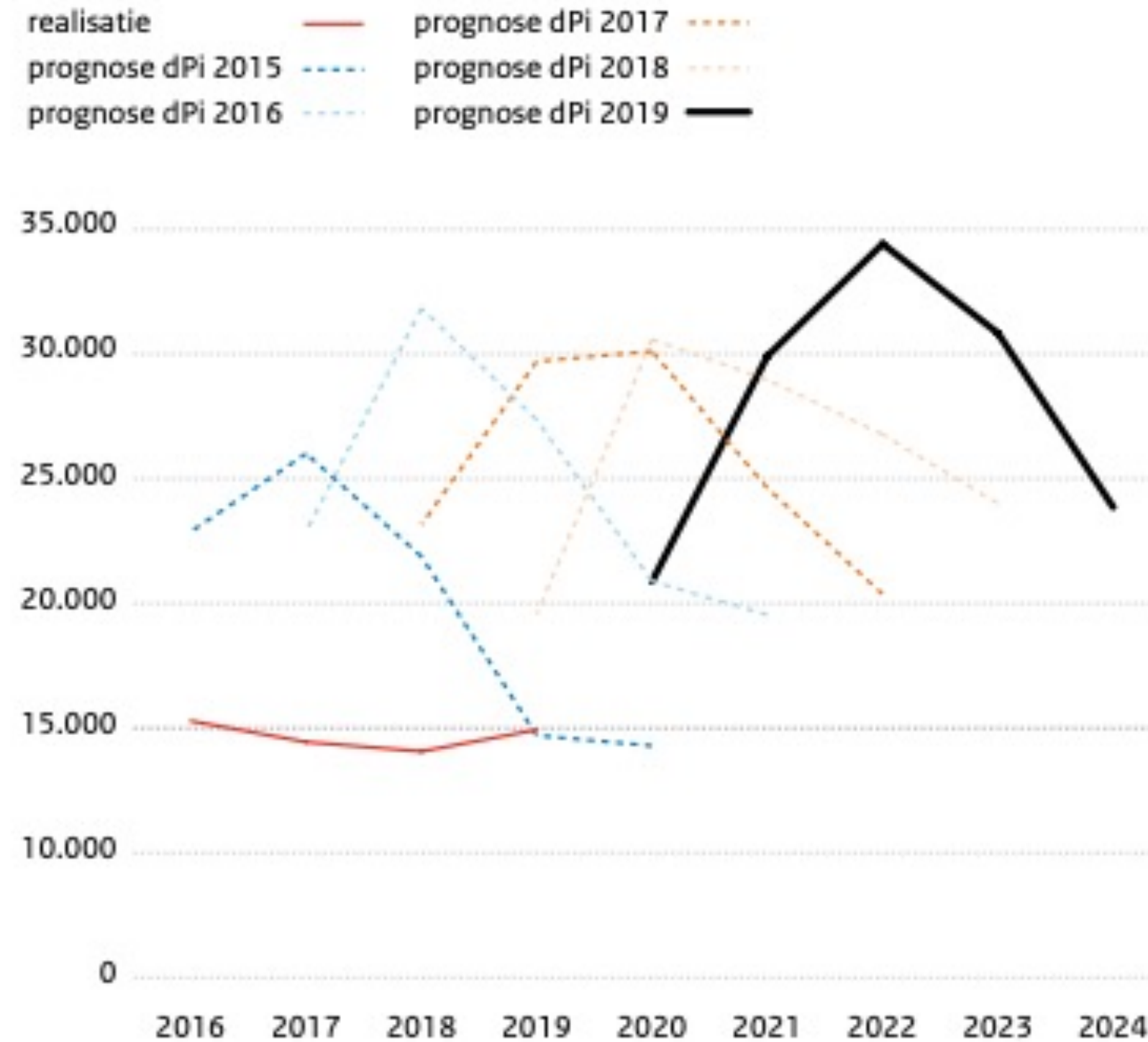
Figuur 8 Aantallen nieuwbouw per regio dPi t.o.v. ‘Opgaven en middelen’, 2020-2024



Social housing



Figuur 6 Sociale nieuwbouw aantallen per prognosejaar



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Traditional construction



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Traditional construction



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Traditional construction

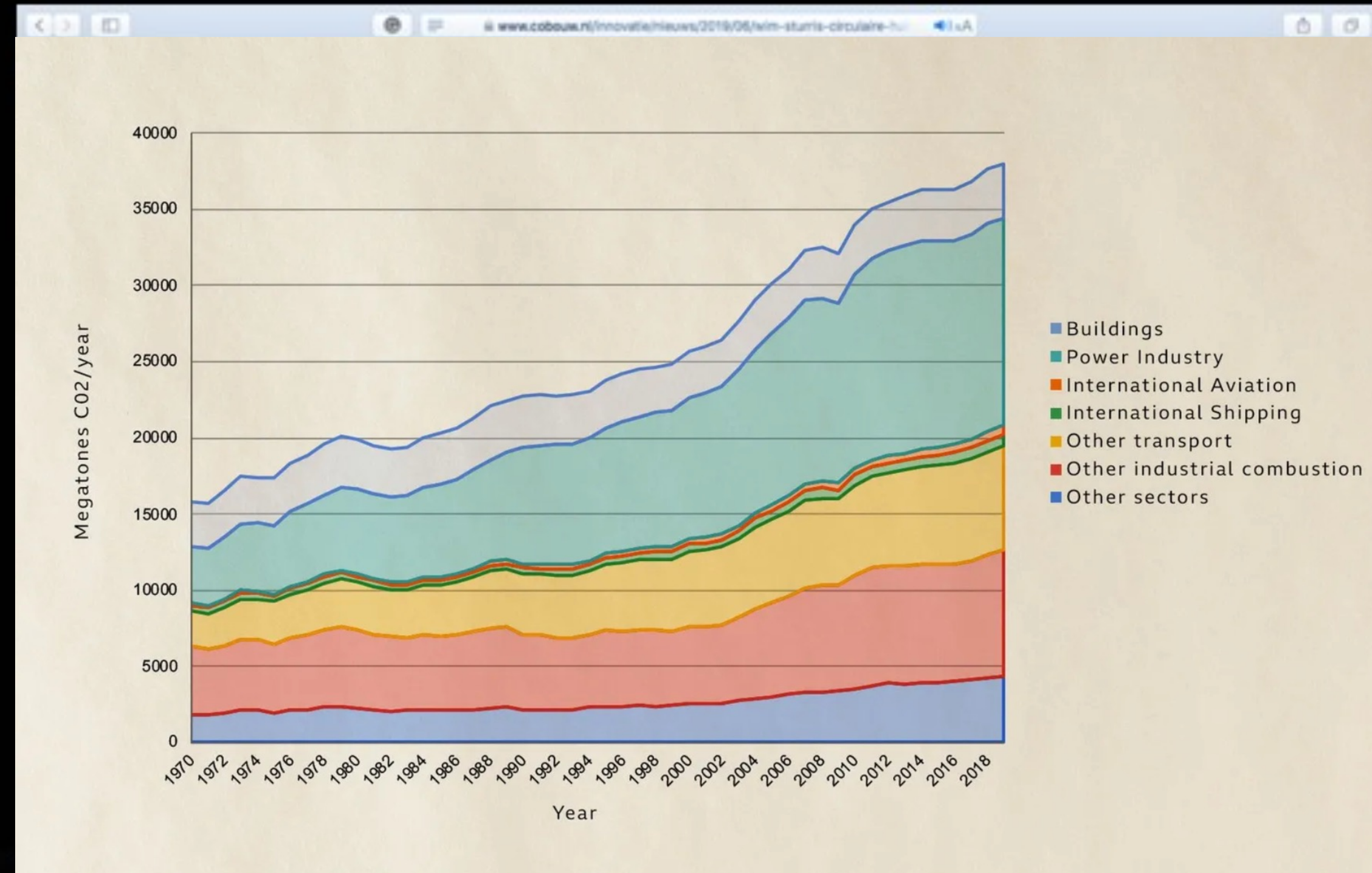


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Traditional construction



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Industrialization. Carbon capture.



KATERRA

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Industrialization. Carbon capture.



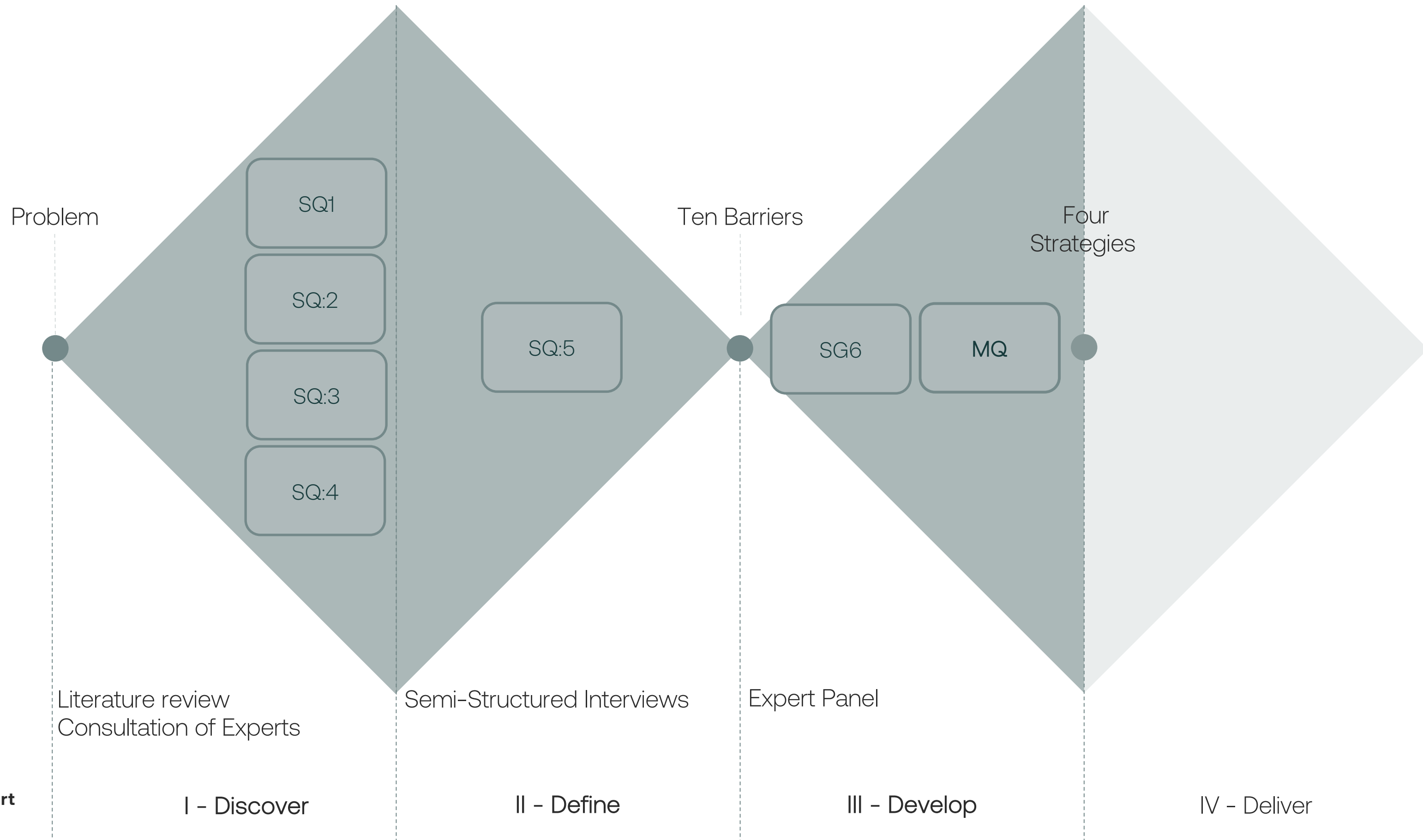
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MASS TIMBER SOCIAL HOUSING

Het definiëren van barrières en het ontwikkelen van strategieën
om massiefhoutbouw mogelijk te maken voor
woningcorporaties

“What are the barriers for the construction of affordable mass timber buildings and what might be strategies for overcoming them?”

Research design

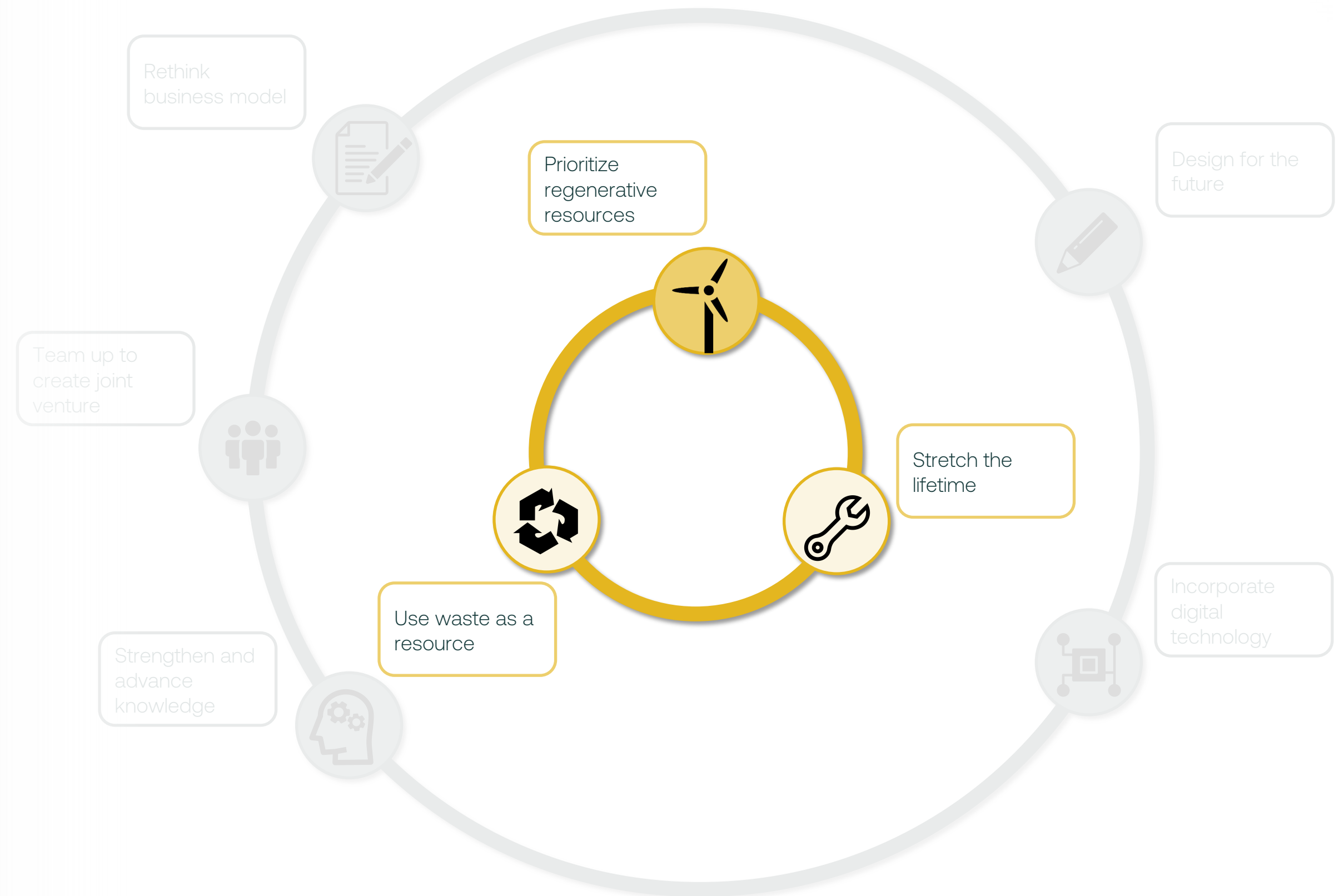


Research questions

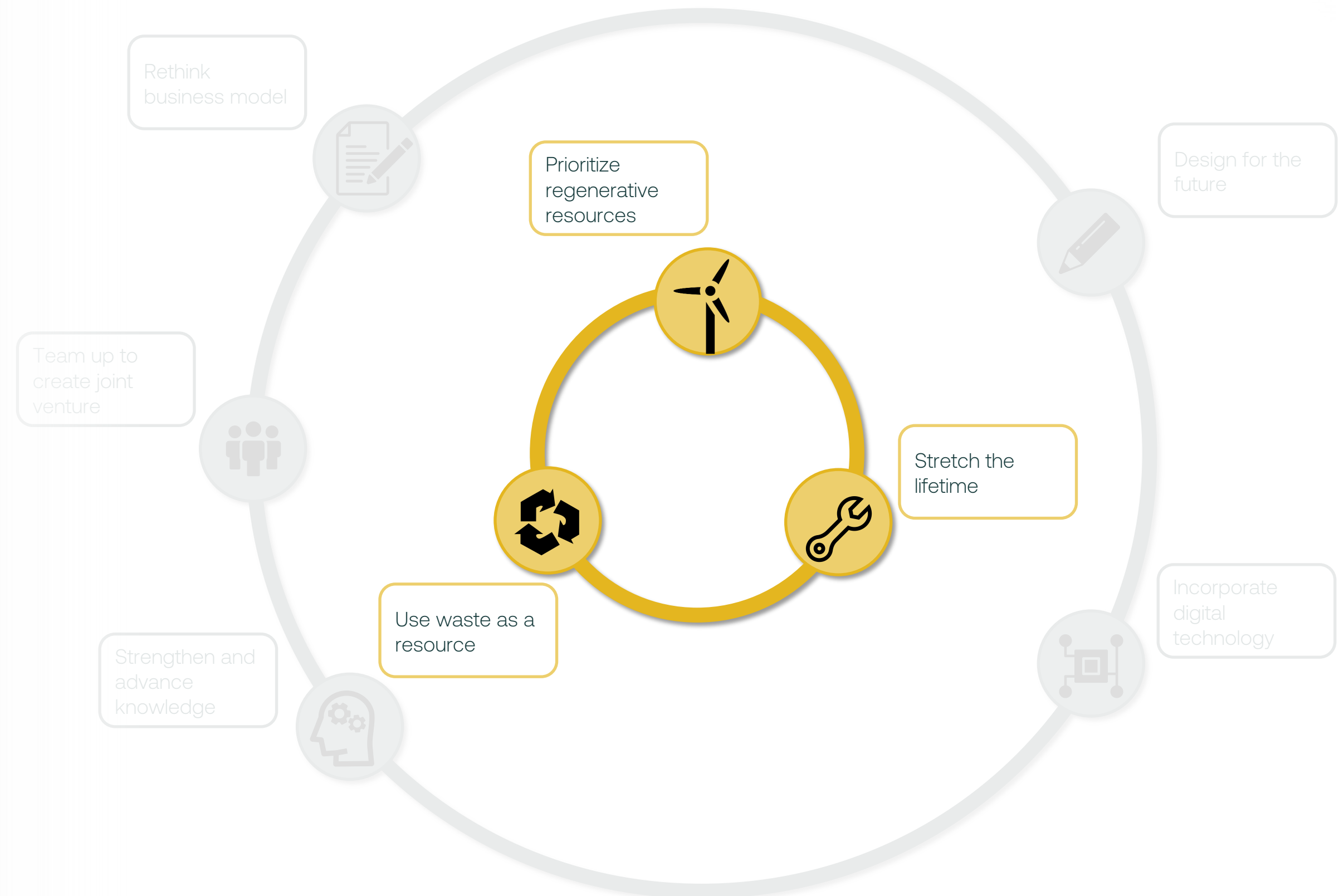


1. What is the relevance of the circular economy framework for mass timber construction?
2. What is the current demand of affordable housing and how is this regulated by housing associations?
3. What is the value proposition of mass timber construction and what are the barriers of the implementation for housing associations?
4. How can modular construction offer a solution and what are the barriers in doing so?
5. What are the barriers for the construction of affordable mass timber buildings for housing associations?
6. Which strategies could enable the construction of affordable mass timber buildings?

Circular economy



Circular economy



Housing associations

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Housing associations

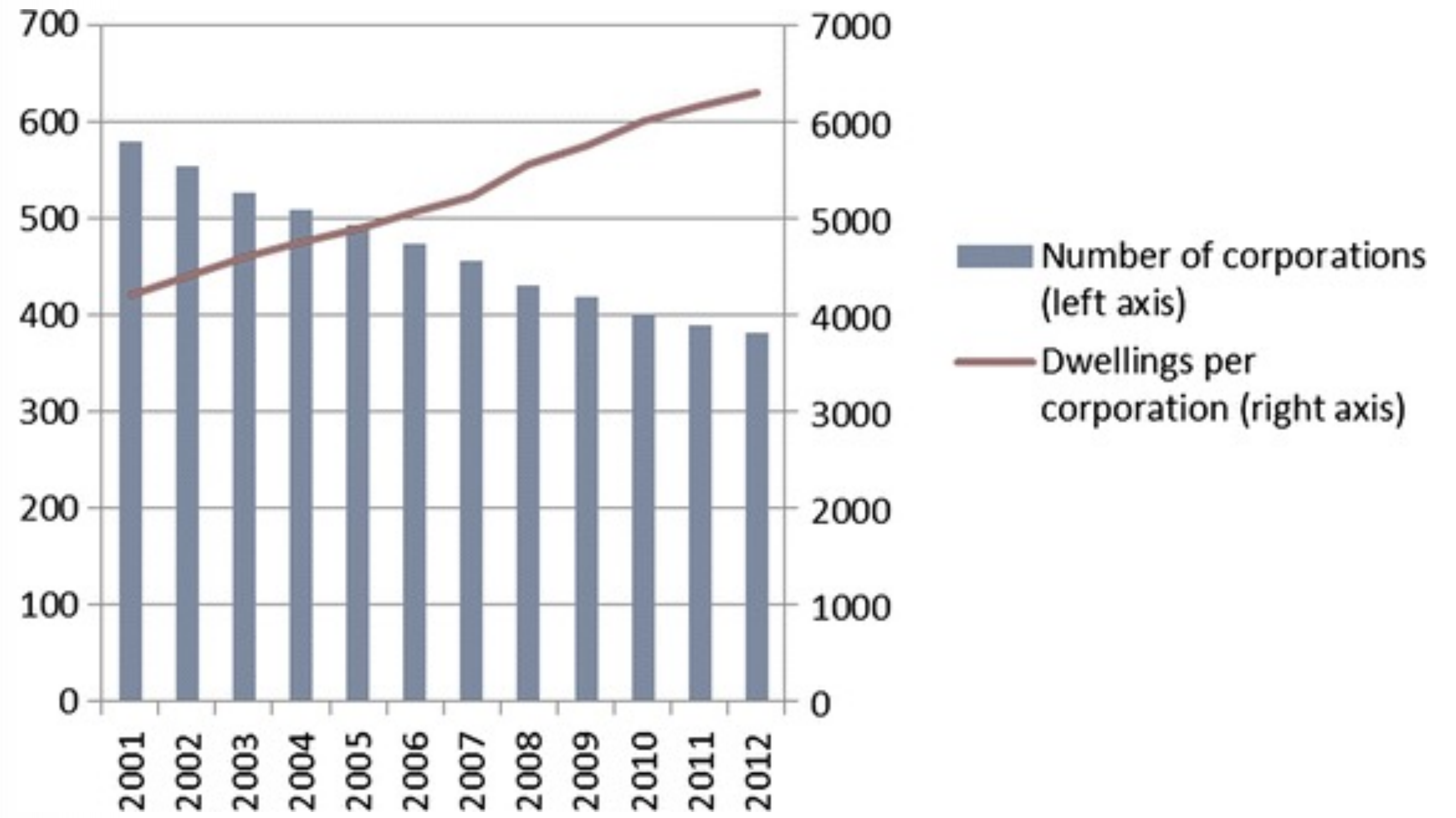
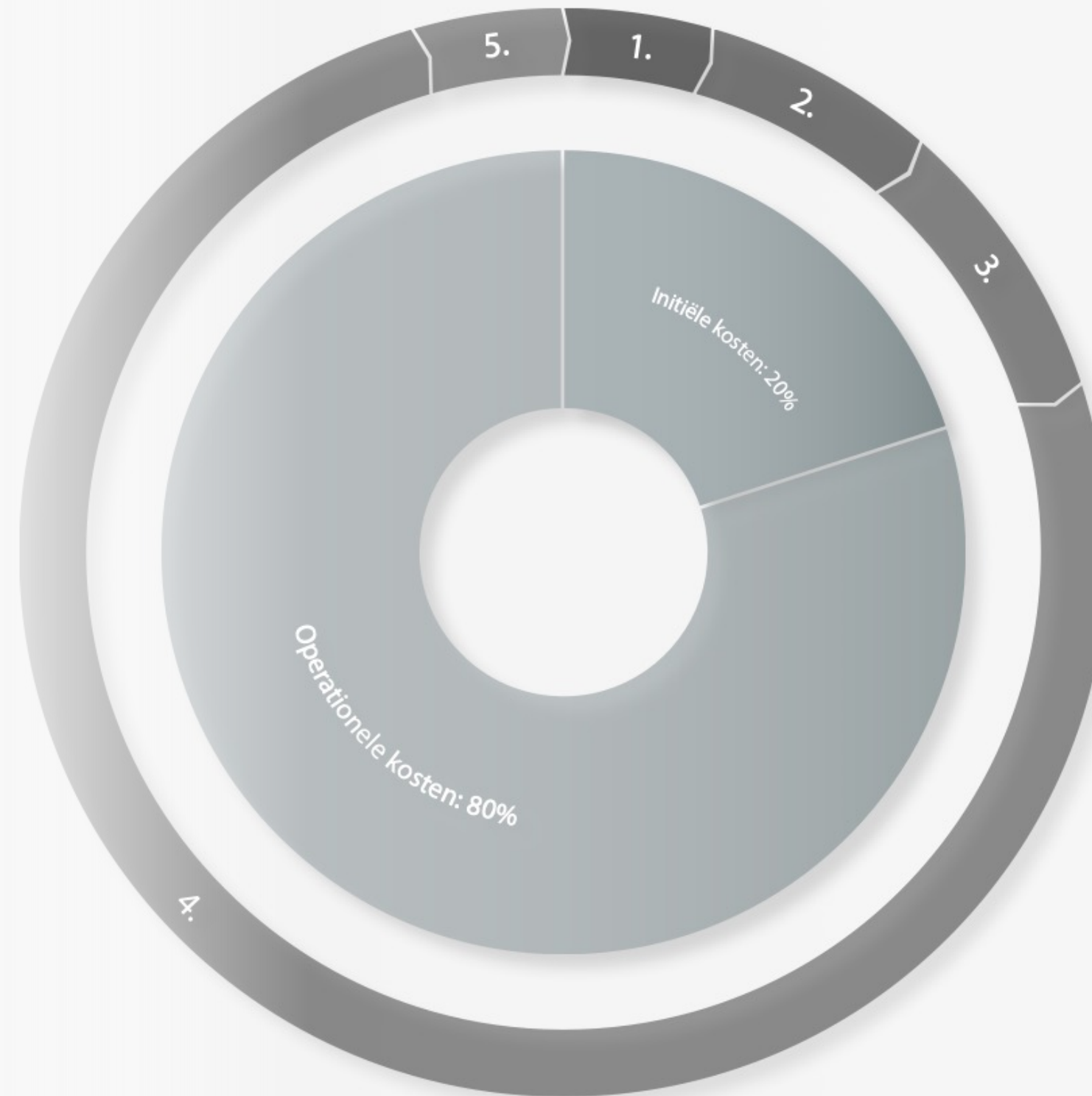


Figure 12: The number of associations and stock (Koolma, 2009)

Housing associations



20%

80%

1. Ontwikkeling



2. Ontwerp



3. Productie



4. Management

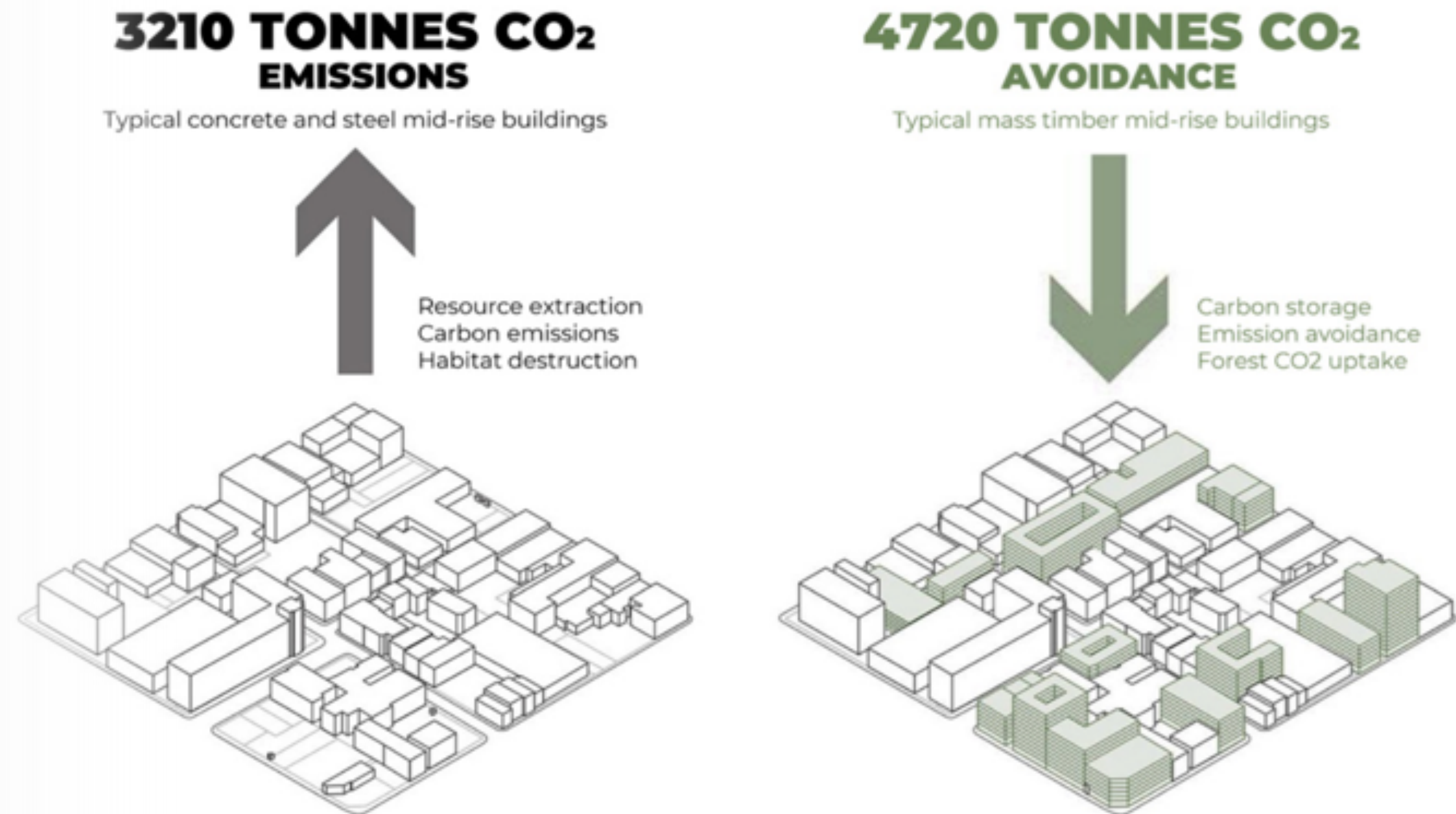


5. Demontage

Mass timber construction

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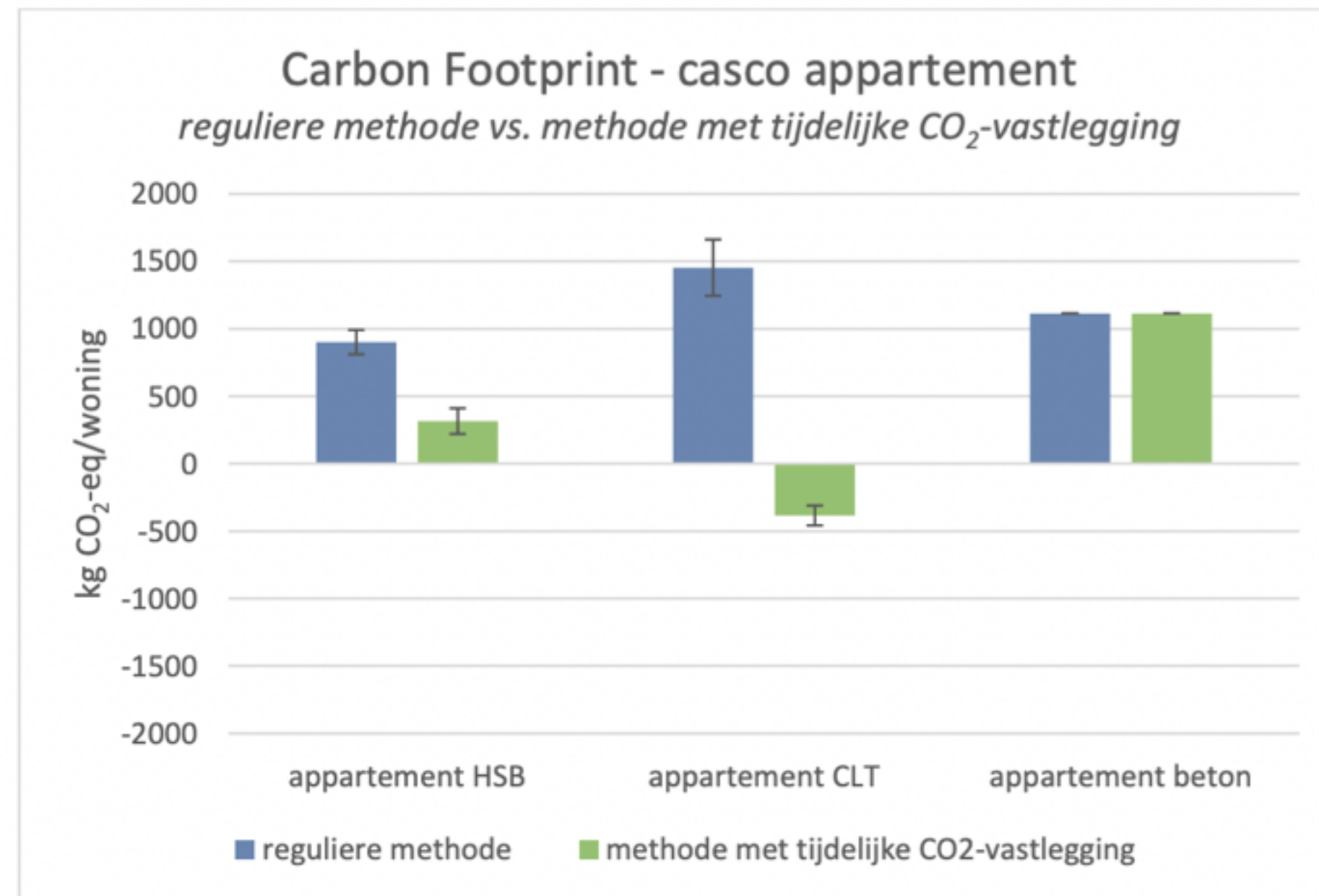
Mass timber construction



CO₂ avoidance by replacing a concrete and steel bearing structure (Think Wood, 2021)

Mass timber construction

- > 10% higher material costs
- > Lack of knowledge -> risk
- > Non-level playing field



Carbon Footprint, regular method vs temporary sequestration method (TNO, 2021)

Modular construction

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Modular construction

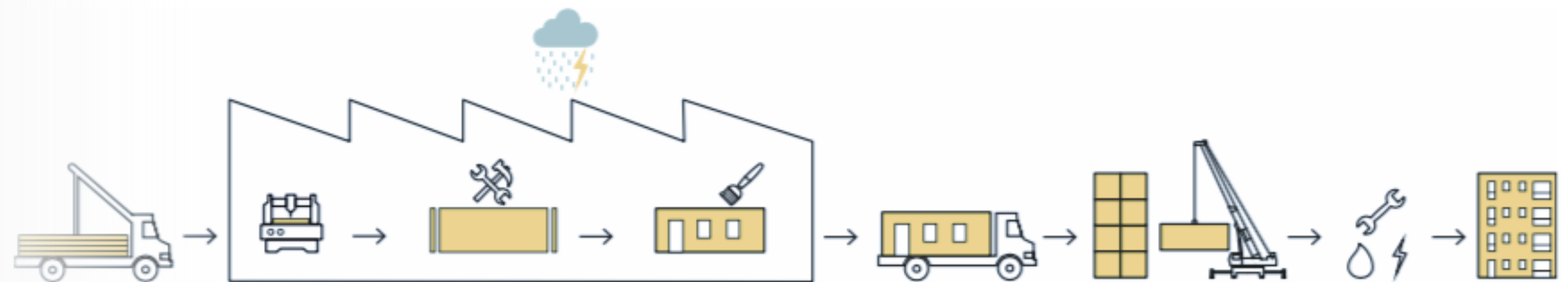


Figure 21: 3D modular prefabrication construction process (Waugh Thistleton Architects, 2019)



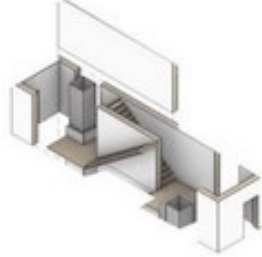

















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Modular construction



Modular construction



				
Core Shear Wall	Commercial Core Floor Cassette	Exit Stair	Co-Living Bathroom Pod	Market Storage Pod
				
Columns & Bracing	Residential Core Floor Cassette	Exterior Cladding Panel	Co-Living Kitchen Pod	Market Bedroom Pod
				
Commercial Floor Cassette	Roof Panel	Balcony	Co-Living Storage Pod	Unit Interior Partition
				
Residential Floor Cassette	Service Shaft	Market Bathroom Pod	Market Kitchen Pod	Unit Demising Wall

Modular construction

- > Speed, productivity, quality and costs
- > Planning, investment and knowledge



Barriers



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Barriers

8 semi- structured Interviews
with housing associations

> Selection

> Findings



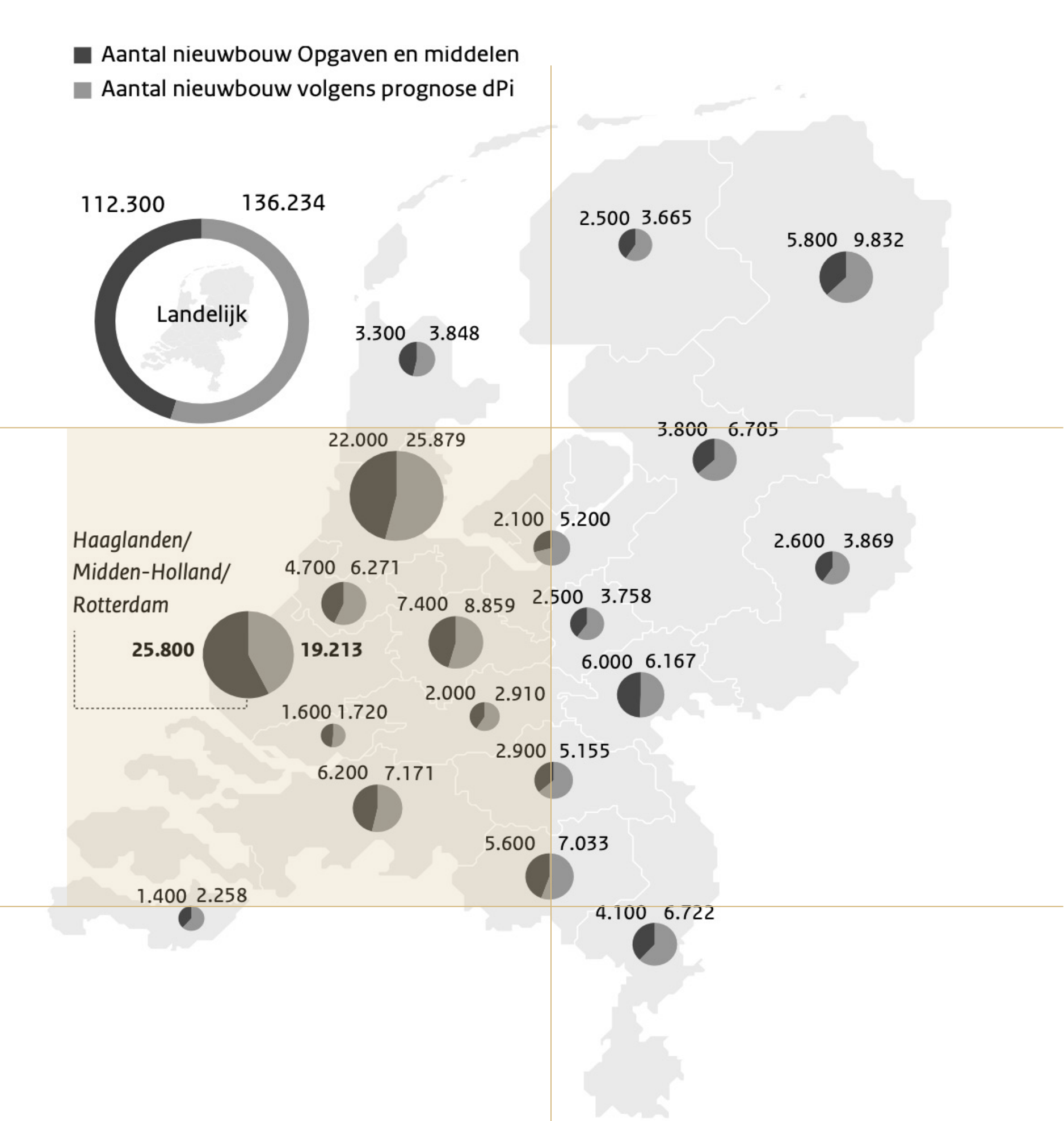
Barriers

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Figuur 8 Aantallen nieuwbouw per regio dPi t.o.v. ‘Opgaven en middelen’, 2020-2024



Barriers

8 semi- structured Interviews
with housing associations

> Selection

> Findings

> Social, cultural,
organisational

> Sectoral

> Technical

> Financial

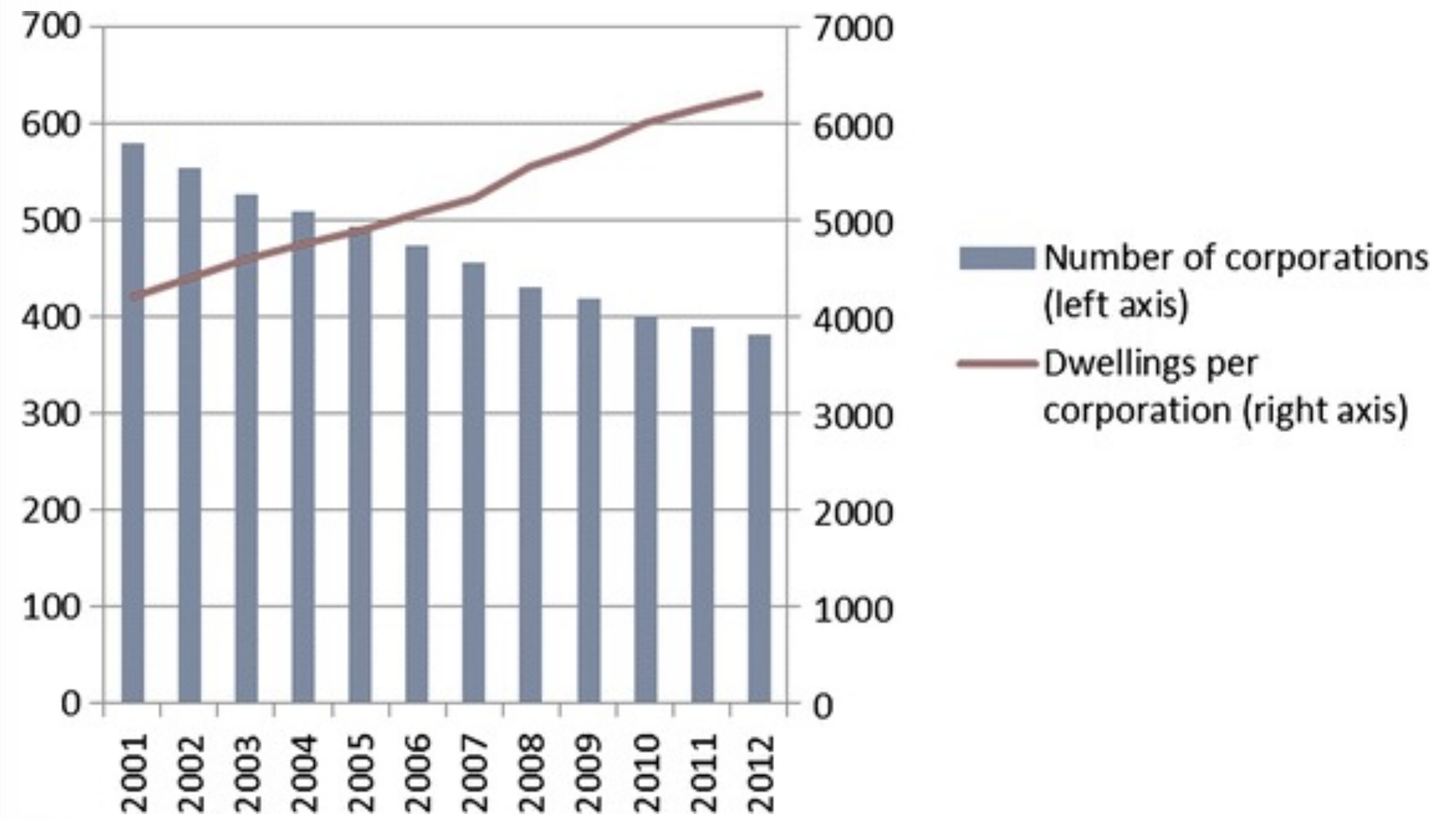


Figure 12: The number of associations and stock (Koolma, 2009)

Barriers

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“Het is makkelijker om te doen wat je gewend bent dan te veranderen.
Beton werkt. Iedereen vertrekt vanuit een betonnen casco en denkt op de
traditionele manier” (Interview A)

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“Elk project wordt als individueel project gezien. Men wilt geen eenheidsworsten. Er heerst misconceptie over waar conceptueel bouwen toe leidt” (Interview C)

Barriers

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Strategies



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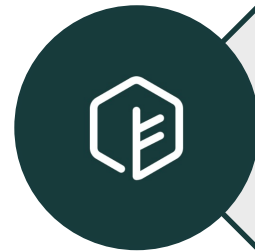
Strategies

Brainstorm with expert panel

> Four strategies



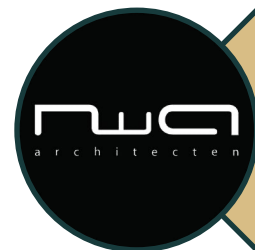
Reno Mol – Director Operations



Jan Noorda – Development Manager



Pablo van der Lugt – Author of Tomorrows Timber



Tonko Leemhuis – Co-Founder

Strategies

Brainstorm with expert panel

> Four strategies



1. IMPROVING KNOWLEDGE AND CHANGING CONDITIONS

2. ALLOWING A MARKET ENTRY





3. DEVELOPING A STANDARDIZED AND FLEXIBLE BUILDING SYSTEM





4. ENABLE CIRCULAR BUSINESS MODELS

Strategy #1

Improving knowledge and changing conditions

Actions

- > Showcase examples 
- > Underscore advantages 
- > Change regulations 
- > Increase mass timber education 





-  Supplier
-  Social Housing Associations
-  Sector
-  Government



Strategy #2

Allowing a market entry

Actions

- > Target early adopters 
- > Provide a pilot location 
- > Lower the costs 
- > Review the decision making process 

Woontij
wonen naar wens

parteon

 **fien**
wonen




wooncorporatie
w o o n
w a a r d



Strategy #3

Create standardization and flexibility

Actions




- > Separate structure and infill 
- > Establish an infill industry 
- > From project to product thinking 



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Create standardization and flexibility

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- > Separate structure and infill 
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- > From project to product thinking 



Strategy #4

Enhance collaboration

Actions

- > Establish future value
- > Separate liabilities



Strategies

Brainstorm with expert panel

> Four strategies



1. IMPROVING KNOWLEDGE AND CHANGING CONDITIONS

2. ALLOWING A MARKET ENTRY

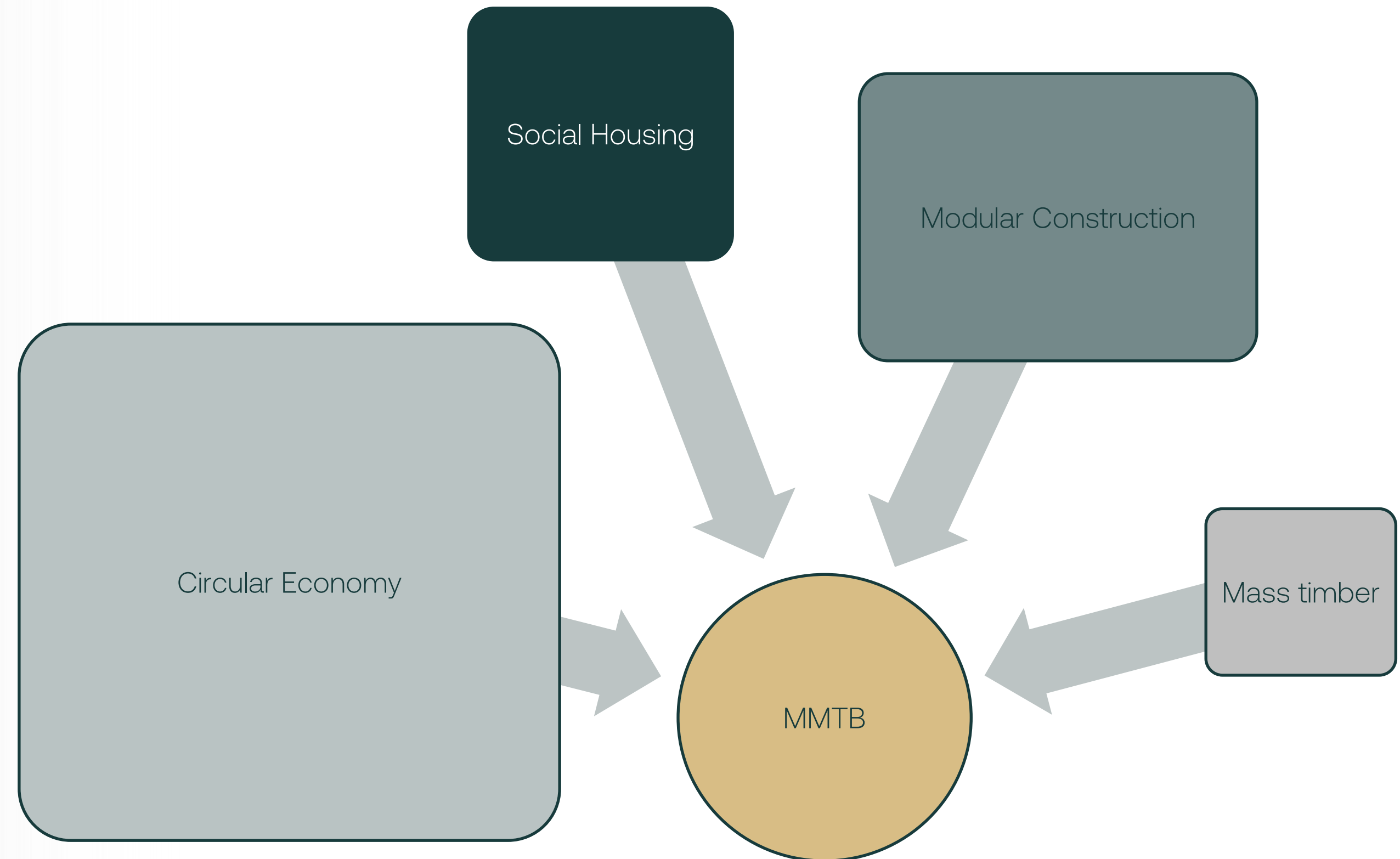
3. DEVELOPING A STANDARDIZED AND FLEXIBLE BUILDING SYSTEM

4. ENABLE CIRCULAR BUSINESS MODELS

“What are the barriers for the construction of affordable mass timber buildings and what might be strategies for overcoming them?”

Implications

- > Implications for academia
 - > A combination of topics
- > Implications for practice
 - > Insight in barriers to overcome them



Limitations

> Limitations

- > Highly explorative
- > Outdated results
- > Undelivered strategies

Recommendations

- > Individual barriers and strategies
 - > Effects of moving from project-based to product-based approach
 - > CBM's of a MMTBs

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