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Development opportunities of ecodesign tools for the building sector - A French case-study

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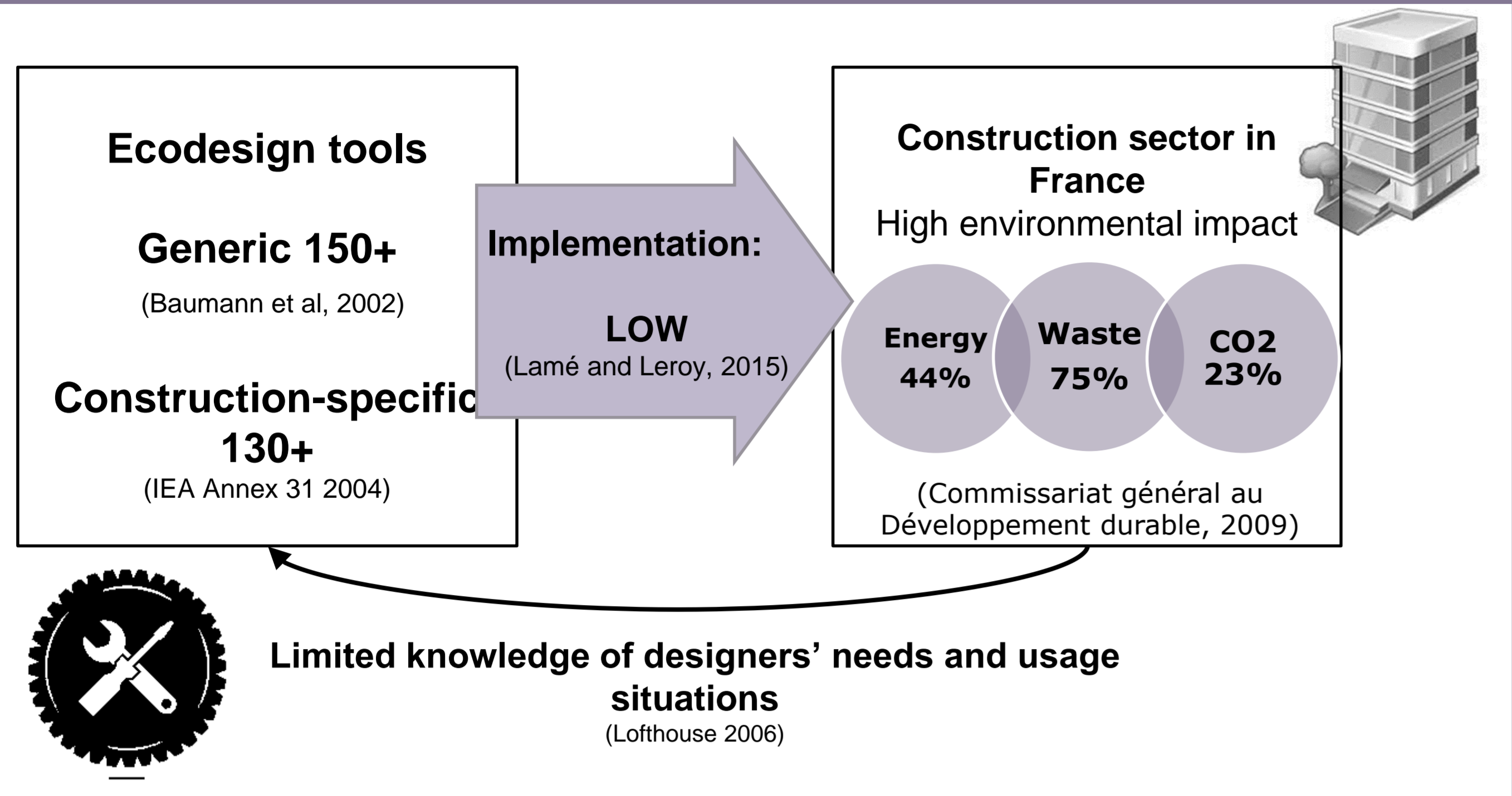
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INTRODUCTION



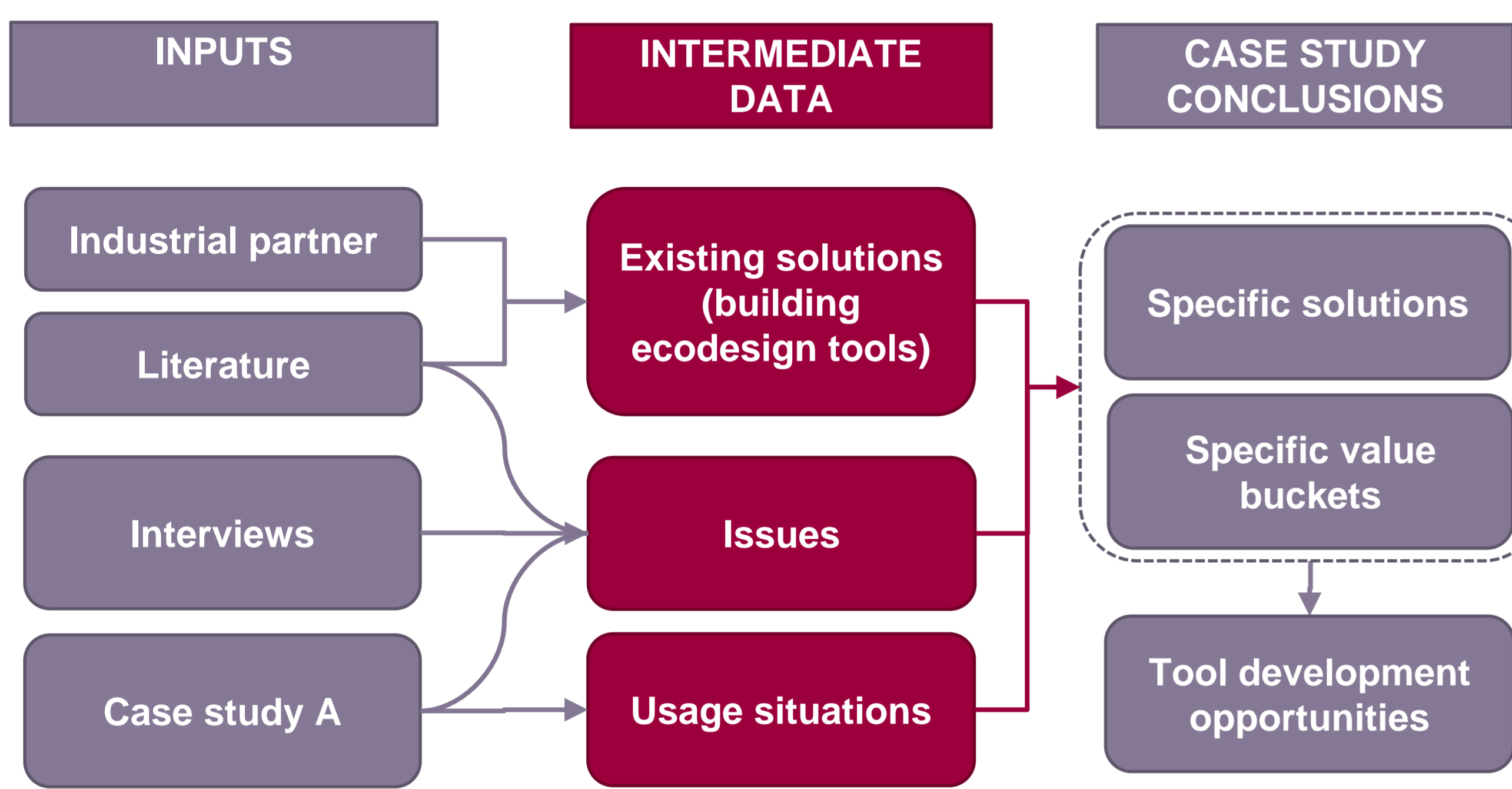
OBJECTIVES

Main objectives are:

- Understand **designers' needs**
- Identify and assess **10 ecodesign tools**
- Measure how **ecodesign tools cover these needs**
- Implement the **DSM Value Bucket Tool** (extracted from *Radical Innovation Design* approach) to identify **development opportunities of ecodesign tools**

METHOD

General framework



Interviews:

- 19 interviews in 14 French construction sector companies
- Full range of design phases participants

Case study:

- Large French promoter
- 2 « positive-energy » office buildings
- Document analysis
- 2 discussion meetings with project managers and environmental consultants

10 ECODESIGN TOOLS

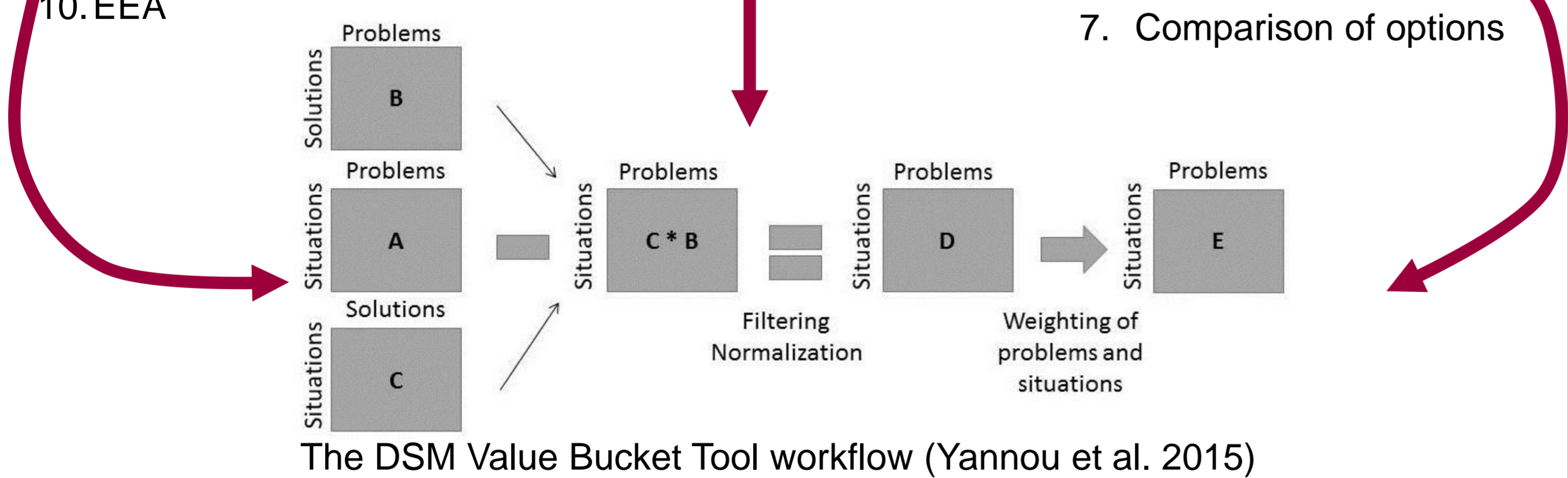
- LCA
- QFD-E
- Screening LCA
- Ecodesign pilot
- Guide HQE
- ESQCV
- DFE matrix
- ECO-VA
- Augmented DSM
- EEA

6 DESIGN CHOICES (USAGES)

- Program
- Sketches
- Façade
- Structure
- HVAC
- Finishing touches

7 PROBLEMS

- Lack of environmental data
- Low level of technical data
- Environment VS other criteria (costs, functional...)
- Project positioning
- Cost of analysis
- Delay of analysis
- Comparison of options



RESULTS AND DISCUSSION

Literature

	Environmental data	Technical data	Multicriteria	Positioning project	Cost	Delay	Comparing options
LCA	1	1	1	3	1	1	3
QFD-E	3	3	4	1	3	3	3
Screening LCA	2	2	1	3	2	2	3
Ecodesign pilot	4	4	0	1	4	4	2
Guide HQE	4	4	3	0	3	3	1
ESQCV	4	2	1	4	4	3	0
DFE matrix	4	4	4	2	1	1	3
ECO-VA	2	2	4	4	1	2	4
Augmented DSM	2	1	4	4	4	4	4
EEA	3	2	3	4	3	3	4

Size of usage	Environmental data	Technical data	Multicriteria	Positioning project	Cost	Delay	Comparing options
1 Program	0,15	0,49	0,48	0,27	0,2	0,46	0,37
1 Sketches	0,03	0,47	0,43	0,23	0,22	0,45	0,28
1 Façade	0,23	0,02	0,21	0,18	0,11	0,34	0
1 Structure	0	0	0	0,03	0	0,21	0
1 HVAC	0,34	0,45	0,25	0,18	0	0,25	0
1 Finishing touches	0	0	0	0	0	0	0

Interviews

	Environmental data	Technical data	Multicriteria	Positioning project	Cost	Delay	Comparing options
Program	3	4	4	3	3	4	3,5
Sketches	2,5	4	4	3	3	4	3,5
Façade	2,5	1,5	2,5	2,5	2	3	1,5
Structure	1	2	2	2,5	2	3	1,5
HVAC	3,5	3,5	3	3	1,5	3	1,5
Finishing touches	1	0,5	1	1	1,5	1,5	1

	Environmental data	Technical data	Multicriteria	Positioning project	Cost	Delay	Comparing options
Program	87	74	75	69	80	79	73
Sketches	86	77	83	75	77	80	87
Façade	58	51	60	64	57	60	69
Structure	87	75	75	86	78	79	90
HVAC	77	62	73	82	74	73	77
Finishing touches	72	64	79	71	63	65	82

Literature

	ACV	QFD-E	Screening LCA	Ecodesign pilot	Guide HQE	ESQCV	DFE matrix	ECO-VA	Augmented DSM	EEA
Program	1	3	2	3	4	3	3	2	4	3
Sketches	2	3	3	3	4	1	3	4	4	3
Façade	3	2	3	2	2	1	1	4	4	1
Structure	4	1	3	4	2	2	4	3	4	4
HVAC	3	3	3	1	2	4	2	3	4	3
Finishing touches	4	4	2	1	2	1	4	3	4	2

	Environmental data	Technical data	Multicriteria	Positioning project	Cost	Delay	Comparing options
2,42 Program	0,15	0,49	0,48	0,27	0,2	0,46	0,37
2,11 Sketches	0,03	0,47	0,43	0,23	0,22	0,45	0,28
1,09 Façade	0,23	0,02	0,21	0,18	0,11	0,34	0
0,24 Structure	0	0	0	0,03	0	0,21	0
1,47 HVAC	0,34	0,45	0,25	0,18	0	0,25	0
0 Finishing touches	0	0	0	0	0	0	0
	0,75	1,43	1,37	0,89	0,53	1,71	0,65

Opportunities for building ecodesign tool development

- Positioning project environmental performance when writing requirements (Program stage)
- Developing multicriteria assessment for Program, i.e. assess how requirements impact all dimensions of the project performance (Environment VS Cost)
- Developing multicriteria assessment for sketches, i.e. how functionality, cost, delays and environmental impacts balance each other in early phases
- Positioning project at the sketches stage

Surprises

- Lack of environmental data and cost of analysis are usually identified as big issue (literature & interviews)
- After computation, these problems are rated very low!

CONCLUSION

Method

- DSM Value Bucket analysis provides new insights on designers needs
- Innovation approaches are valuable for developing ecodesign tools

Next developments

- Make sense of environmental analysis results, move from assessment to eco-design practices
- Include other criteria: initial cost, operational cost, maintenance easiness...

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