THE "AS-BUILT" BIM AS A DECISION-MAKING TOOL BETWEEN DEMOLITION OR DECONSTRUCTION

Issue


« On Spaceship Earth there are no passengers; everybody is a member of the crew. We have moved into an age in which everybody's activities affect everybody else. »
(Marshall McLuhan, 1965)
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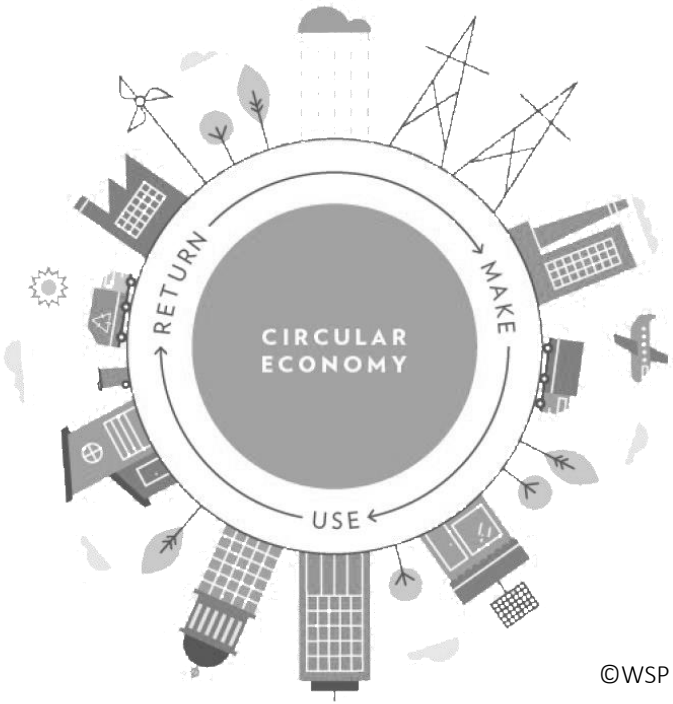
Two possible solutions

CIRCULAR ECONOMY

Materials



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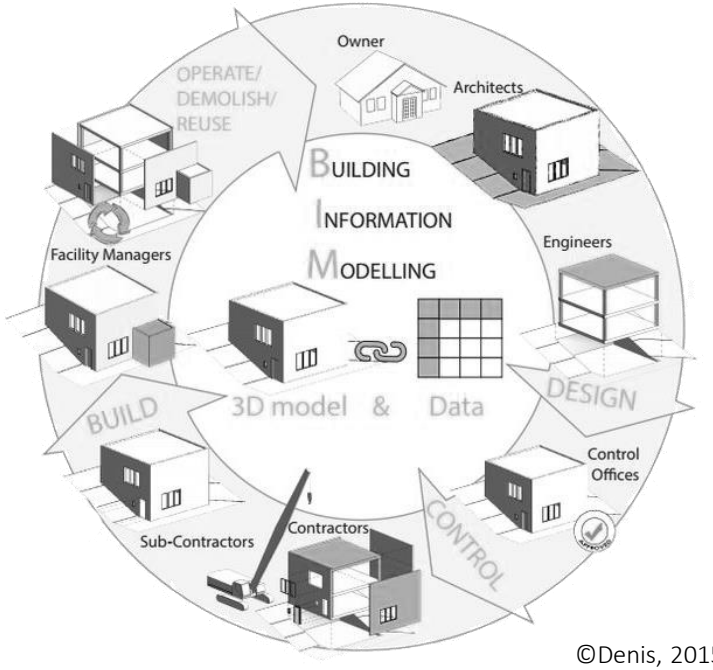
BIM

Information



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Research questions

?

Motivations?

Types of projets?

Challenges and solutions?

Tools?

Data backup?

New skills?

Methodology

State of the art

- Research questions

↓

Online survey

- Challenges, solutions and desires

↓

Interviews

- BIM + EC experience feedback

Online survey

14. For what reason(s) do you or your architectural office chose to use recovered materials? Please rank them in order of importance, with 1 being the most important and 5 being the least important

Drag & drop end/or use the arrows

- Cost savings
- Obtaining a green/LEED/ BREEAM/HQE certificate etc
- Respond to a specific client's request
- Aesthetic choice

15. In how many reuse projects have you or your architectural office been involved in?

- ○ None
- ○ 1 project
- ○ 2 to 5 projects
- ○ 6 to 10 projects
- ○ More than 10 projects

16. How would you rate your overall experience with the use of recovered materials?

0	1	2	3	4	5	6	7	8	9	10

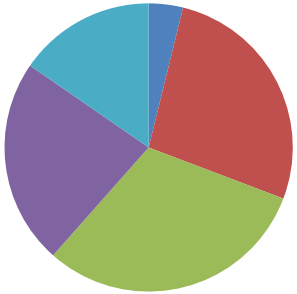
Very dissatisfied — Very satisfied

Online survey methodology

Target audience	▶ BIM and/or EC Architects Belgium & neighbouring countries
Type of survey	▶ Standardized online questionnaire
Type of questions	▶ MCQ + open questions
Diffusion	▶ @ + LinkedIn + f
Sections	▶ Demographic data ▶ CE ▶ BIM ▶ CE + BIM

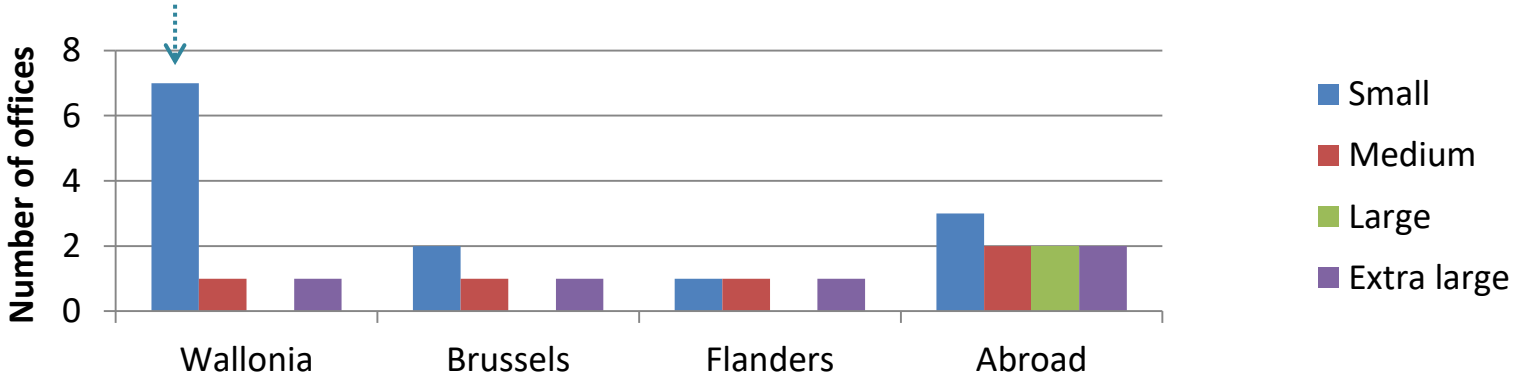
Description of the sample

- 26 architects surveyed
- Categorization of the offices that participated in the survey



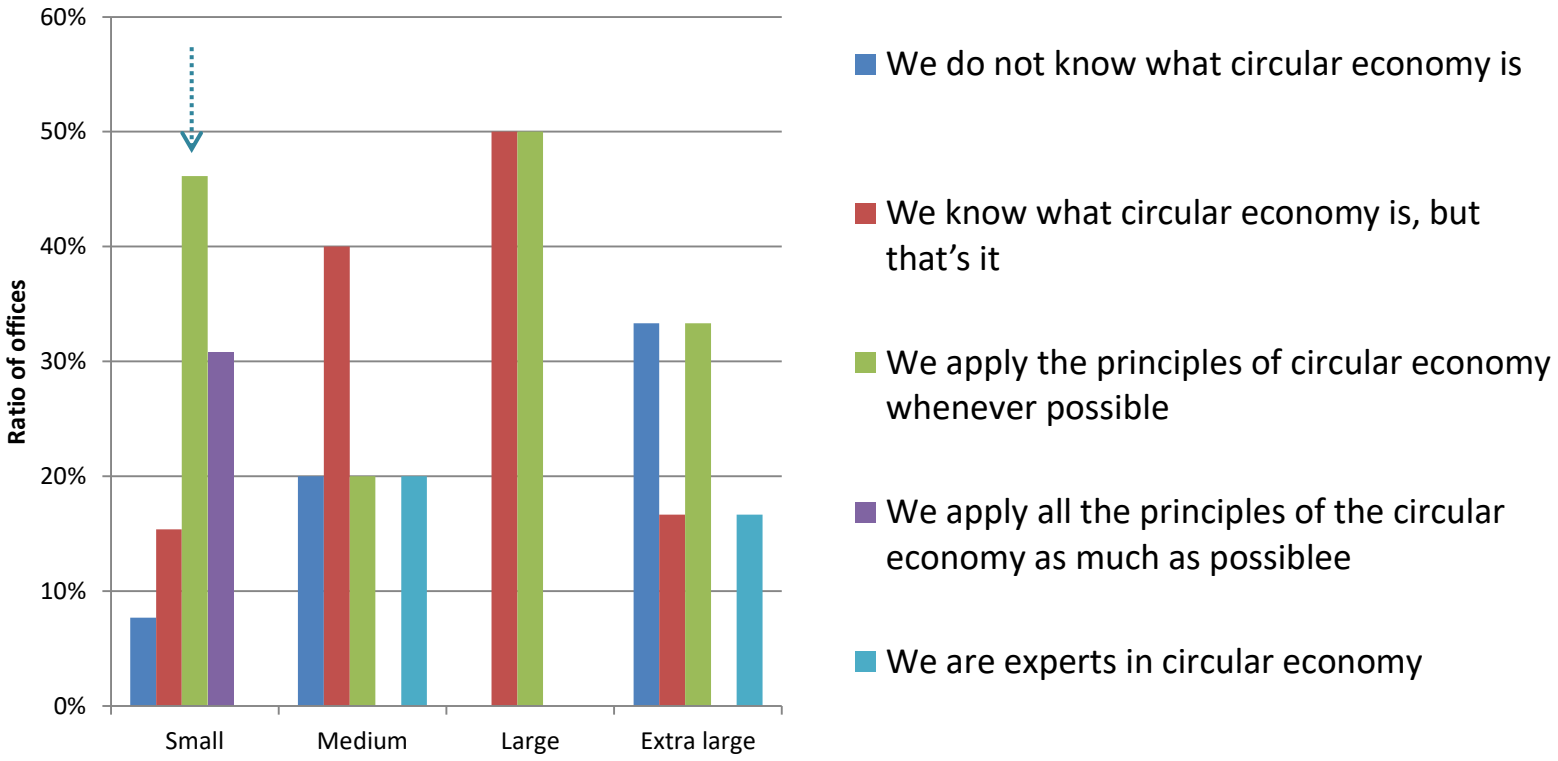
4% Neither BIM, nor reuse enthusiasts
27% Only a supporter of reuse
31% Only BIM enthusiast
23% Adherent to both practices but do not combine them on the same project
15% Adherent to both practices and combining them on the same project

- Size and location of offices



Circular economy

- Knowledge and application of CE principles based on office **size**



Circular economy

- Main reasons for using reuse materials (order of importance)

Environmental

Economical

Aesthetical

Client

Certification

Circular economy

- *« The lack of knowledge and information on reused building materials is the greatest constraint to reuse. »*

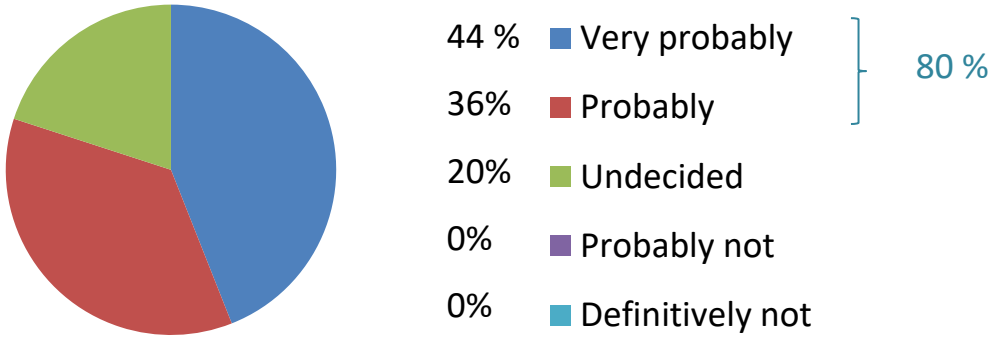
Circular economy

- Brakes and solutions for reuse

Brakes on reuse	Possible solutions
Lack of interest	Positive advertising
Lack of information	Quality and performance standards
Lack of visibility	Complete courses on the issue of re-use
Price	Taxes and subsidies

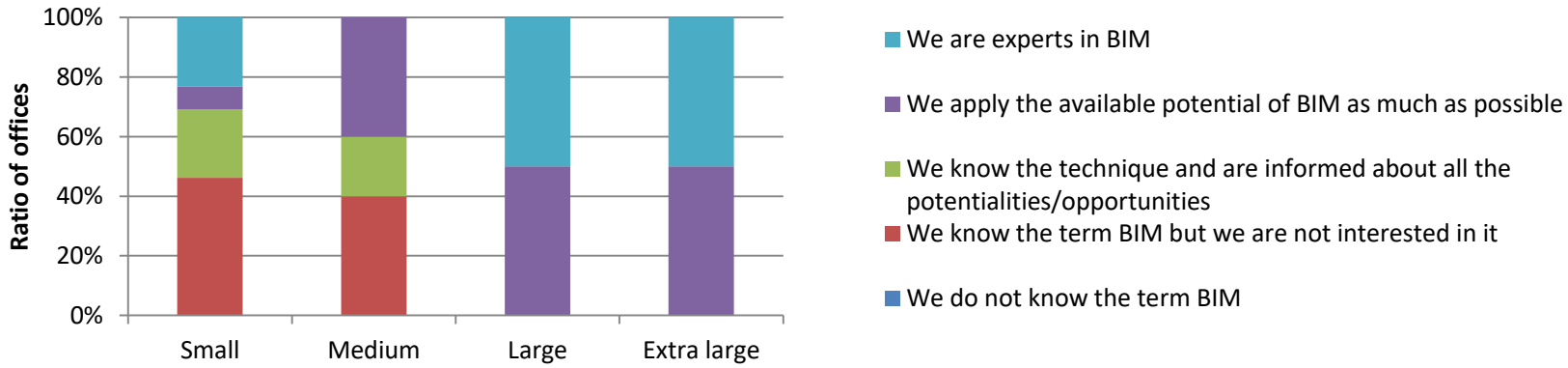
Circular economy

- Probability of using reuse materials if there were more incentives or tools in place

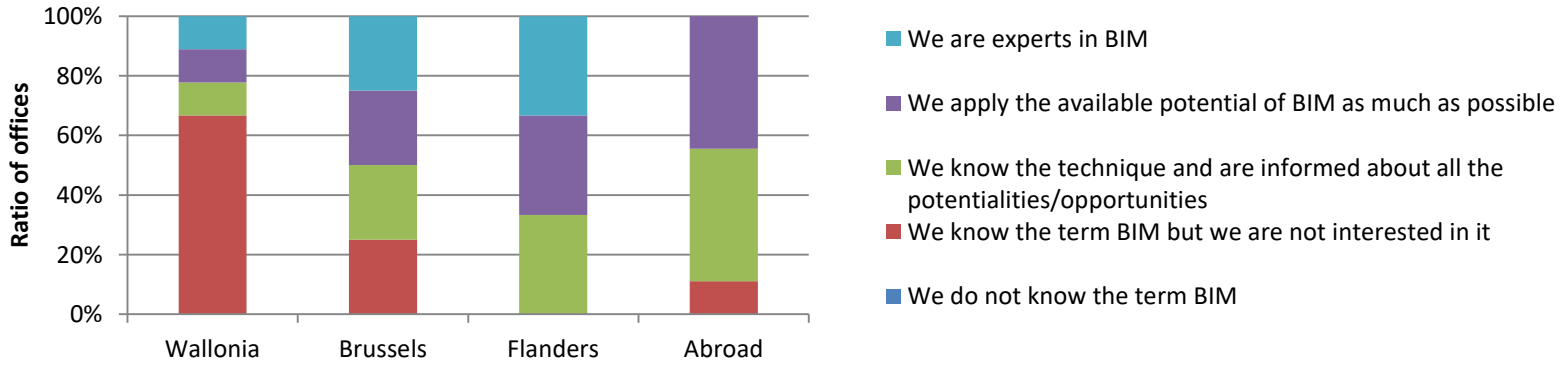


BIM

- BIM knowledge according to office **size**

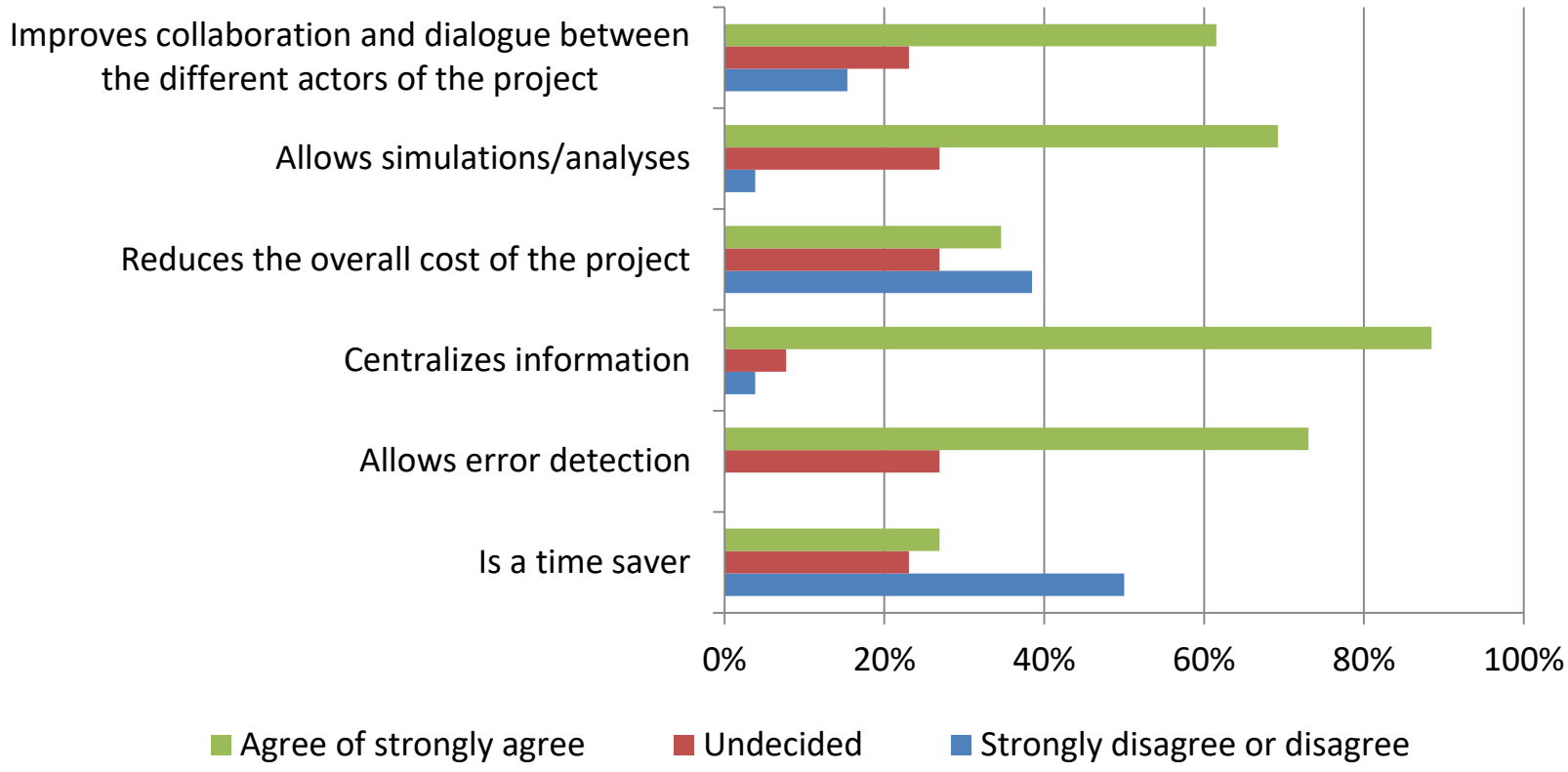


- BIM knowledge according to office **location**



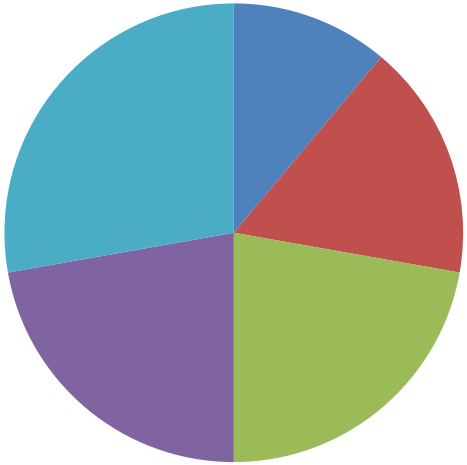
BIM

- Advantages and disadvantages of BIM



BIM

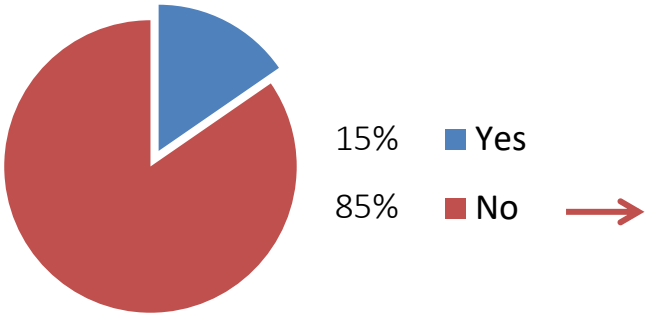
- Architects' willingness to share information with project partners (contractors, engineers, subcontractors, specialists, manufacturers, etc.)



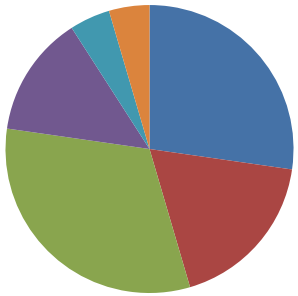
11%	We never share
17%	We are very careful when sharing information
22%	We only share information when requested to do so
22%	We share the information with a proactive vision
28%	Sharing is multiplying so that transparency benefits the project

CE + BIM combination

- Offices that have tried to integrate information about recovered materials into a BIM model

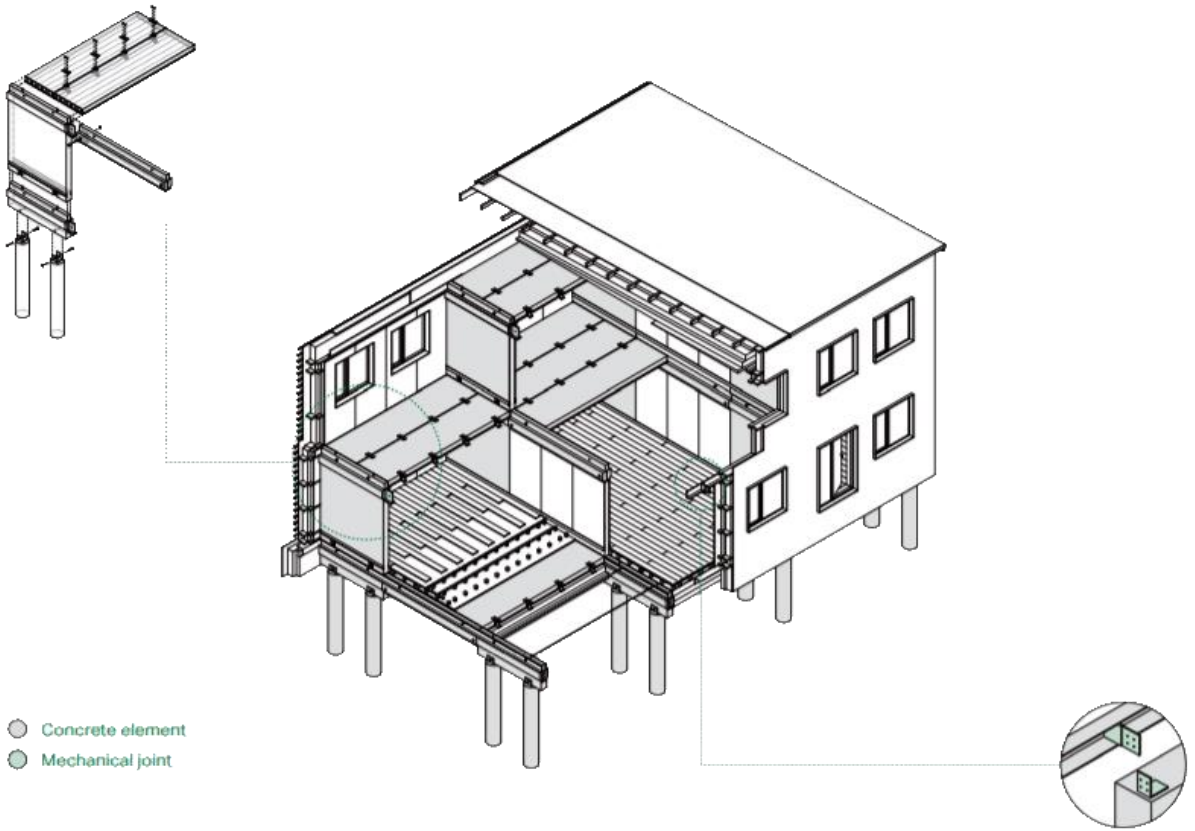


15% Yes
85% No



21 % We do not use BIM
22 % The digitization work is too tedious
25 % We don't know how to do it
11 % We are in need of time
4 % We are in need of resources
21 % We consider the digitization work unnecessary

CE + BIM interviews



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Interview methodology

Architects	▶ EC+ BIM according to the online survey
Type of interview	▶ Semi-directive
Type of questions	▶ Open questions
Duration	▶ ± 1 hour
Sections	▶ Information about the architectural office ▶ General use of BIM & EC ▶ Analysis of one or two projects ▶ Global questions

Studied projects

Project	Type	Selective deconstruction	Reuse	DfD
Home extension	Renovation	*	*	Yes
Alleray	Renovation	Yes	*	Yes
Dethy	Renovation	Yes	Yes	No
City hall	Renovation	Yes	Yes	Yes
PIT lab	New	N.A.	Yes	Yes
Circle house	New	N.A.	Yes	Yes

*question not addressed during the interview

Home extension

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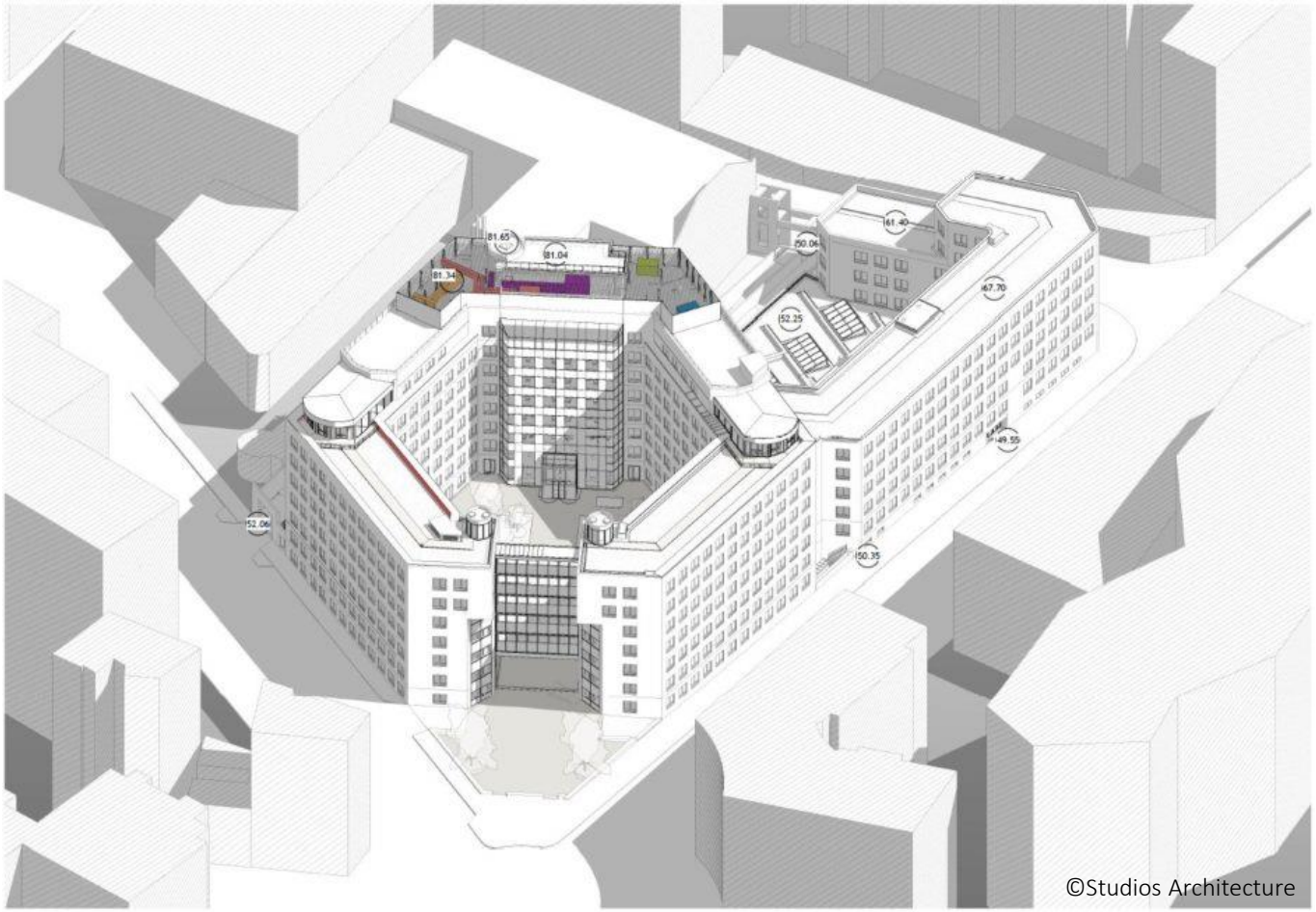
Alleray



Alleray

Alleray

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Dethy

Dethy

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Eindhoven City Hall

DOOR ARCHITECTEN

Eindhoven City Hall

DOOR ARCHITECTEN

What are the reasons that led you to consider the use of BIM/DfD in this project?

"We used BIM because we wanted to work constructively with the different project partners. Thanks to the high level of cooperation, many errors were discovered during the design phase."

(Terry Pater)

rudy uytenhaak partners architecten

Ballast Nedam Zuid

DWA

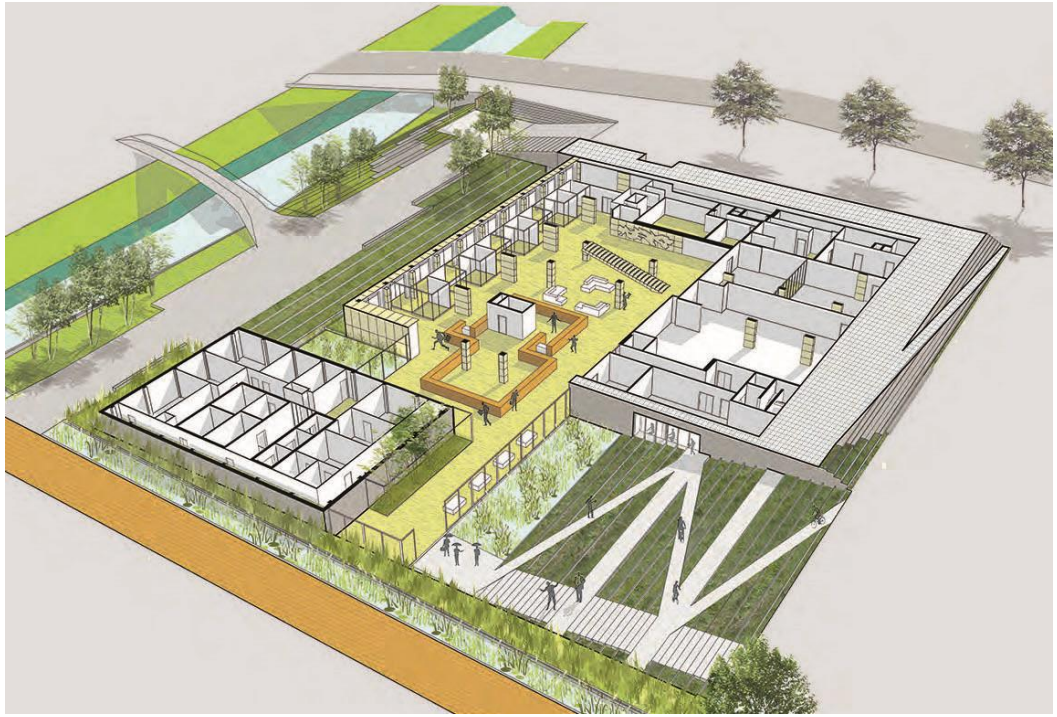
BRINK GROEP

Kuijpers

Eindhoven City Hall

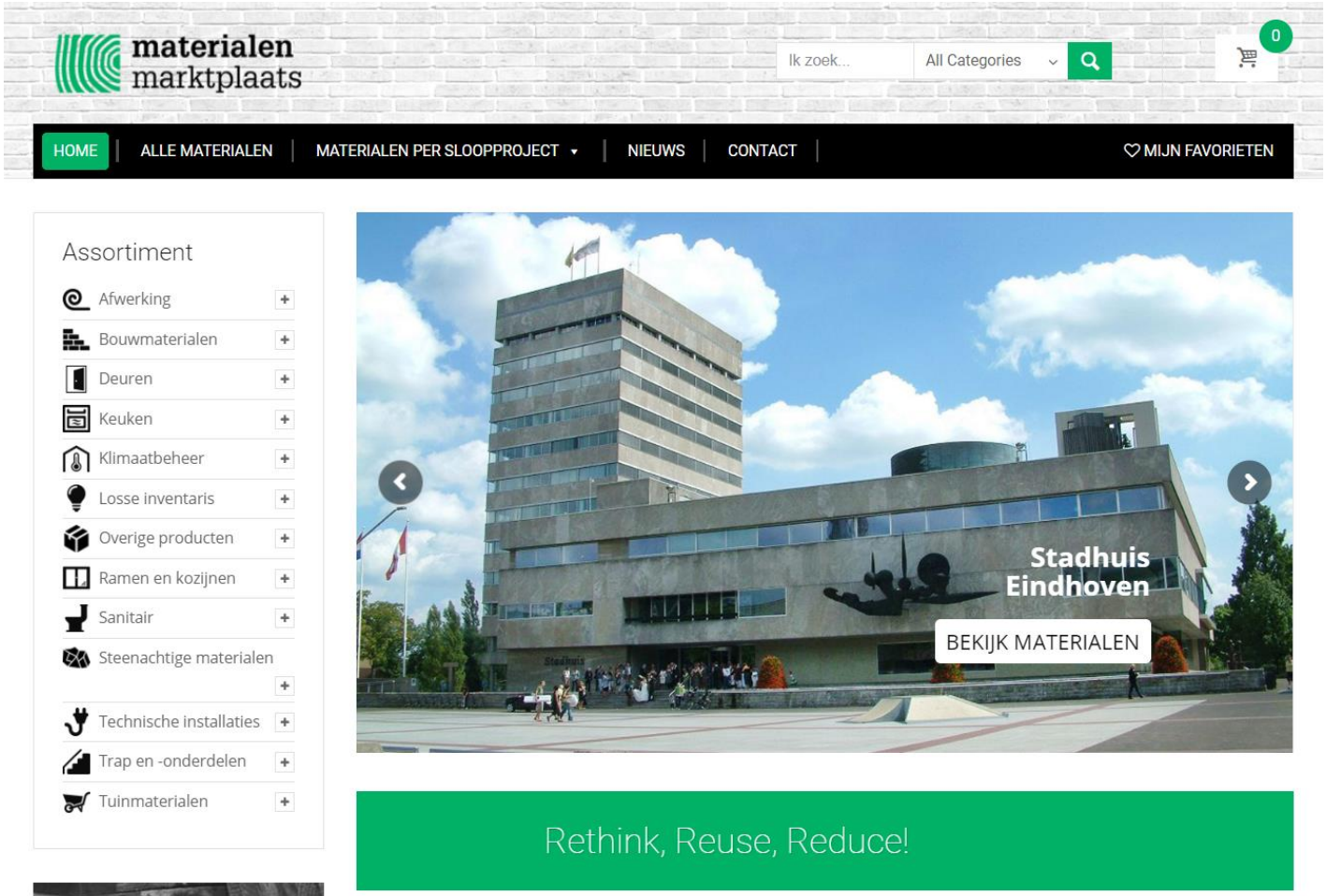
DOOR ARCHITECTEN

At what stage of the project did BIM help you in relation to the traditional working method?



"BIM allows us to facilitate the production of documents and get a good overview of connections."
(Terry Pater)

Eindhoven City Hall



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PITlab

PITlab

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Circle House

Circle House

Conclusions of interviews

BIM + CE avantages

- Improves collaboration between stakeholders
- Better knowledge of the building (inventory)
- Database (material characteristics)

Types of projects

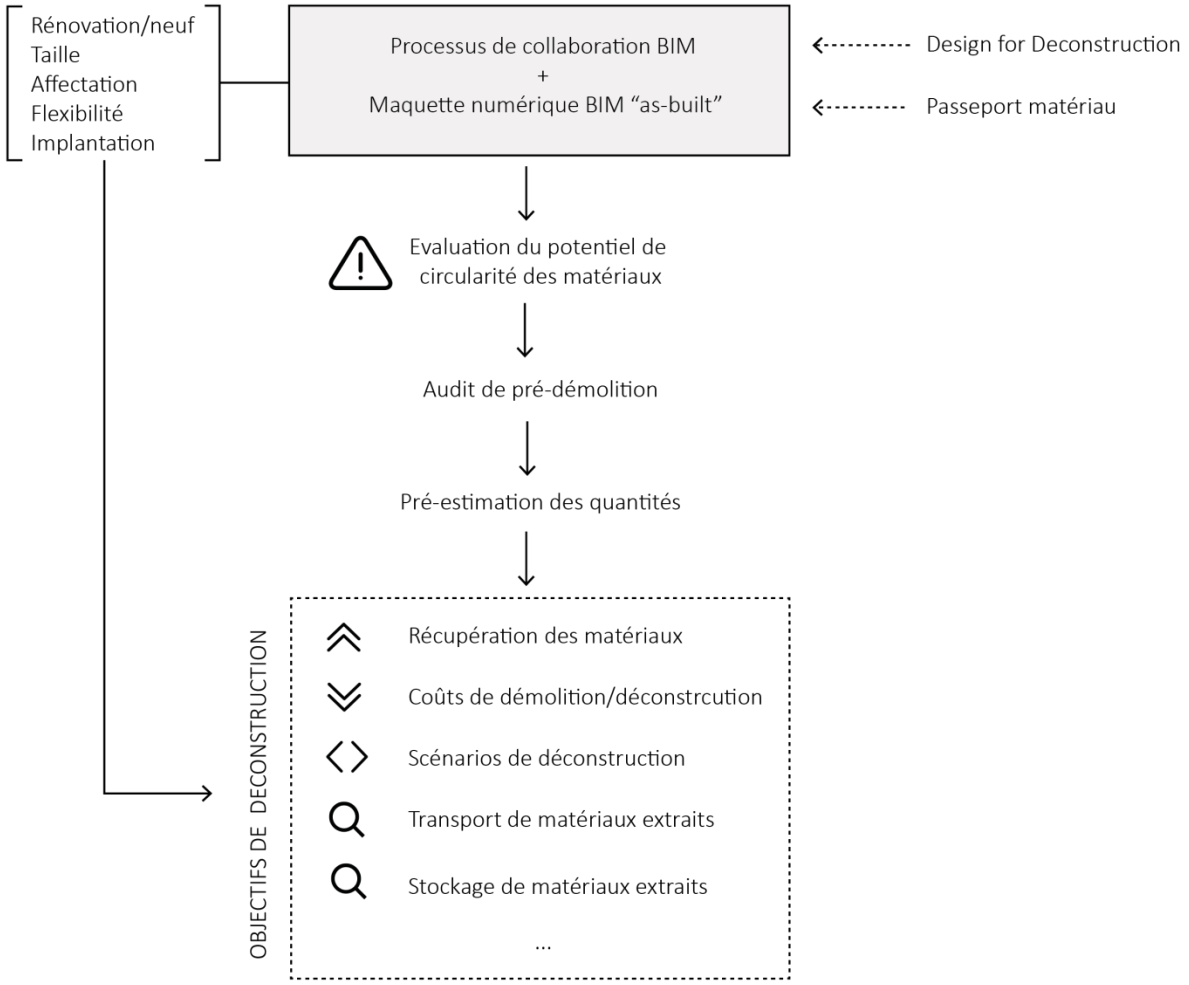
- Size
- Dlexibility

Wishes in relation to BIM modeling softwares

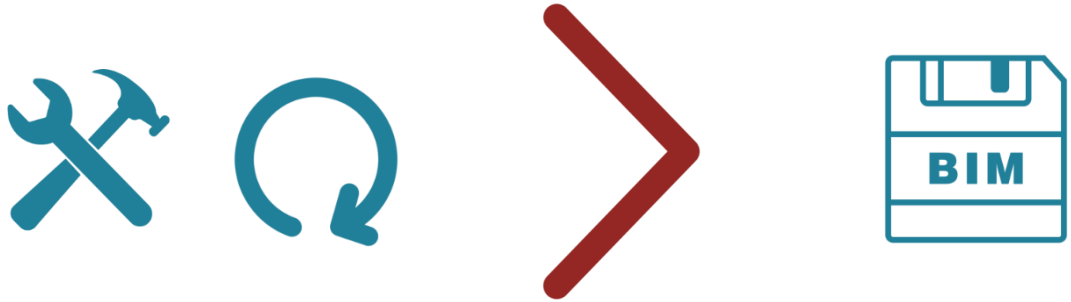
- Ultimate software (compatibility issues)
- DfD from the design stage
- Planning and visualization of the deconstruction

Conclusions

The BIM as a decision-making tool between demolition or deconstruction



General conclusion



Thank you!