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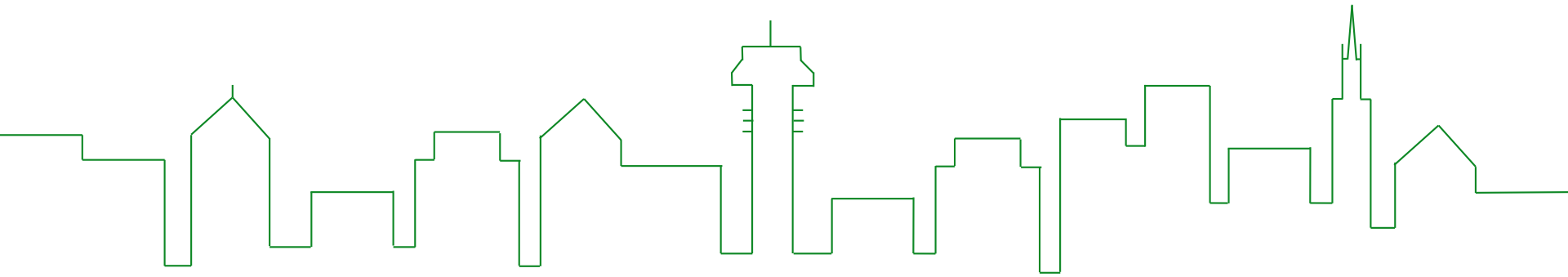
Bio-based building Materials in Sweden

Prospects for an increased use



Emilia Markström, Anders Bystedt, Dick Sandberg

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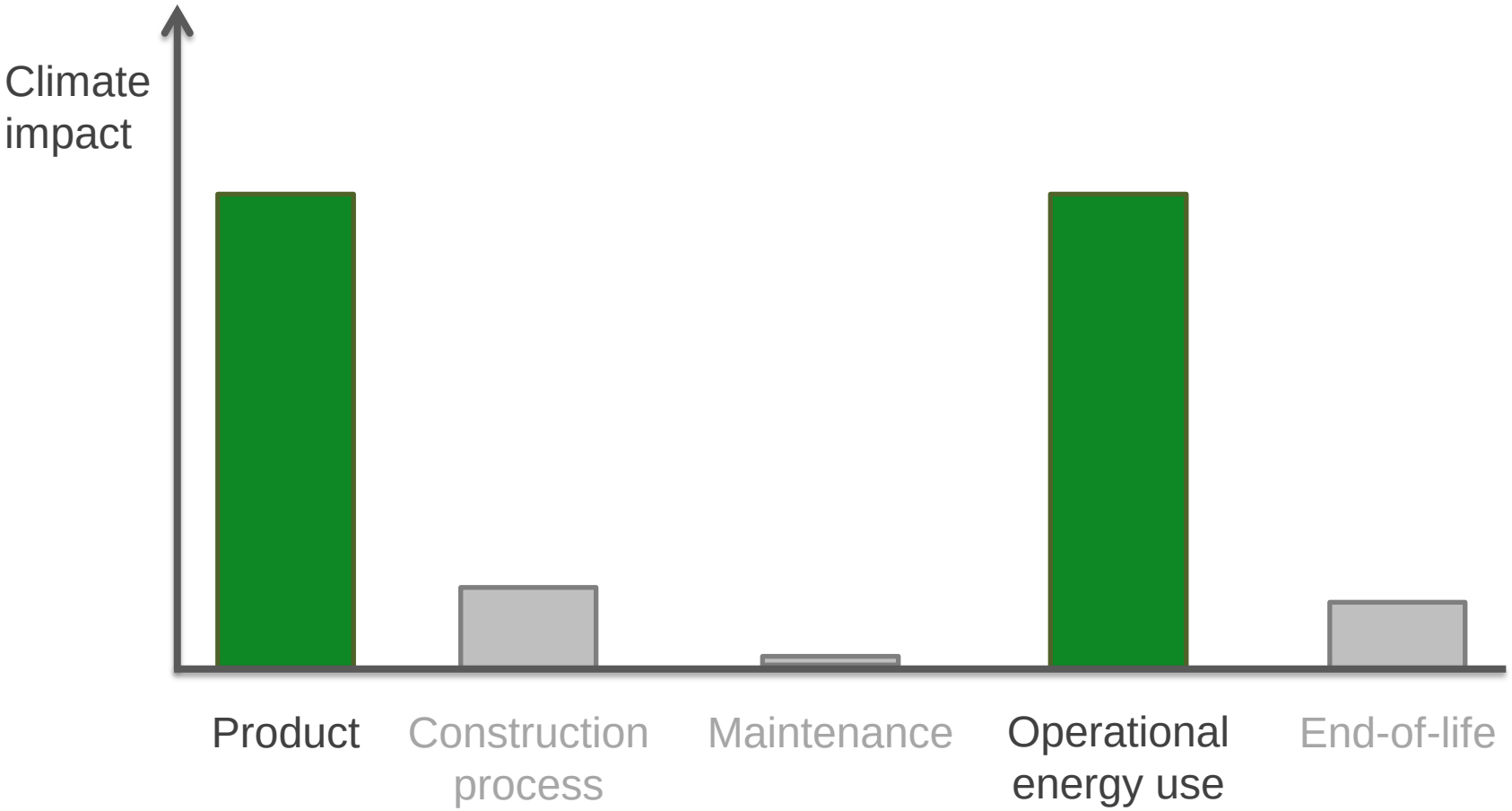
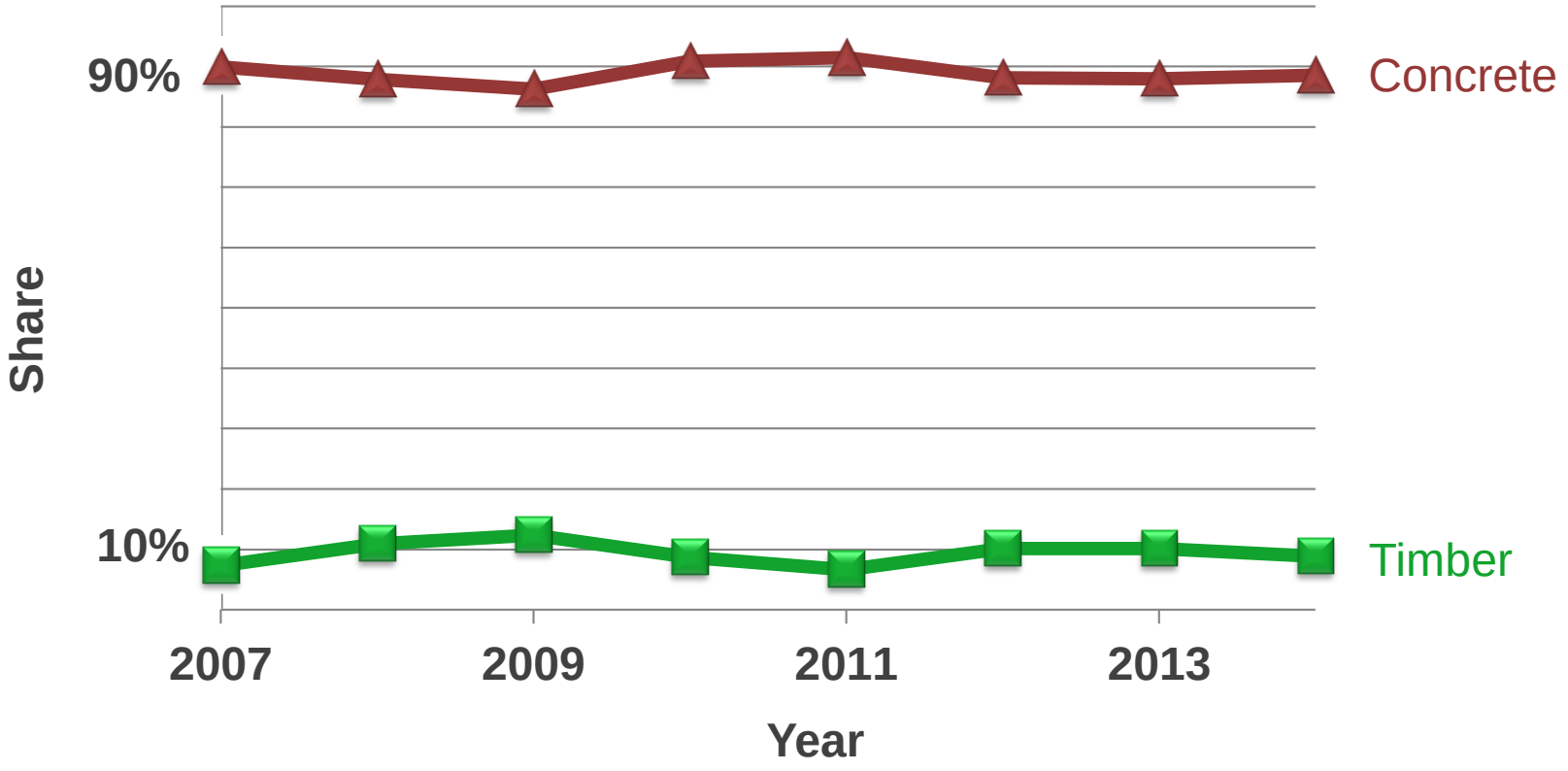
Why bother?

Climate impact from different life cycle stages: low-energy concrete building



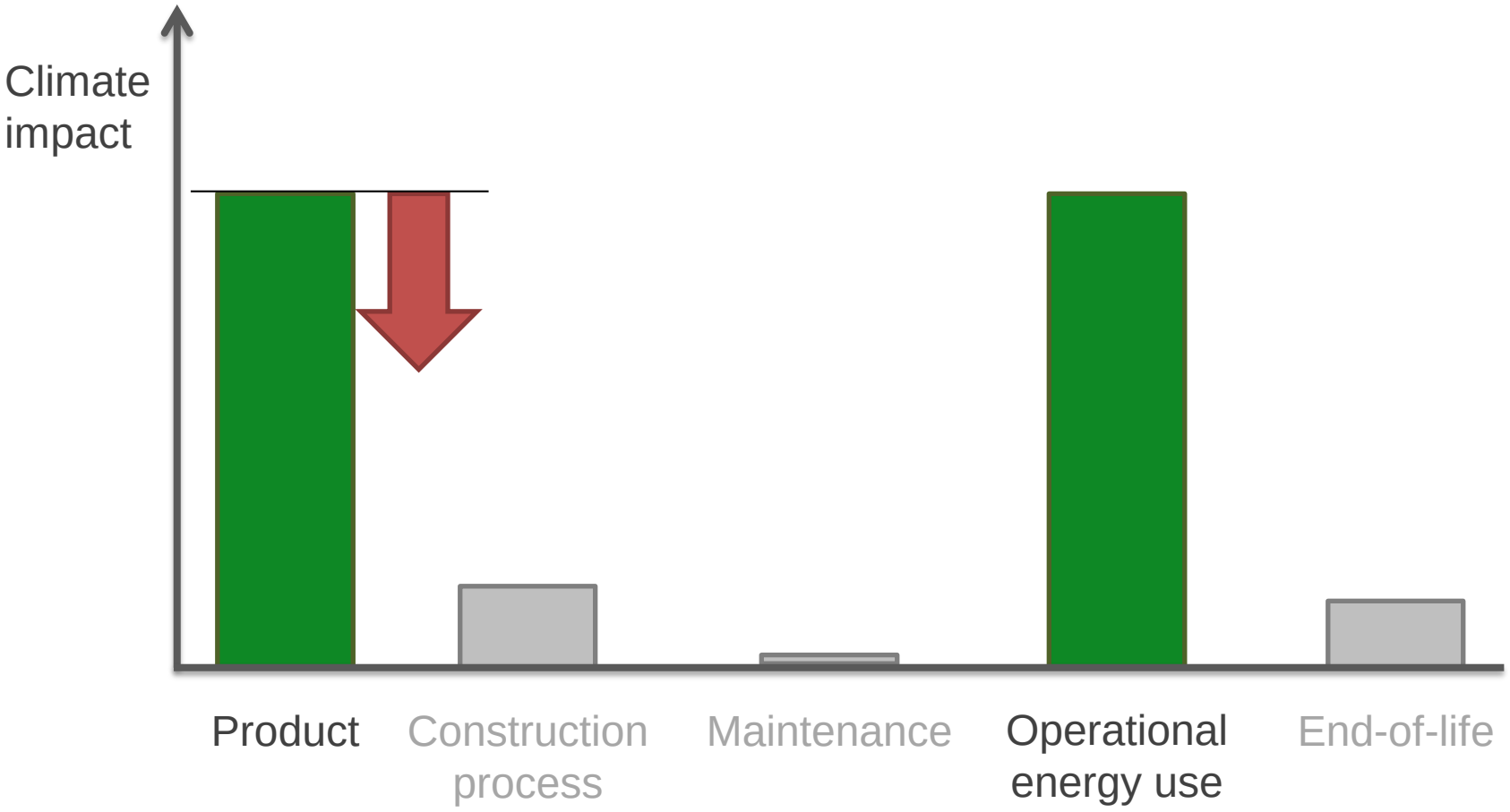
The diagram is based on data from an LCA made by IVL Swedish Environmental Research Institute.

Frame material in new built apartments in Sweden



The diagram is based on data from TMF (http://www.tmf.se/statistik/traandel-flerbostadshus).

Climate impact from different life cycle stages: low-energy concrete building



The diagram is based on data from an LCA made by IVL Swedish Environmental Research Institute.

Aim

Probability

Drivers and Barriers

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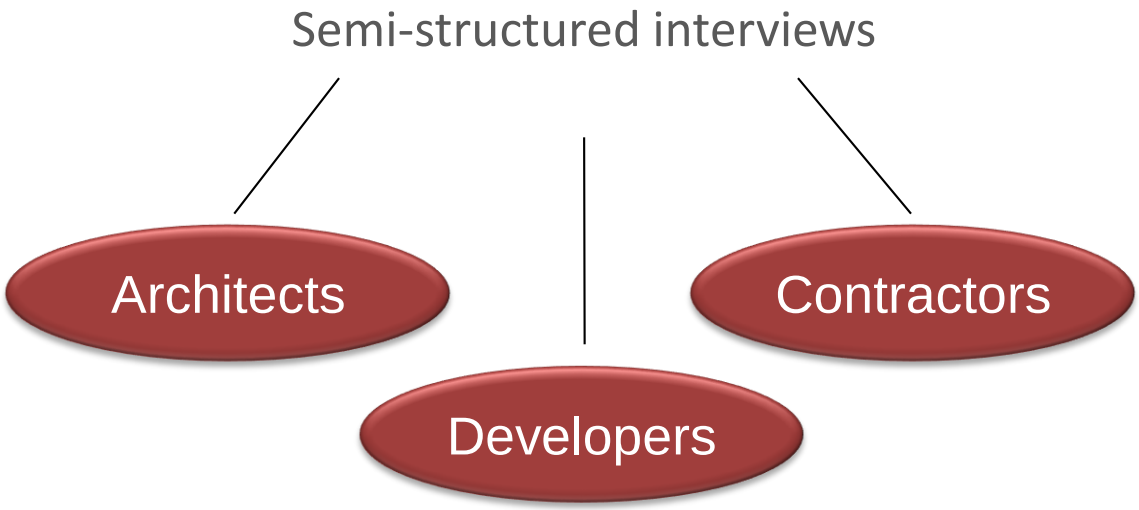
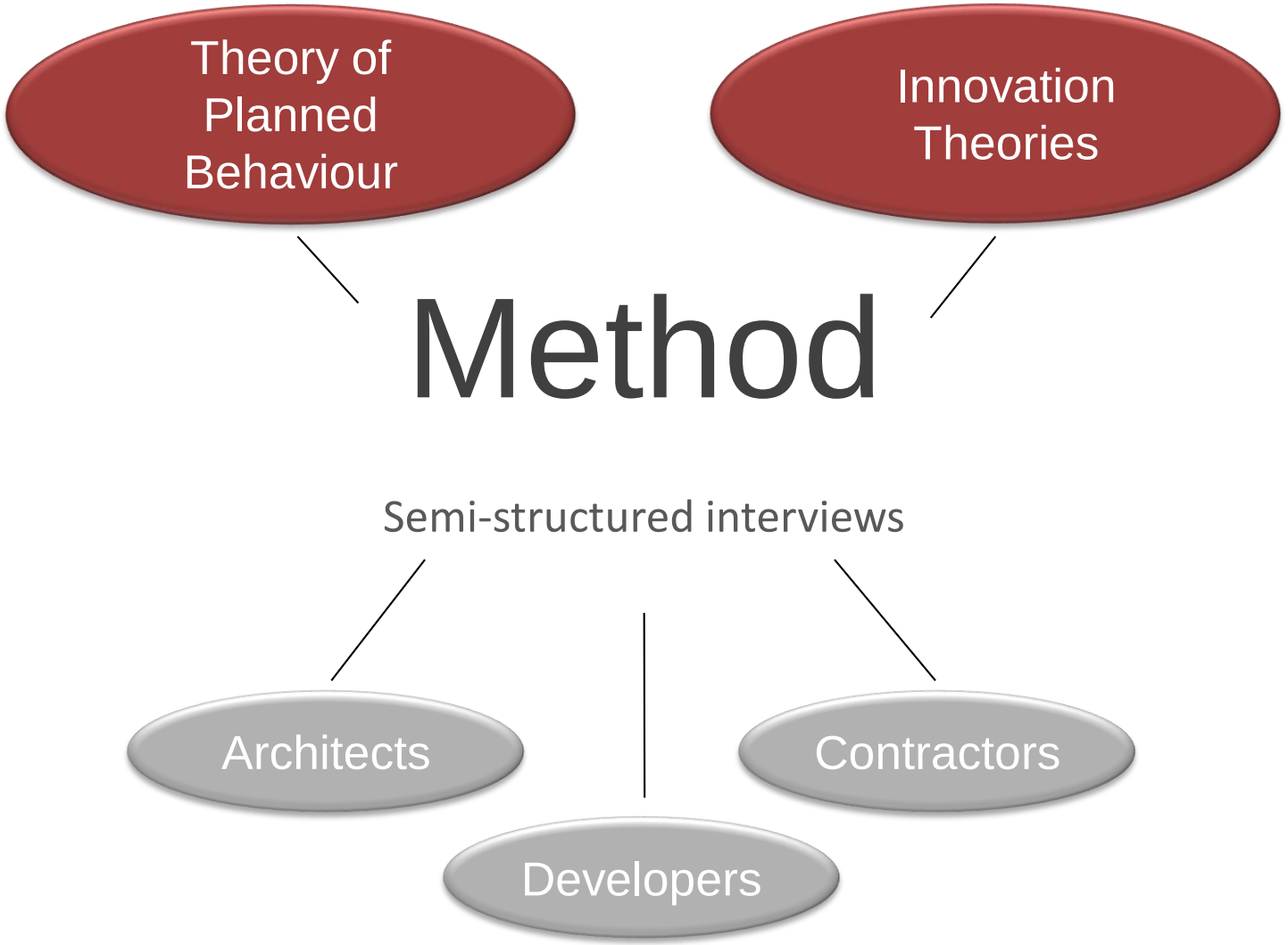
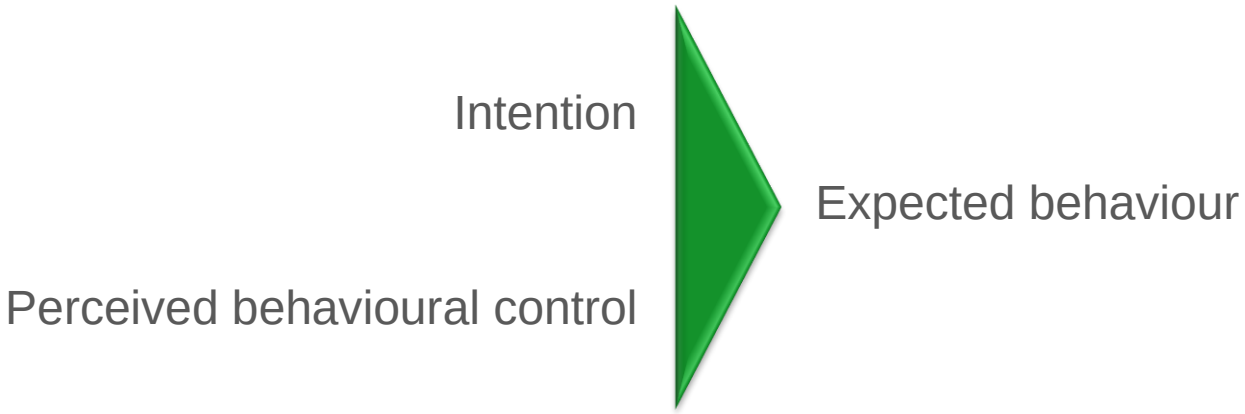
Method

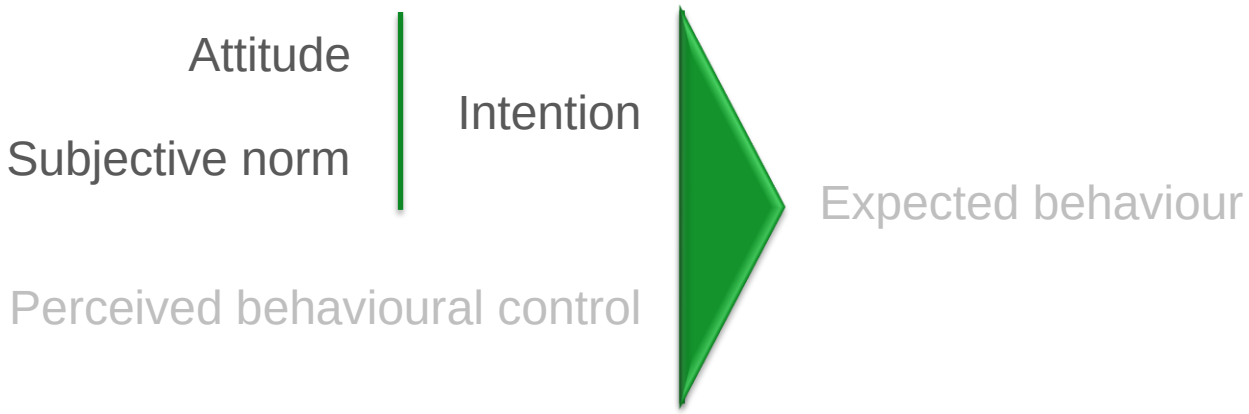


Interview group

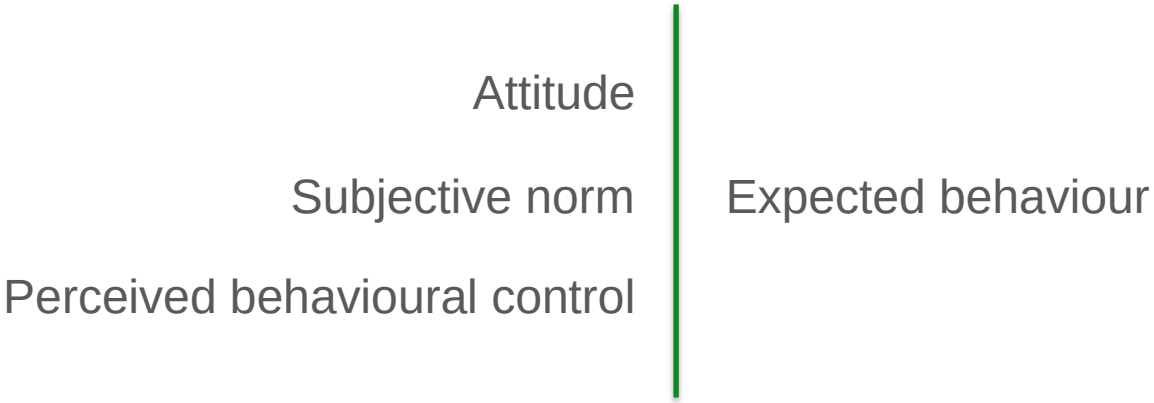
Category	Years of experience			Gender		Number of interviews
	< 10	10-20	> 20	Male	Female	
Architect	1	0	3	3	1	4
Contractor	1	2	1	2	2	4
Developer	0	2	2	4	0	4


Theory of Planned Behaviour
Innovation Theories
Method
Semi-structured interviews
Architects
Developers
Contractors


Intention
Perceived behavioural control
Expected behaviour


Attitude
Subjective norm
Intention
Perceived behavioural control
Expected behaviour

TPB


Attitude
Subjective norm
Perceived behavioural control
Expected behaviour

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Results

Part 1 - probability

Expected behaviour

Attitude

Subjective norm

Perceived behavioural control

A

“It is nice to have at least some part of the exterior made in wood since it provides a warmth.”

(Architect)

Expected behaviour

Attitude

Subjective norm

Perceived behavioural control

A C

Expected behaviour

Attitude

Subjective norm

Perceived behavioural control

A C D

Expected behaviour

Attitude

Subjective norm

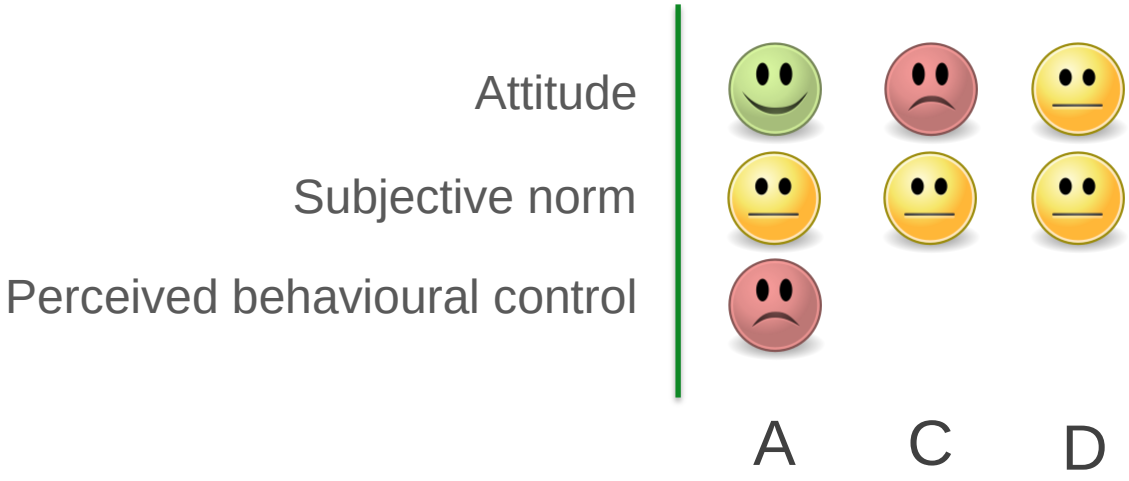
Perceived behavioural control

A C D

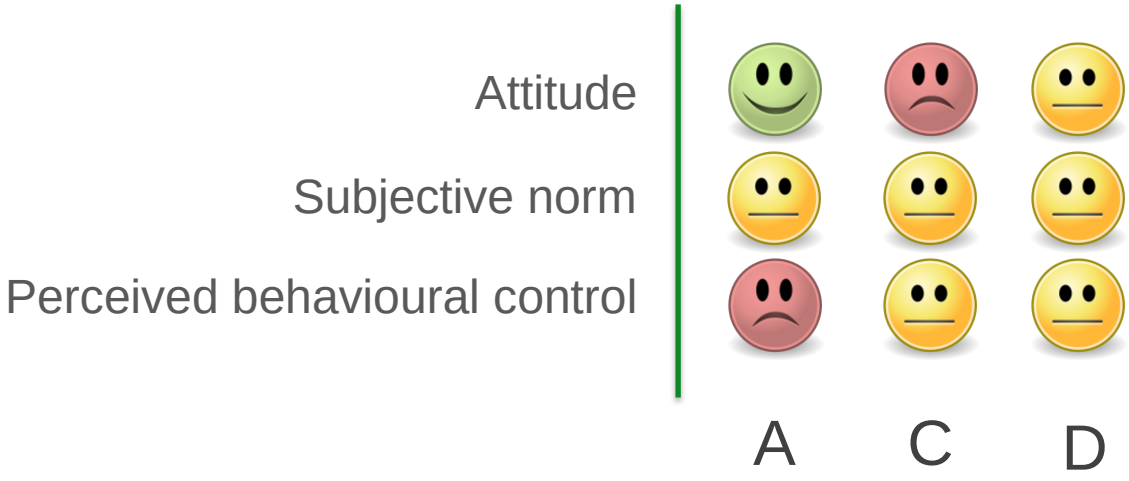
”Today, one is more willing to use bio-based materials than before but there also exists a resistance.”

(Developer)

Expected behaviour



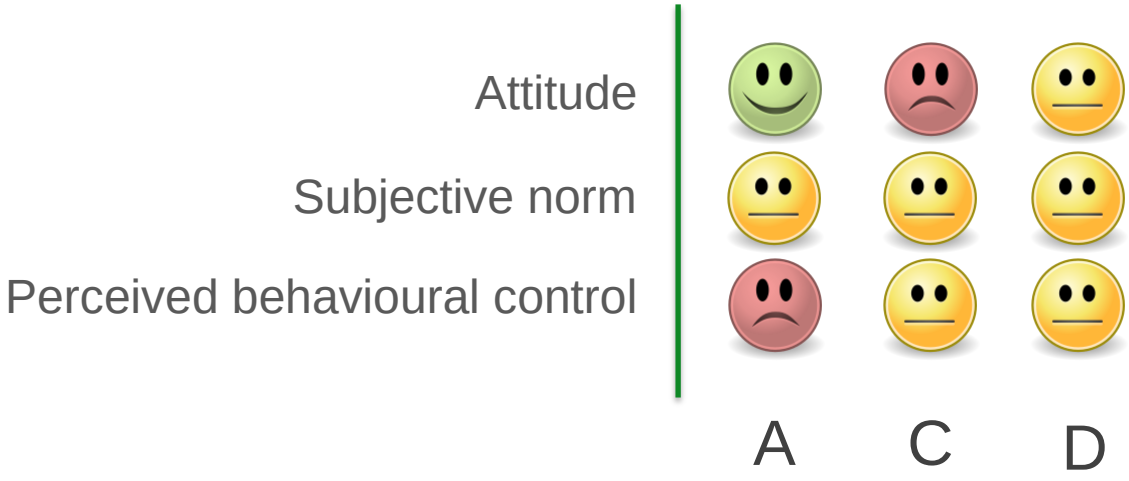
Expected behaviour



”The knowledge of bio-based materials within the sector is quite low.”

(Contractor)

Expected behaviour



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Results

Part 2 – Drivers and Barriers

Barriers

Barriers

tradition in building with concrete
new and not tested

“The main risk [with selecting a new material] is that you don’t know the service-life...”

(Developer)

Barriers

tradition in building with concrete
new and not tested
bad examples

“The wood fibers rose already after two years and made it impossible to walk on. If such uncertainties regarding the quality of the product exist, the project backpedals.”

(Contractor)

Barriers

tradition in building with concrete
new and not tested
bad examples
lack of knowledge

Barriers

tradition in building with concrete
new and not tested
bad examples
lack of knowledge

too costly
maintenance

Barriers

tradition in building with concrete
new and not tested
bad examples
lack of knowledge

too costly
maintenance

too short service-life
mould and moisture damage

Barriers

tradition in building with concrete
new and not tested
bad examples
lack of knowledge

too costly
maintenance

to short service-life
mould and moisture damage
fire safety
acoustics

Barriers

tradition in building with concrete
new and not tested
bad examples
lack of knowledge

too costly
maintenance

to short service-life
mould and moisture damage
fire safety
acoustics
cracks and settlements
hard to obtain an airtight structure

Barriers

tradition in building with concrete
new and not tested
bad examples
lack of knowledge

too costly
maintenance

to short service-life
mould and moisture damage
fire safety
acoustics
cracks and settlements
hard to obtain an airtight structure

shortage of construction workers
local plan
insurance issues

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Drivers

Drivers

faster construction
lack of labour

Drivers

faster construction
lack of labour

social benefits
green building certification
political pressure

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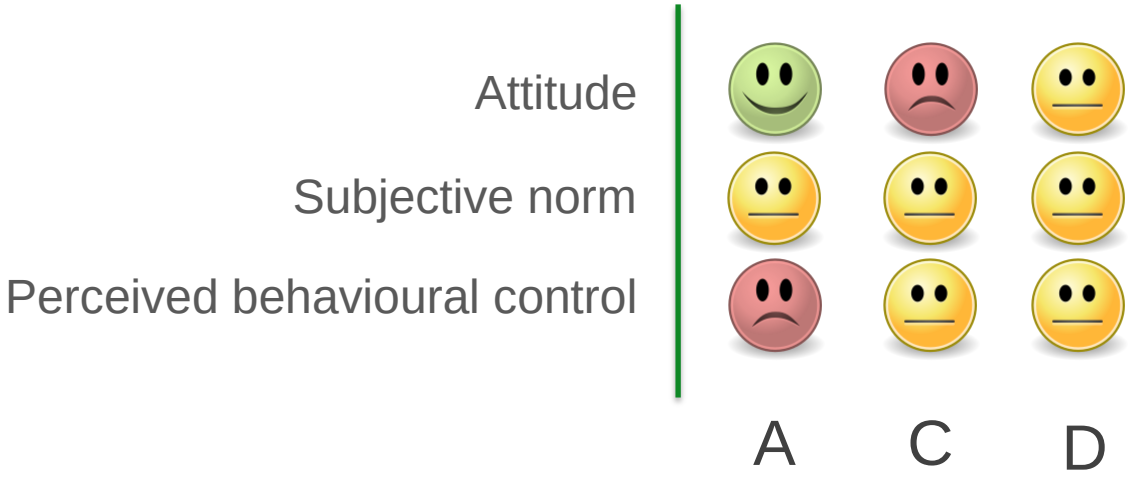
Conclusions

Expected behaviour



Barriers

new and not tested
tradition in building with concrete
bad examples
lack of knowledge

too costly
maintenance

to short service-life
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Drivers

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political pressure

Parameters of importance when selecting material

Parameter	Architects	Contractors	Developers
Functional requirements	x	x	x
Cost	x	x	x
Durability	x	x	x
Availability		x	
Assembly time		x	
Aesthetics	x		x
Residents’ perceptions	x		x
Maintenance			x
Not harmful			x

Barriers

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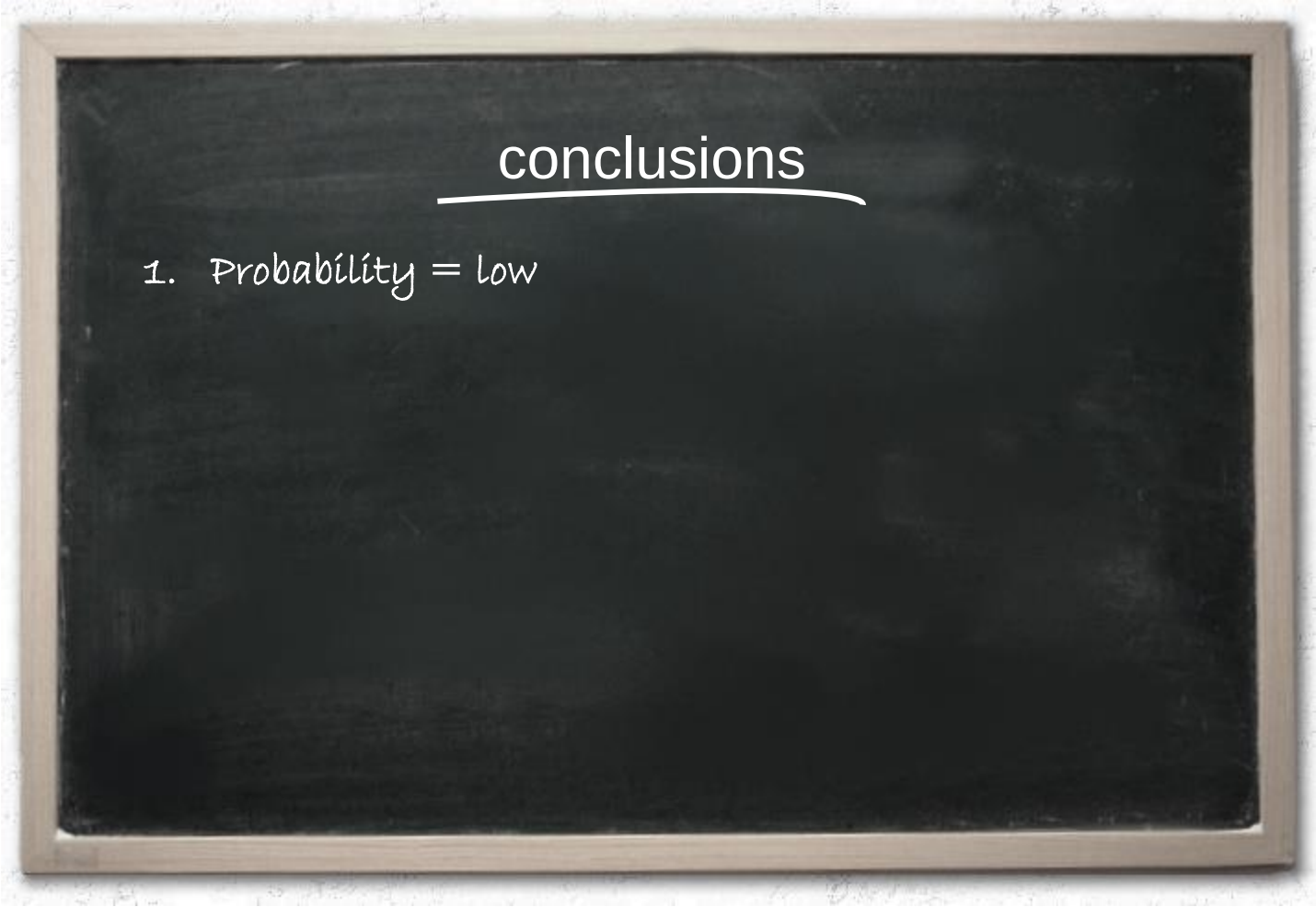
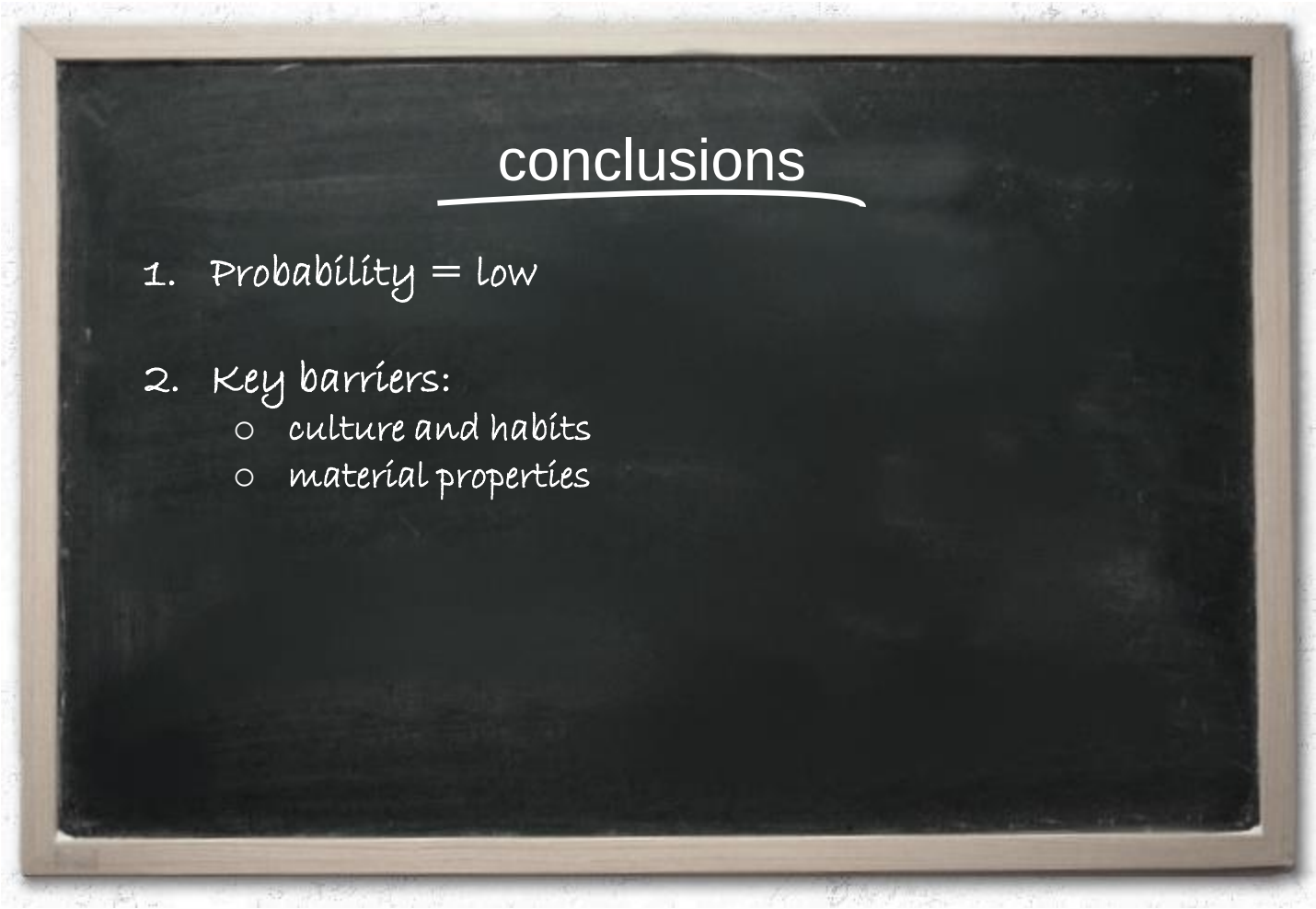
Functional requirements
Cost
Durability



Picture: https://commons.wikimedia.org/wiki/File:Black(green)board.jpg



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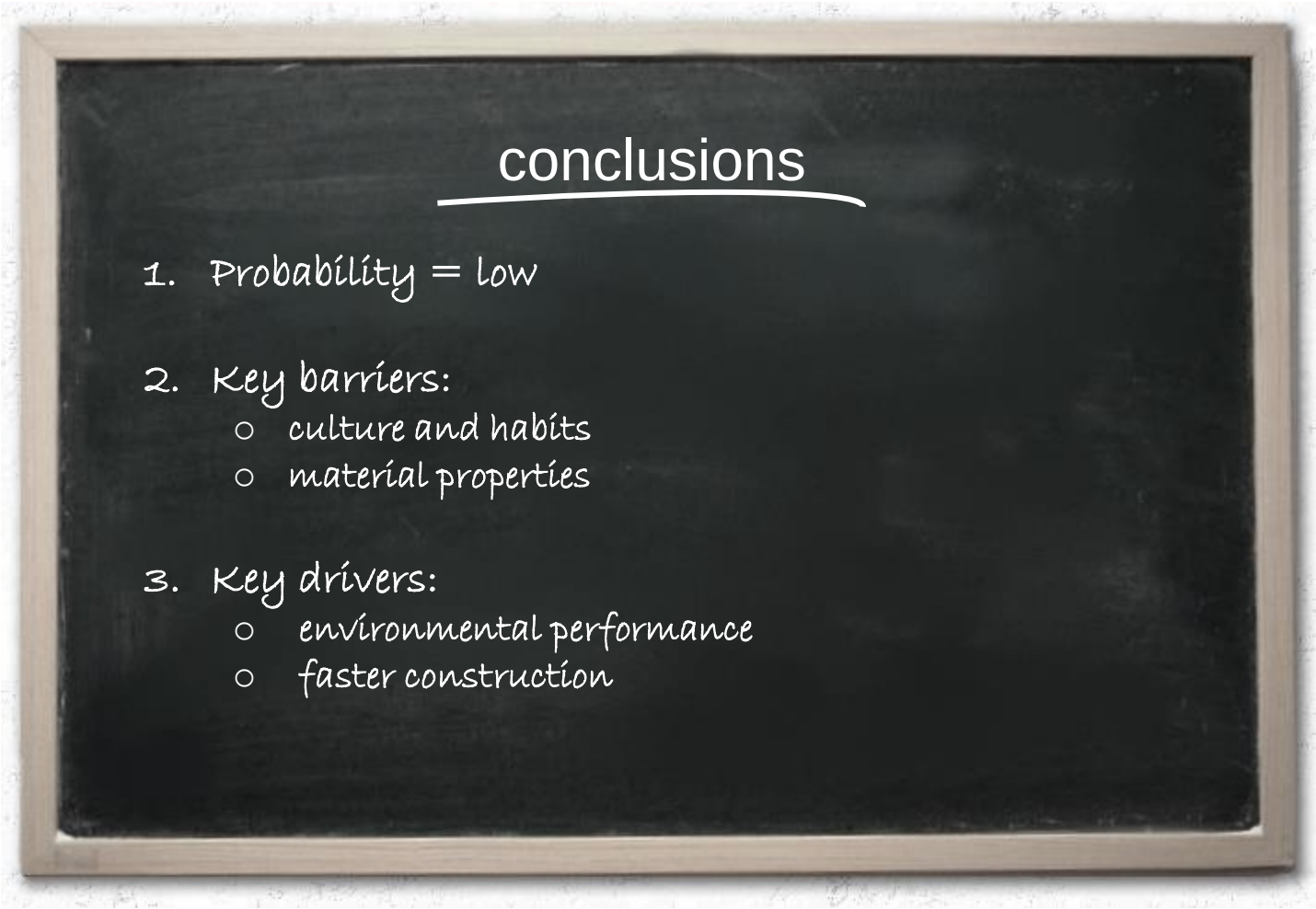

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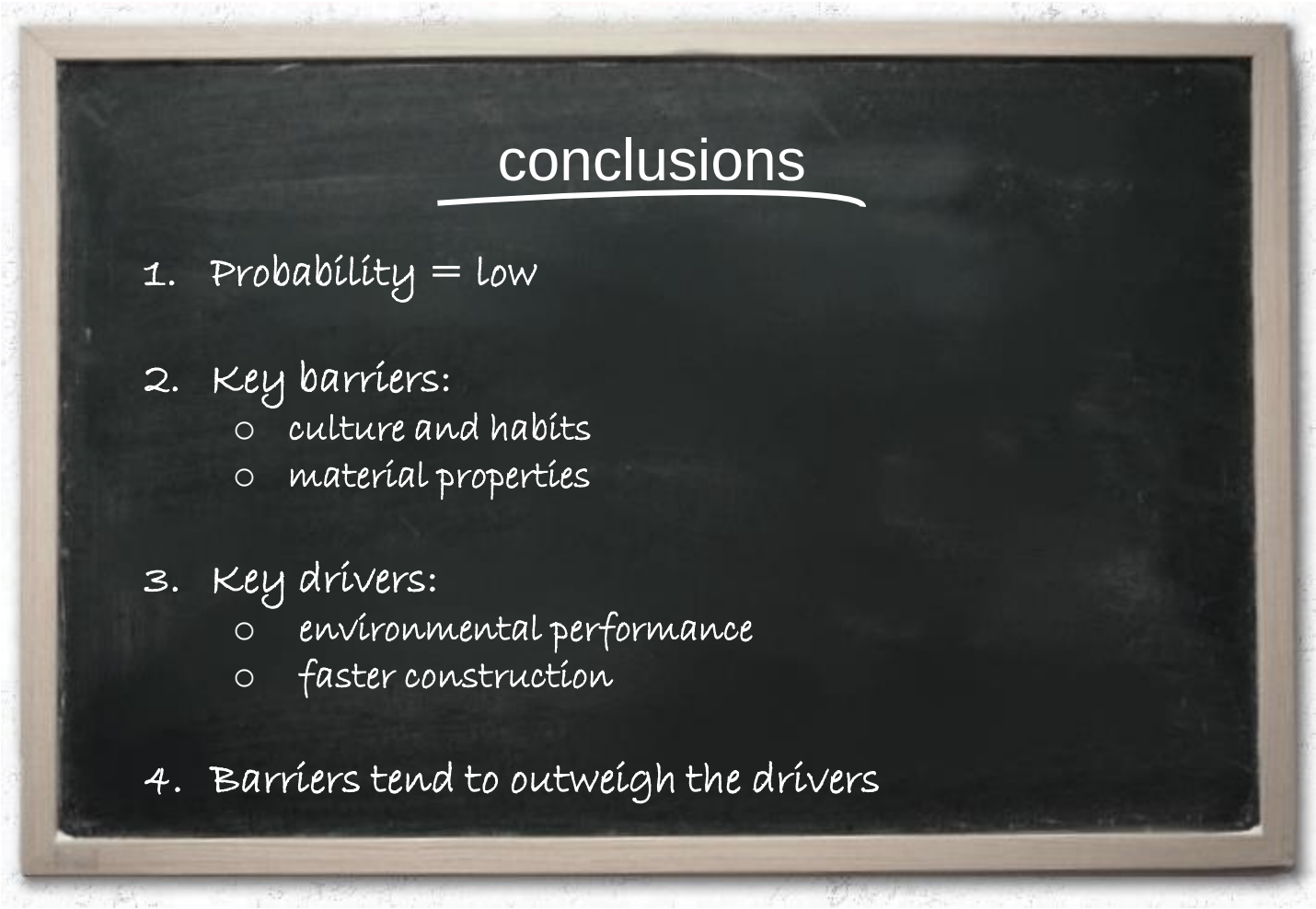

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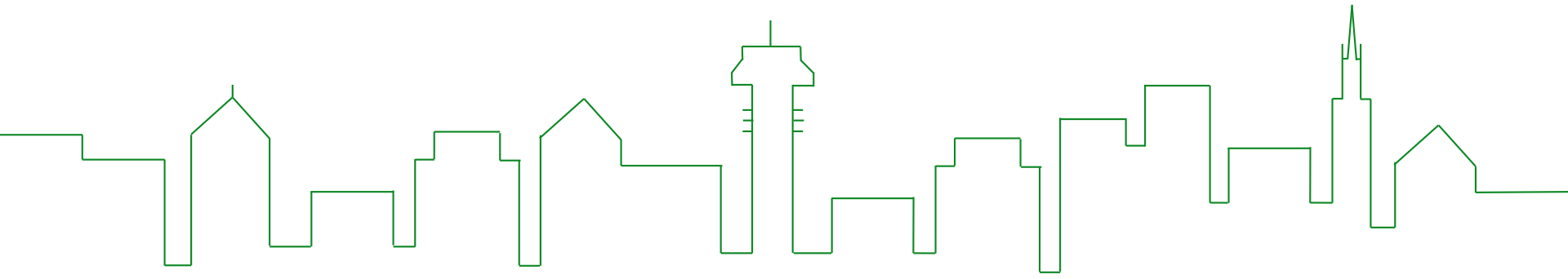
Thanks!



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