

Interreg North-West Europe DigitalDeConstruction

WPT1 SYSTEM DEVELOPMENT

Deliverable DT1.1.3

Report on the analysis of end-user

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1. SUMMARY

This report gives an overview of the results of the online survey that was conducted to obtain a view on the end-user needs.

2. INTRODUCTION

This report is part of the Activity 1 of the Workpackage 1 of the project *DigitalDeConstruction or Advanced Digital Solutions Supporting Reuse and High-Quality Recycling of Building Materials*. DigitalDeConstruction aims to develop an innovative digital decision support system, integrating various digital tools (3D scanning, Building Information Modelling, a digital materials & buildings database, blockchain technology) that helps to define the most sustainable and economical deconstruction and reuse strategy for buildings.

WP.T1 contributes to the 1st sub-objective: to develop the DDC system through integrating various digital tools. Activity 1 consist in the development of the concepts of the systems and technical specifications of system components.

This report gives an overview of the results of the online survey that was conducted, which had multiple purposes:

- Informing the stakeholders on the existence of the DDC-project
- Identifying current stakeholders and end-user needs in terms of demolition, reuse, recycling, ...
- Measuring 'point zero', the current implementation rate of digital tools in this sub-sector of the construction industry
- Engaging stakeholders in the process of the DDC developments

Link to the original survey:

<https://forms.office.com/Pages/ResponsePage.aspx?id=o4yRiczhzUmRfOEo5mRKDK-Z-ptc4u9PrNC6OgmWf35UMk5GQkUwQjIYVh9MVVhHRUtBREswV1JTOS4u>

3. RESPONSE RATE

3.1 Distribution of received answers

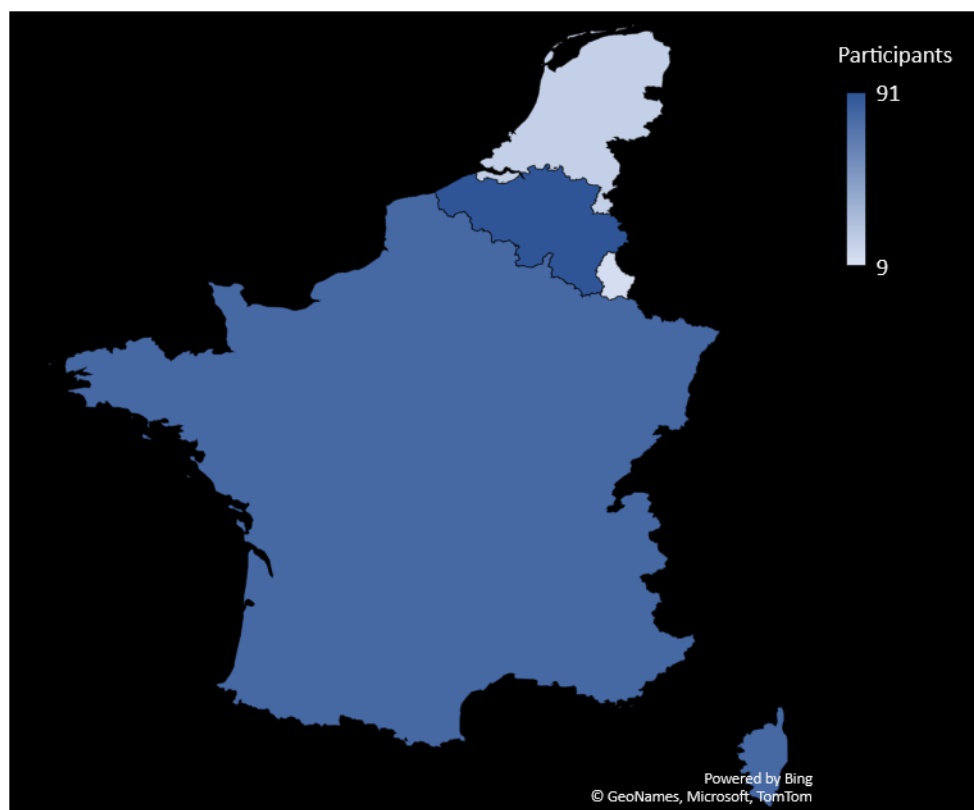
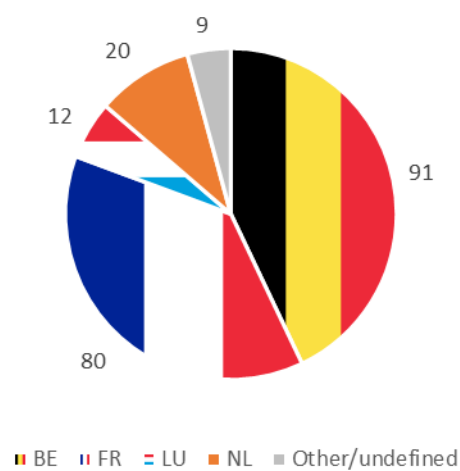
The survey was launched in the beginning of June 2020 and distributed via various mailing lists, social media, direct contacts, ... of the DDC-partners. The survey was available in 3 languages: Dutch, French & English.

A total of 212 answers has been received at the moment of writing.

3.1.1 Per country

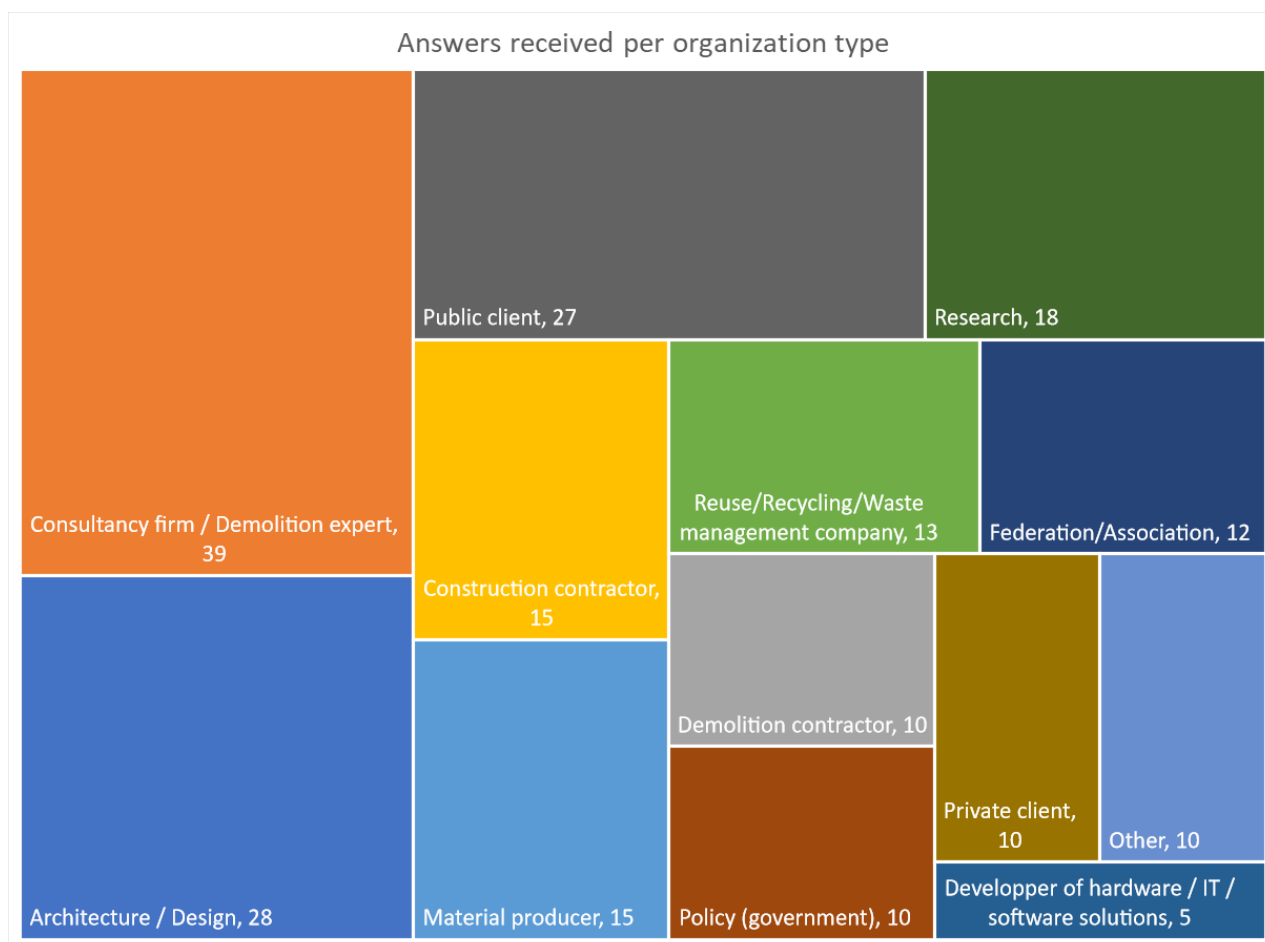
Respondents mainly are based in Belgium & France.

Answers received per country



3.1.2 Per organization type

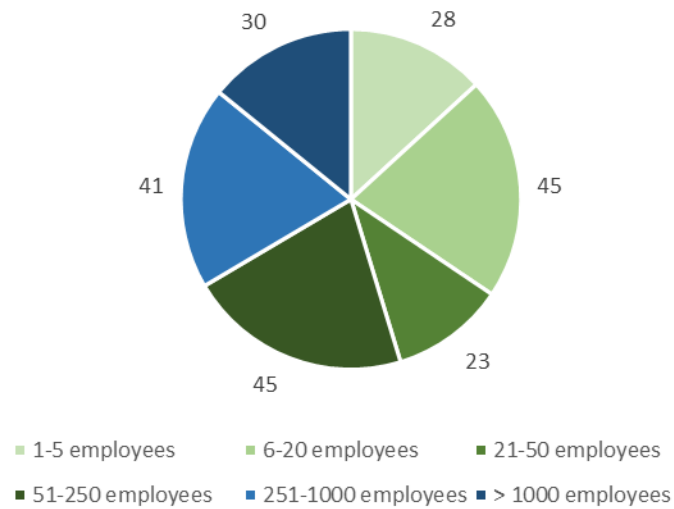
Considering the type of organisation, it is clear that many different types of organisations have answered the survey. Only the category 'platforms of materials' is not represented.



3.1.3 Per organization size

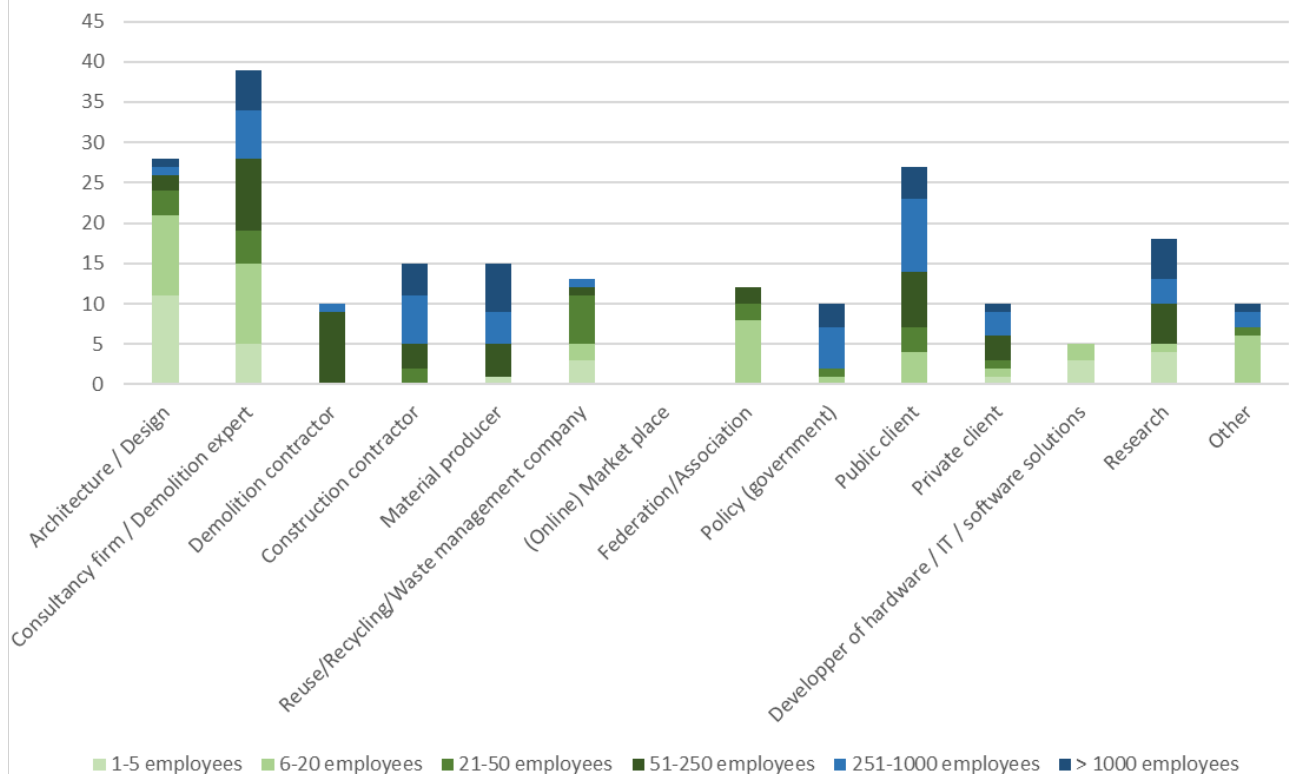
The survey was answered by very small, medium and large organisations, so a good spread in the field.

Organization size



Hereunder, the information on organisation type and organisation size are shown. The architects, demolition contractors, reuse/recycling companies are mainly small and medium, whereas the consultancy firms, construction contractors, material producers and (public) clients & governments are more 'larger' organisations.

Organization size

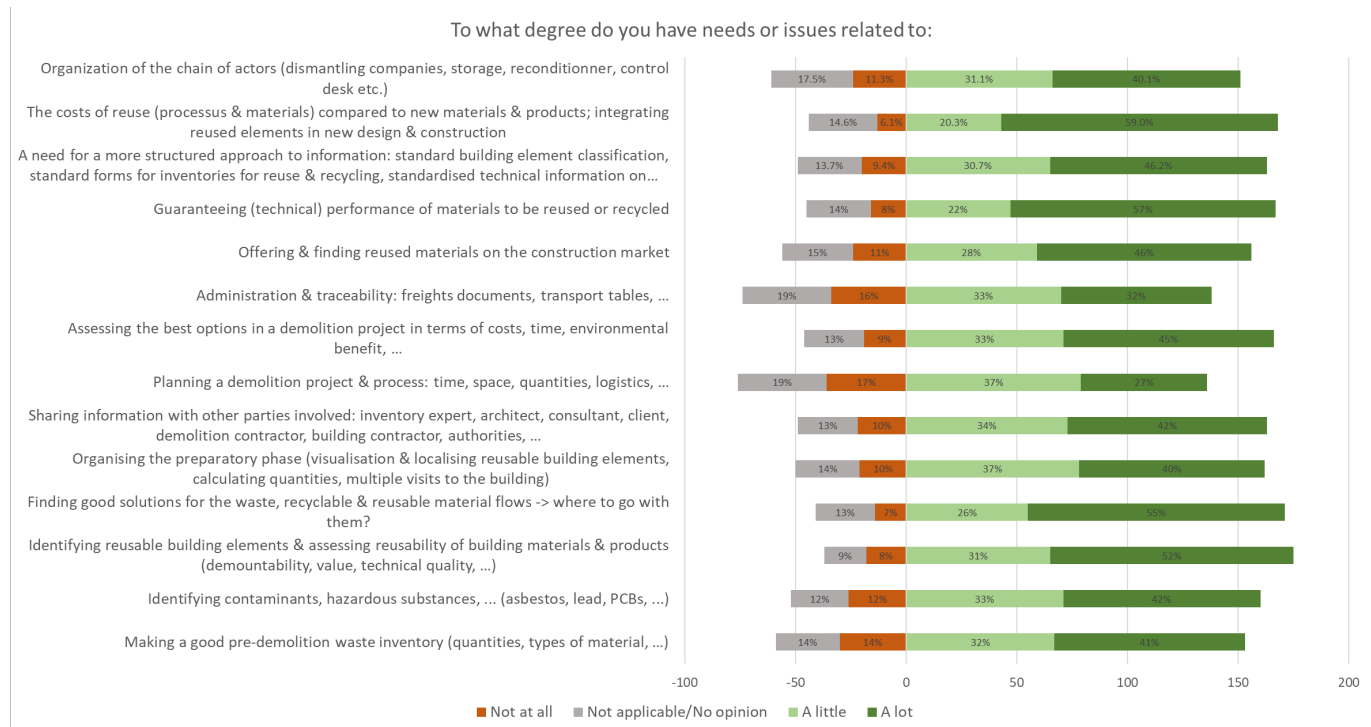


4. IDENTIFICATION OF NEEDS AND ISSUES

4.1 Overall view

The first question considered the topics which may be concern or provoke needs today in practice.

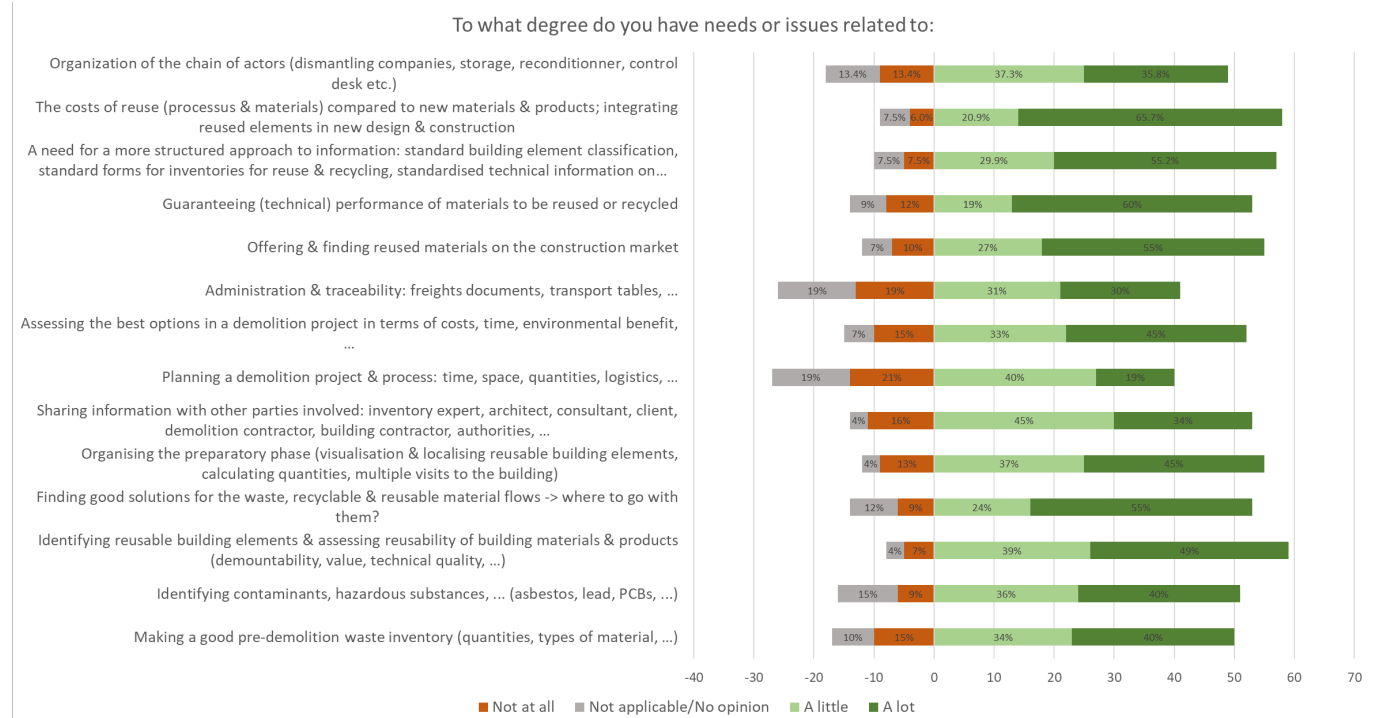
When looking at the overall result for the identification of needs and issues, it can be seen that 60 to 80 % of the answers indicate that there are needs. The domains that have somewhat lower indicated needs are 'Administration and traceability' and 'Planning a demolition project'.



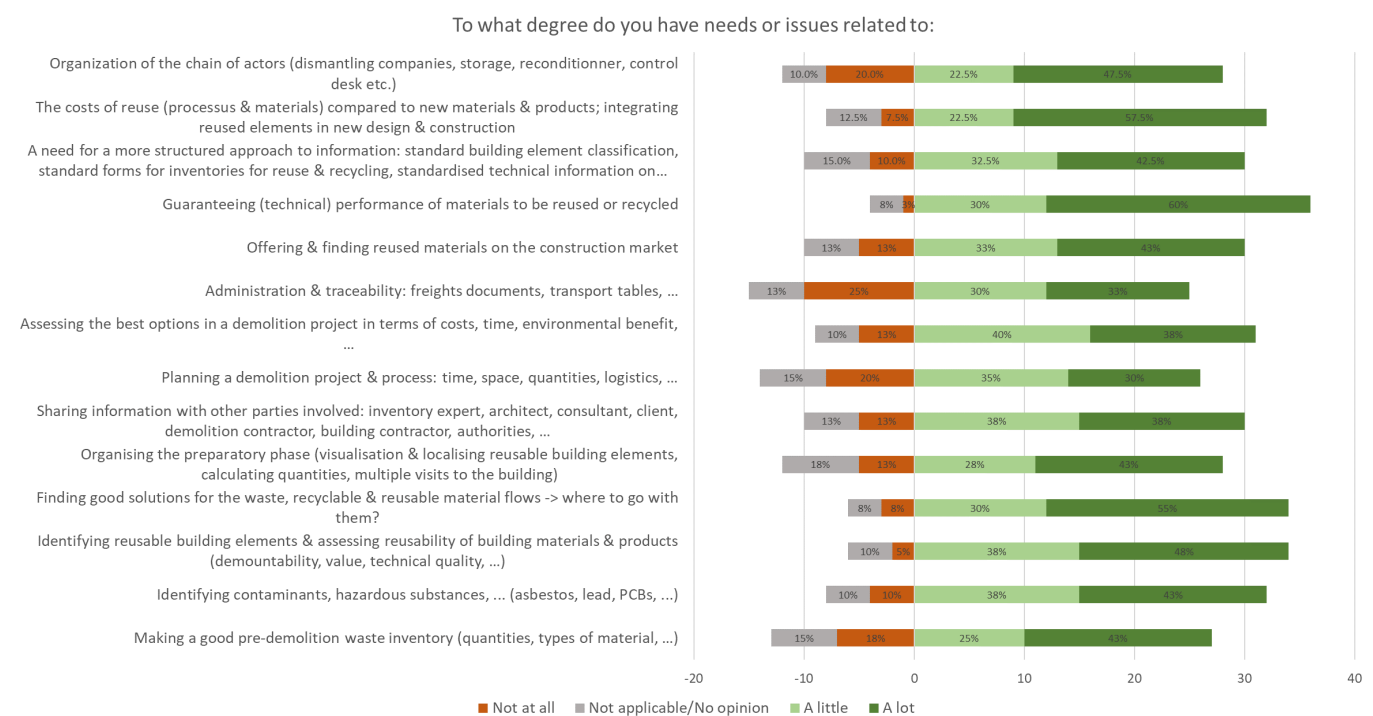
4.2 Per organization type

When zooming in on different organization types, the needs are still high, and more difference between the different types of needs can be observed.

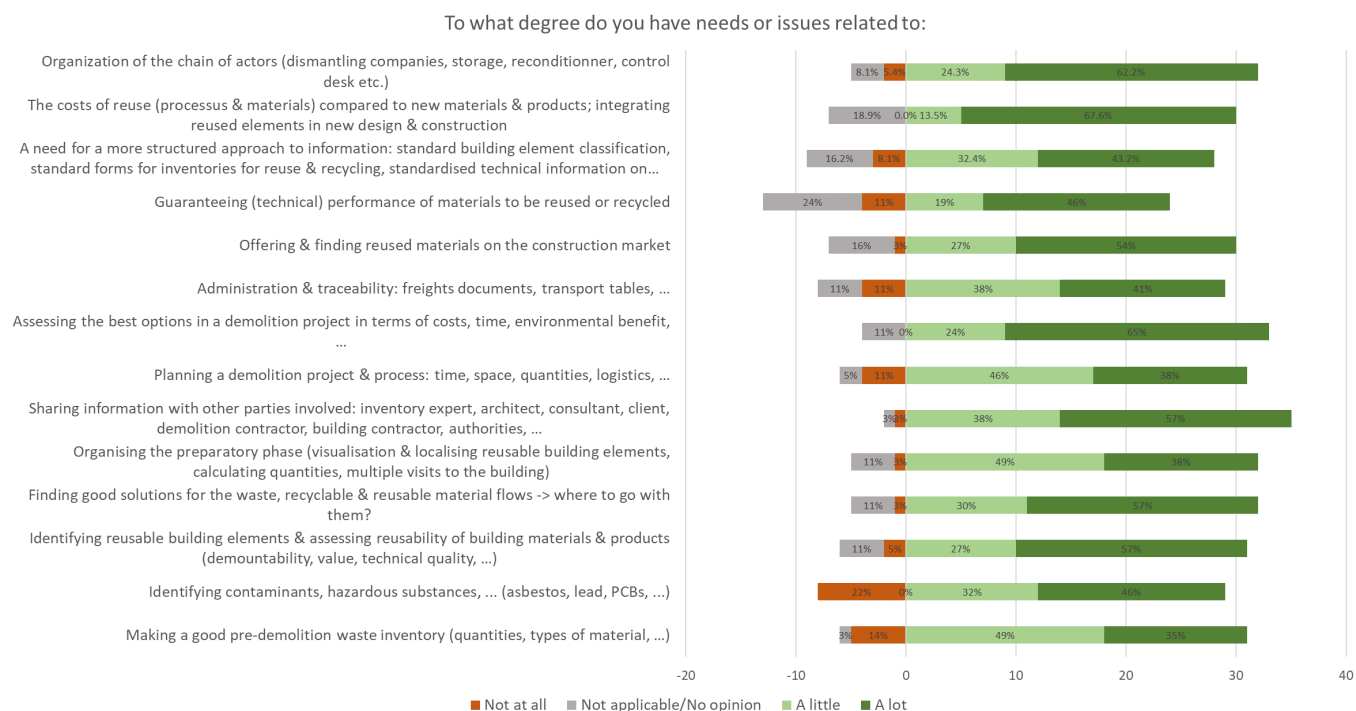
Design phase: 'Architecture / Design' and 'Consultancy firm / Demolition expert'



Construction phase: 'Construction contractor', 'Demolition contractor' and 'Material producer'



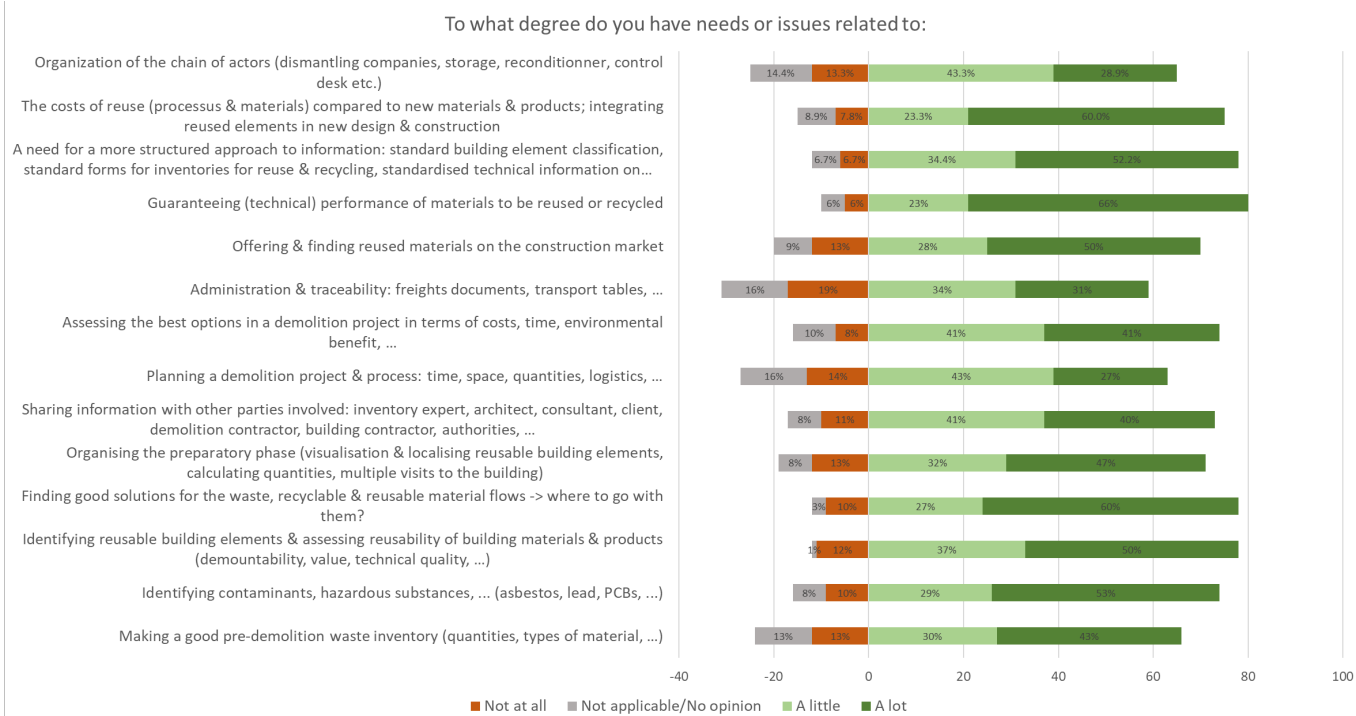
Clients: 'Private client' and 'Public client'



4.3 Per country

When comparing the results between Belgium and France, it can be seen that the need for 'Planning' is somewhat lower in France.

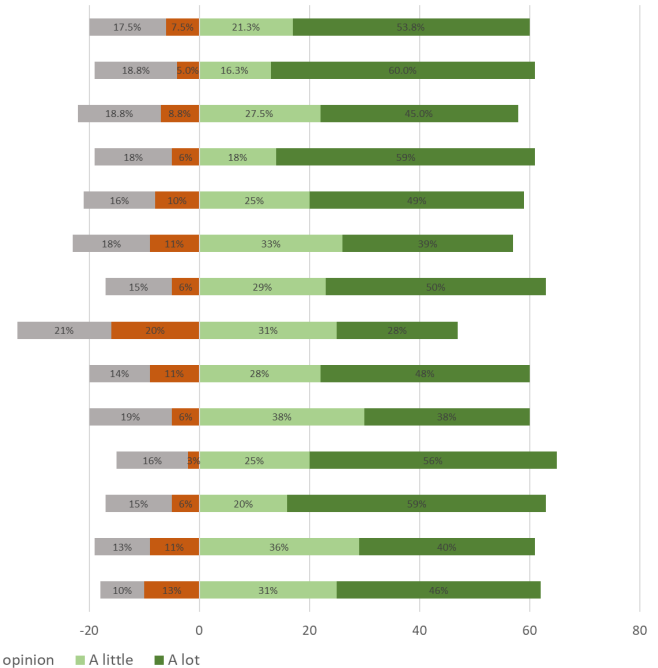
Belgium



France

To what degree do you have needs or issues related to:

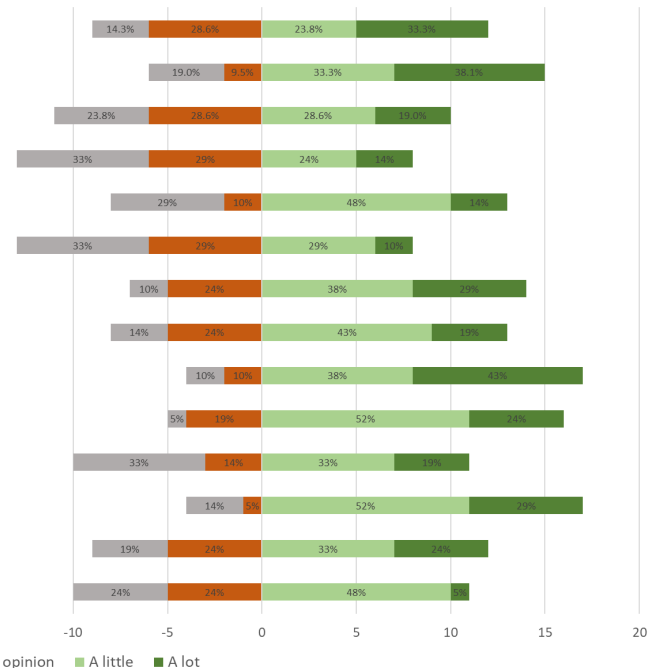
- Organization of the chain of actors (dismantling companies, storage, reconditionner, control desk etc.)
- The costs of reuse (processus & materials) compared to new materials & products; integrating reused elements in new design & construction
- A need for a more structured approach to information: standard building element classification, standard forms for inventories for reuse & recycling, standardised technical information on...
- Guaranteeing (technical) performance of materials to be reused or recycled
- Offering & finding reused materials on the construction market
- Administration & traceability: freights documents, transport tables, ...
- Assessing the best options in a demolition project in terms of costs, time, environmental benefit, ...
- Planning a demolition project & process: time, space, quantities, logistics, ...
- Sharing information with other parties involved: inventory expert, architect, consultant, client, demolition contractor, building contractor, authorities, ...
- Organising the preparatory phase (visualisation & localising reusable building elements, calculating quantities, multiple visits to the building)
- Finding good solutions for the waste, recyclable & reusable material flows -> where to go with them?
- Identifying reusable building elements & assessing reusability of building materials & products (demountability, value, technical quality, ...)
- Identifying contaminants, hazardous substances, ... (asbestos, lead, PCBs, ...)
- Making a good pre-demolition waste inventory (quantities, types of material, ...)



Netherlands

To what degree do you have needs or issues related to:

- Organization of the chain of actors (dismantling companies, storage, reconditionner, control desk etc.)
- The costs of reuse (processus & materials) compared to new materials & products; integrating reused elements in new design & construction
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Luxemburg

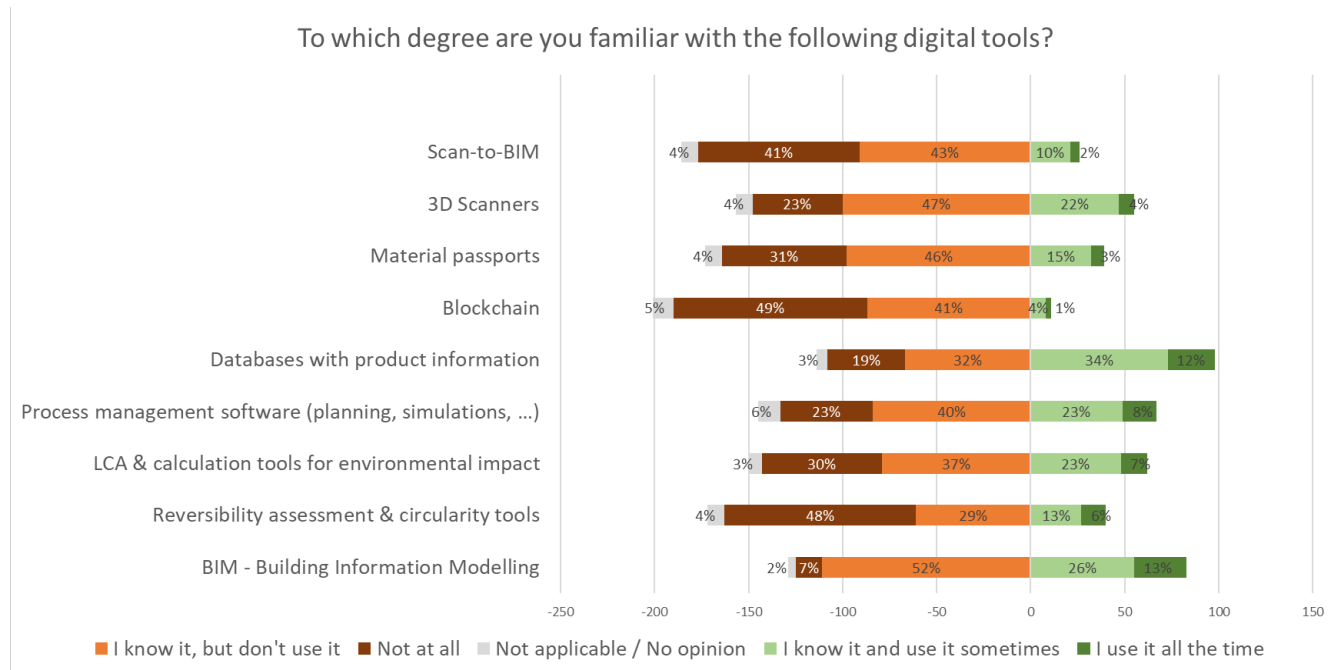
To what degree do you have needs or issues related to:



5. FAMILIARITY WITH DIGITAL TOOLS

5.1 Overall

When looking at the overall result for the familiarity with digital tools, it can be seen that only between 5 and 50% of the answers indicate that the category of tools is used sometimes or regularly. The current adoption rate for digital tools is low, especially for newer technologies such as Blockchain. It might be interesting to see if the results are still valid within 2 years, at the end of the project.



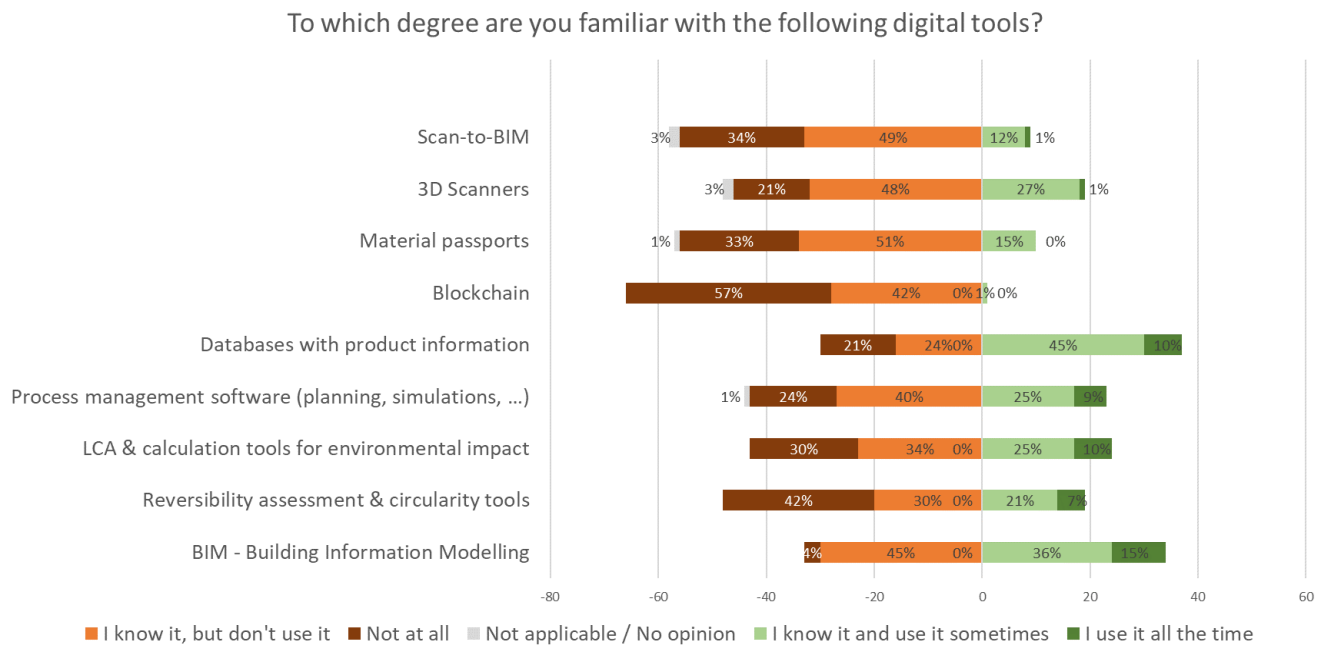
When zooming in on the organizations that indicated they use digital tools sometimes or all the time (the green bars in the graph above), it can be seen that the use of digital tools is higher in certain organization types. As an example, the BIM adoption rate in 'Architecture / Design' organizations is at 71% while the answers of the demolition contractors and waste management organizations indicate an adoption rate of around 20%.

5.2 Per organization type

When zooming in on different organization types, more differences in digital tools adoption rate can be observed.

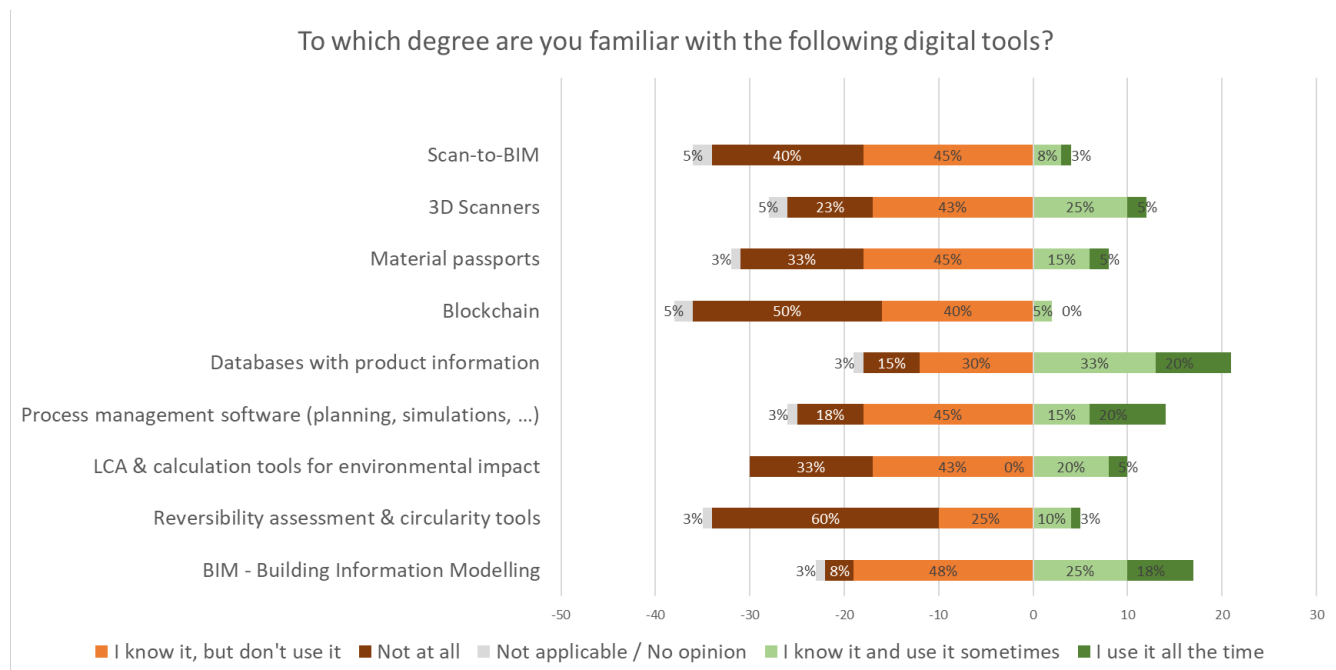
Design phase: 'Architecture / Design' and 'Consultancy firm / Demolition expert'

For these types of organizations, it can be seen that the adoption rate for the different types of digital tools is higher than the overall average, except for 'Material passports' and 'Blockchain' tools.



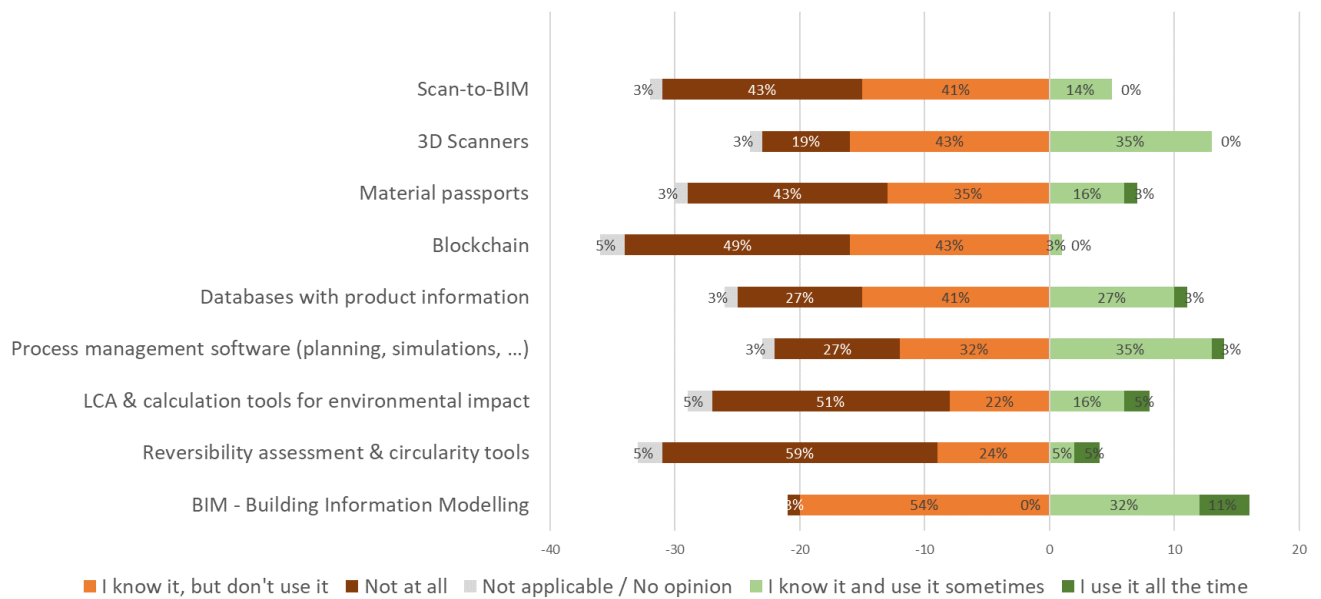
Construction phase: 'Construction contractor', 'Demolition contractor' and 'Material producer'

For these types of organizations, the use of databases with product information is clearly higher than the overall average. For the other types of tools, there are no major differences with the overall average.



Clients: 'Private client' and 'Public client'

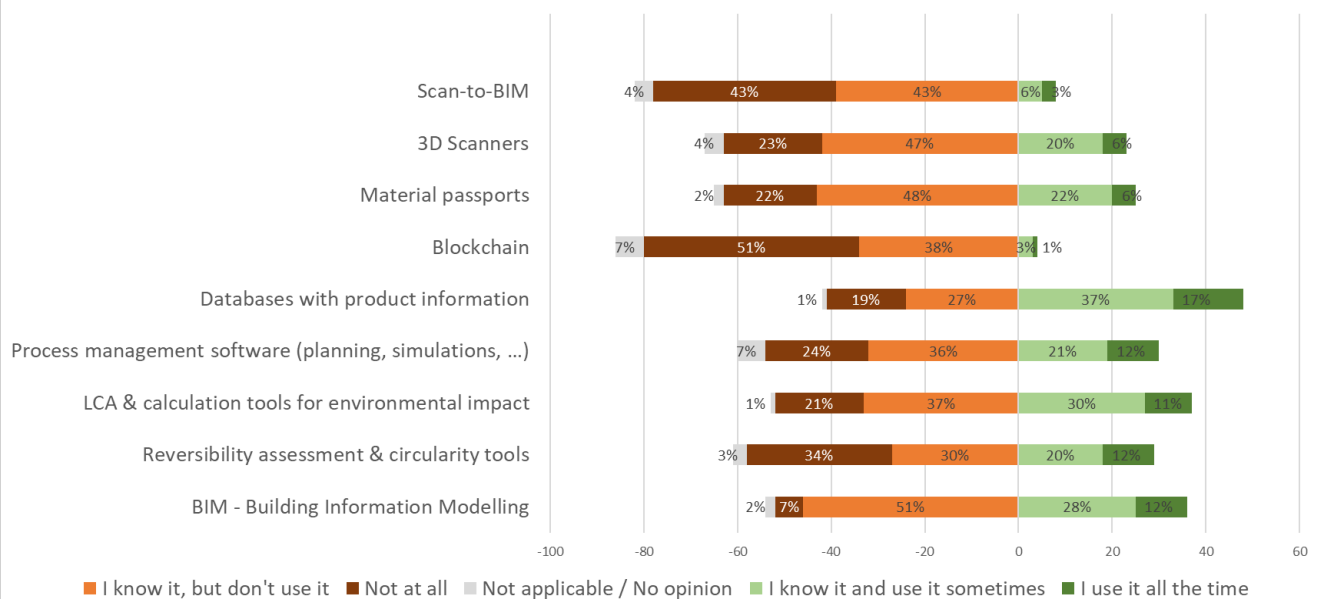
To which degree are you familiar with the following digital tools?



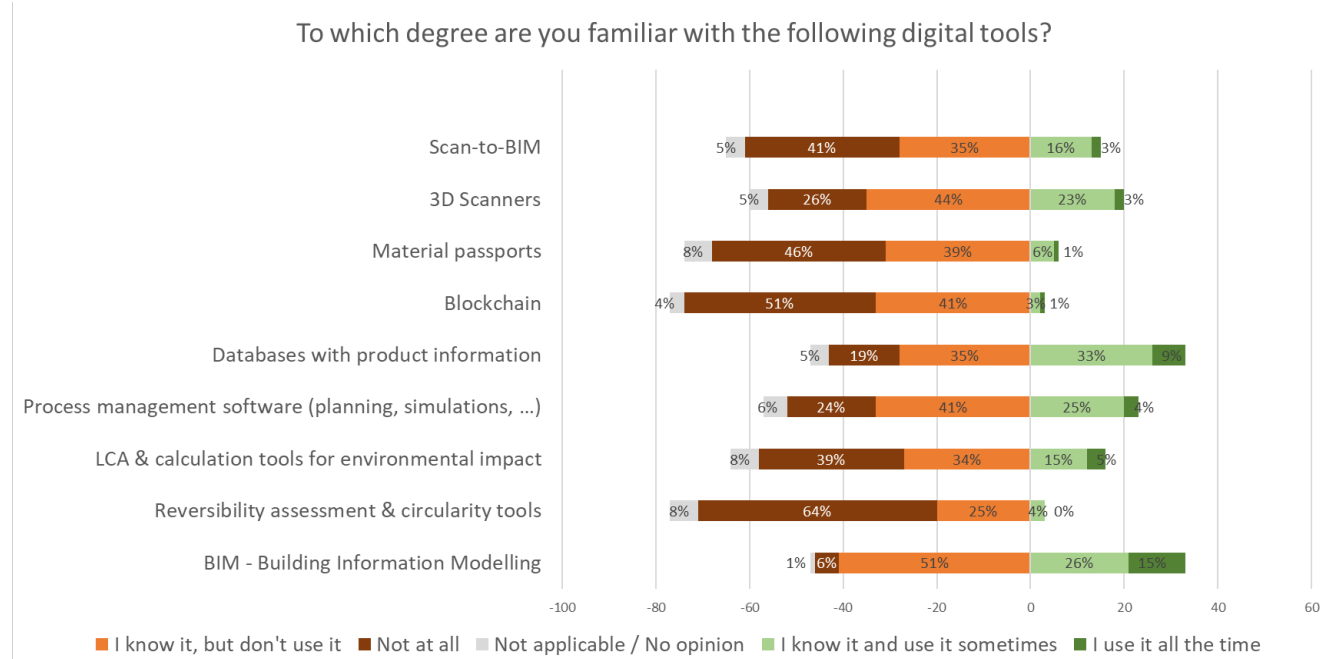
5.3 Per country

Belgium

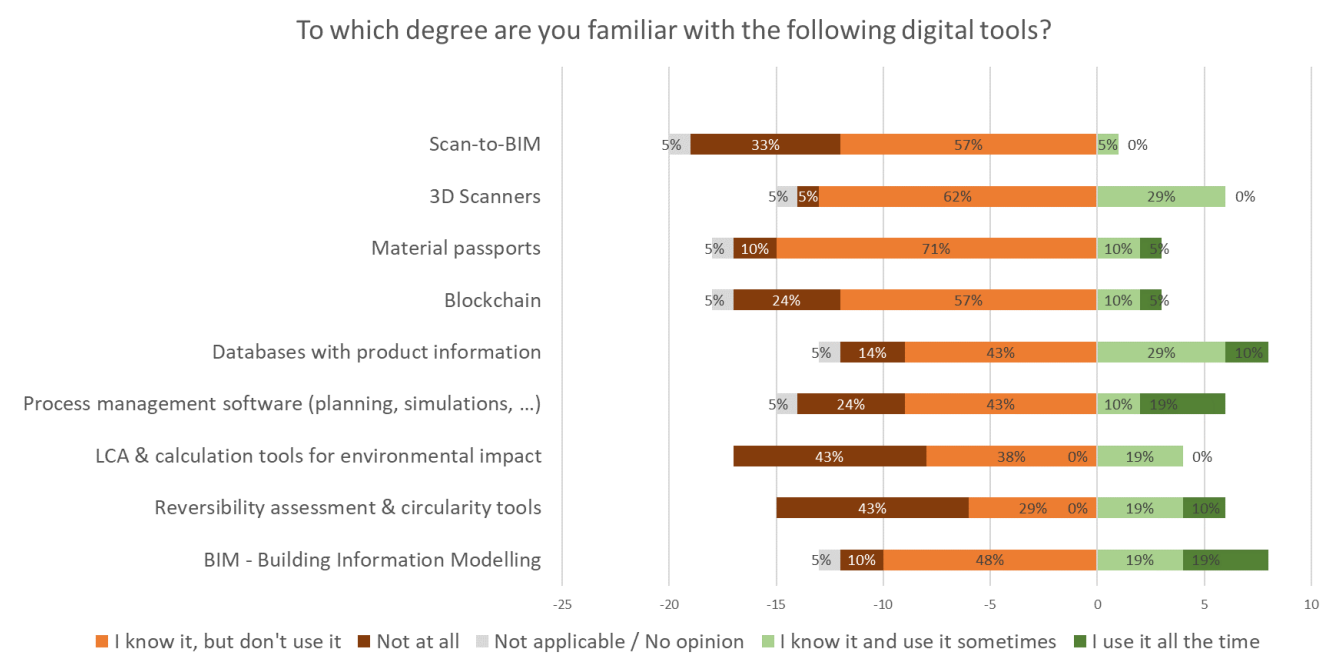
To which degree are you familiar with the following digital tools?

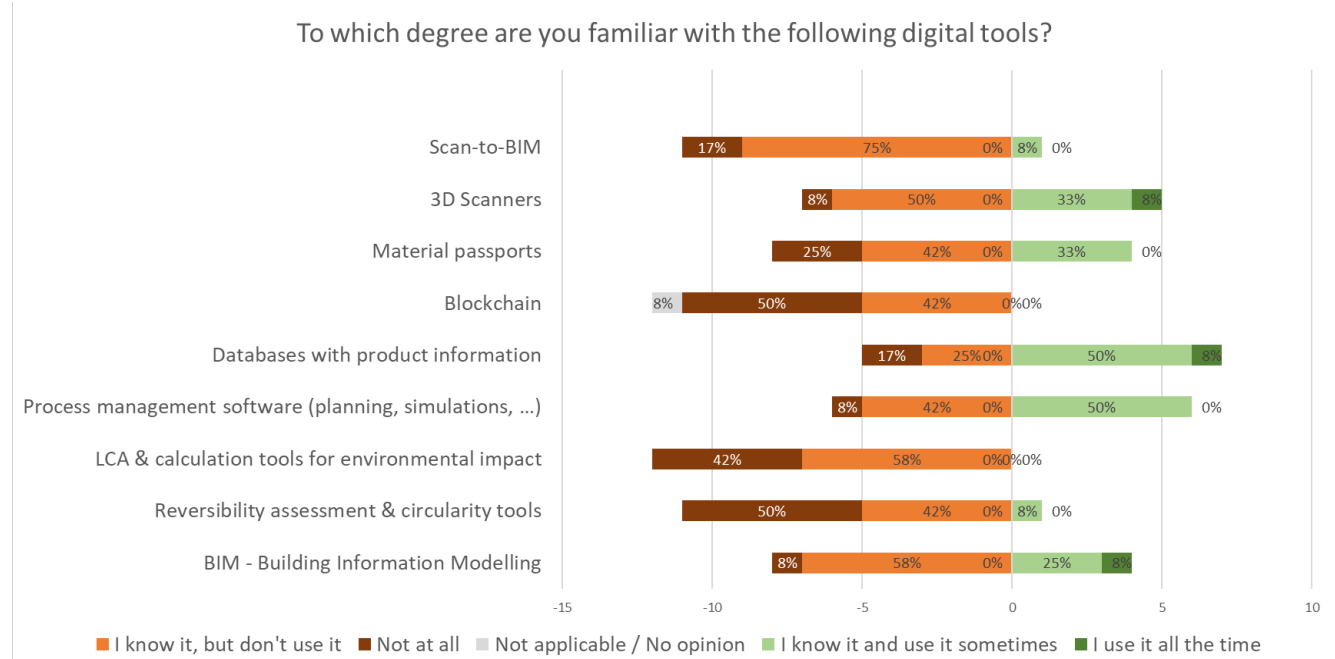


France



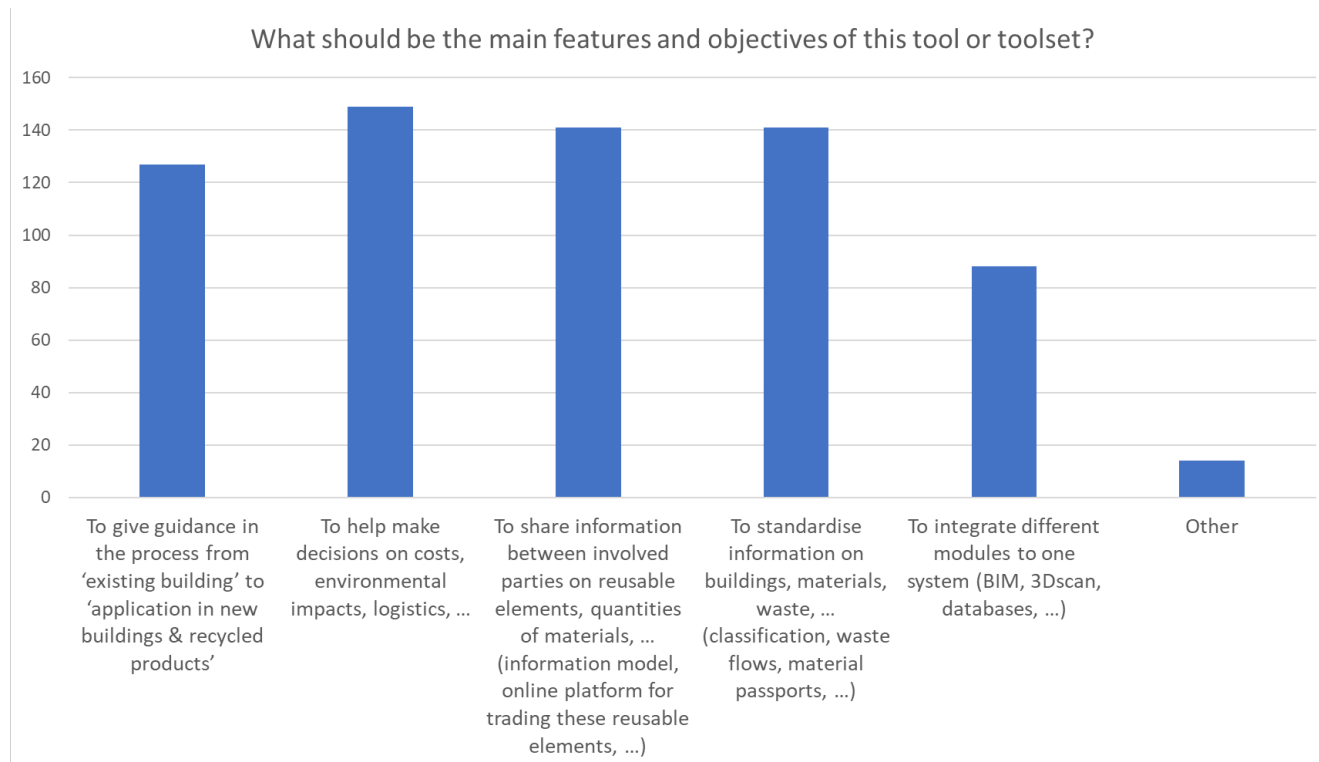
Netherlands





6 FEATURES AND OBJECTIVES FOR DIGITAL DECONSTRUCTION TOOLSET

6.1 Overall



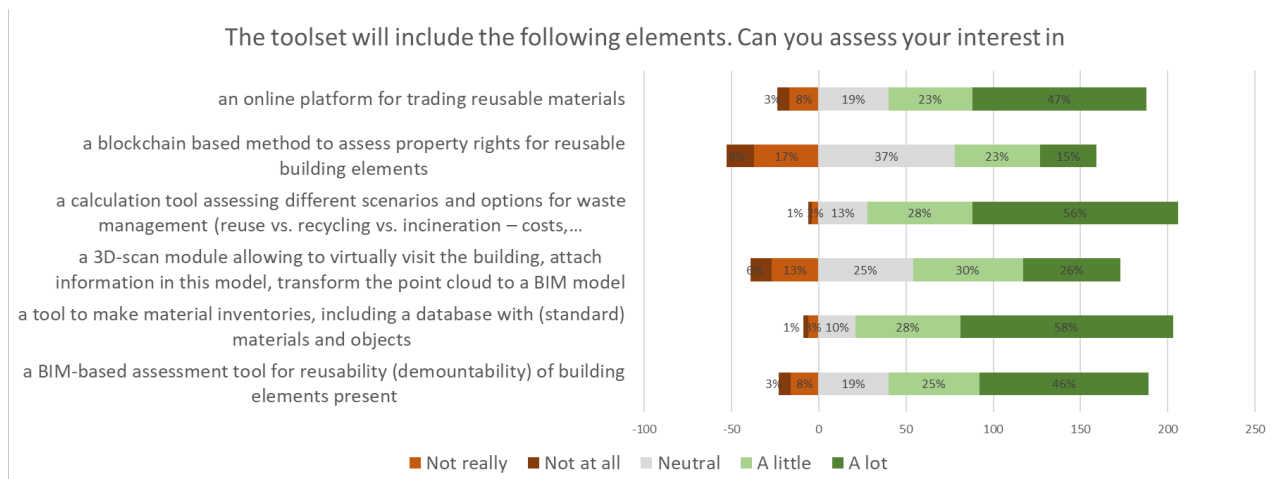
In the category 'Other', the following remarks and proposals were made:

- "Validation and transparency about validation."
- "Inventarisatation of materials and planning of deconstruction"
- "We are in an initial phase, so answers 4 and 5"
- "Facilitate the realization of material inventories on site"
- "the two first options are not realistic and in my opinion not necessary"
- "Map the needs and nearby resources."
- "Respond to regulatory and insurance constraints."
- "Access to trustworthy data on quality and quantities of materials as well as on their date of availability. Also obtain transparency on the regulatory aspects for exchanging materials. The tool should be easy to use on a the construction site!"
- "Create a database created with study/design offices that monitor the construction site."
- "helping tool outside BIM also"

6.2 Functions and elements for Digital Deconstruction toolset

6.2.1 Overall

Except for the blockchain method, the proposed functions are considered interesting by more than 50% of the participants.



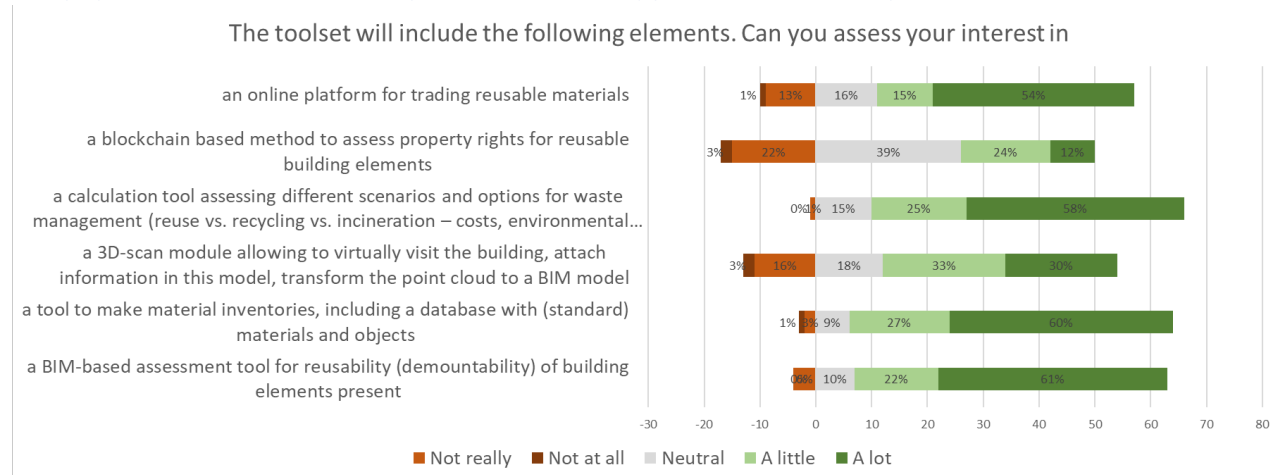
When asking for missing functions, following answers were received:

- "use of material passports for inventories"
- "online trading platform"
- "detailed analysis taking into account market circumstances"
- "trading platform also for recycling"
- "CO2 equivalent calculation, keep track of planning to reduce storage"
- "interfacing and/or collaboration with Madaster"
- "improve documentation of new buildings"
- "managing and tracking module (documents, quantities, ...) for the deconstruction site"
- "Database (matrix) of qualified companies active in re-use, recycling, etc..."
- "long-term availability of reusable materials to align with slow construction process; technical info and datasheets on reusable materials; standardized as-built documentation taking into account demolition and re-use; cost simulator"
- "Localize nearby storage/recycling facilities"
- "application for road construction"
- "direct integration/connection with BIM/digital twin"
- "non-BIM database for existing buildings that don't have BIM model; managing and tracking module for the deconstruction site; best practice examples"
- "keep complexity of the tool low; doesn't have to be comprehensive"
- "calculation of required labour time for demolition"
- "quick assessment with minimal user effort"
- "Attention to civil engineering works and pavements."
- "RAS"
- "API"
- "Train recycling centers to also sort, repair and prepare for re-use"
- "automated link between material inventory and BIM to have virtual stock of re-use materials"
- "circular design guidelines"

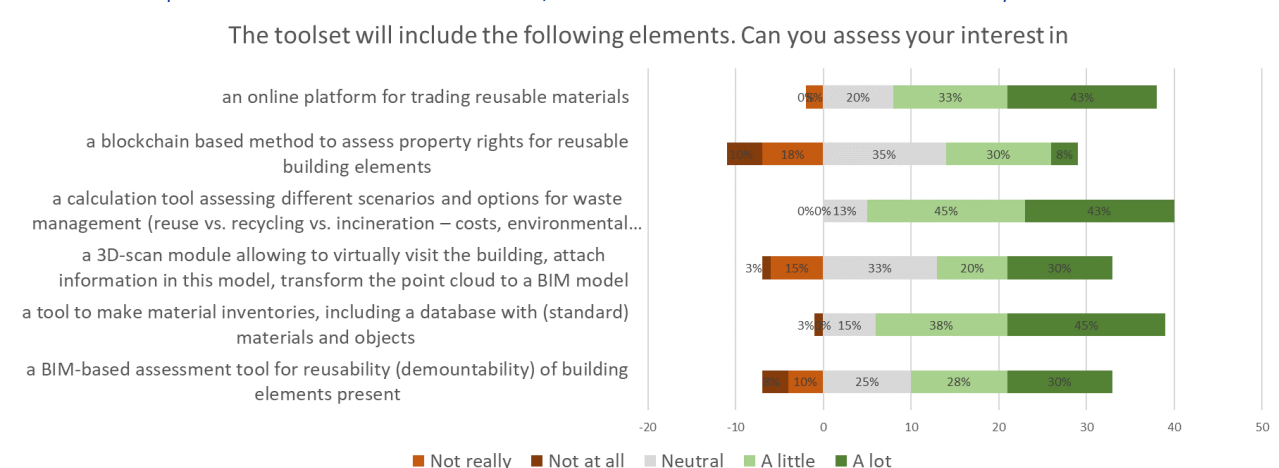
- "dynamic update of materials costs based on experiences from previous projects (e.g. taking into account that percentage of re-use materials will be damaged during deconstruction and transport, etc...)"
- "a means to identify and certify technical performance of materials to allow for regulatory compliance"
- "Guidelines on a phased process to execute safe and successful deconstruction of structural elements."
- "traceability; communication between stakeholders; accessible for all (e.g. some SME don't have BIM tools)"
- "bring together supply and demand side"
- "tool should run on tablet; easily create datasheets using photo's taken with tablet; possibility to share data with local network group (scale TBD)"

6.3 Per organization type

Design phase: 'Architecture / Design' and 'Consultancy firm / Demolition expert'

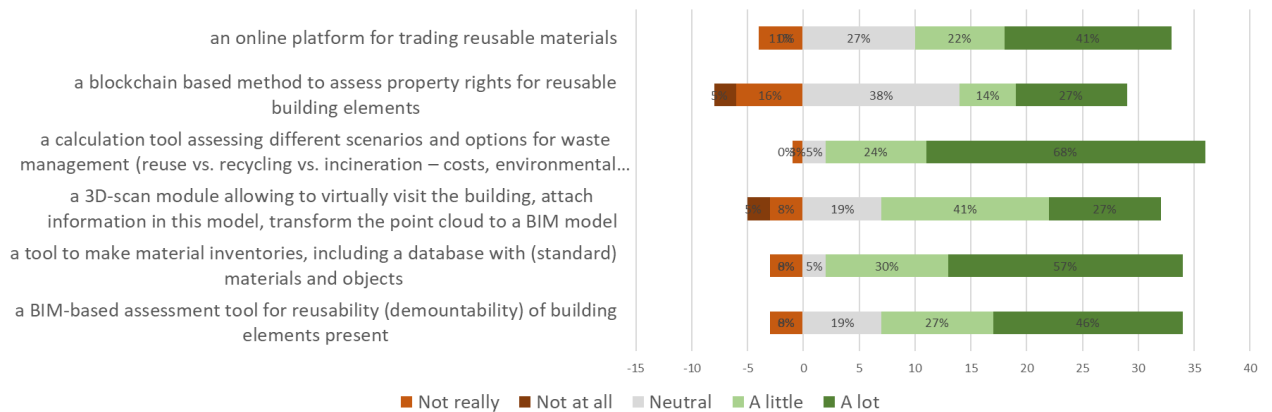


Construction phase: 'Construction contractor', 'Demolition contractor' and 'Material producer'



Clients: 'Private client' and 'Public client'

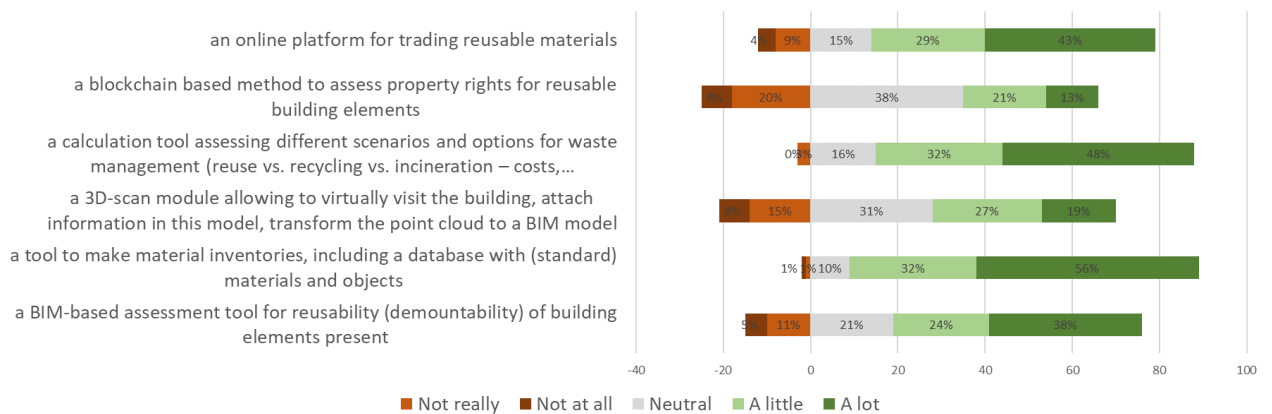
The toolset will include the following elements. Can you assess your interest in



6.4 Per country

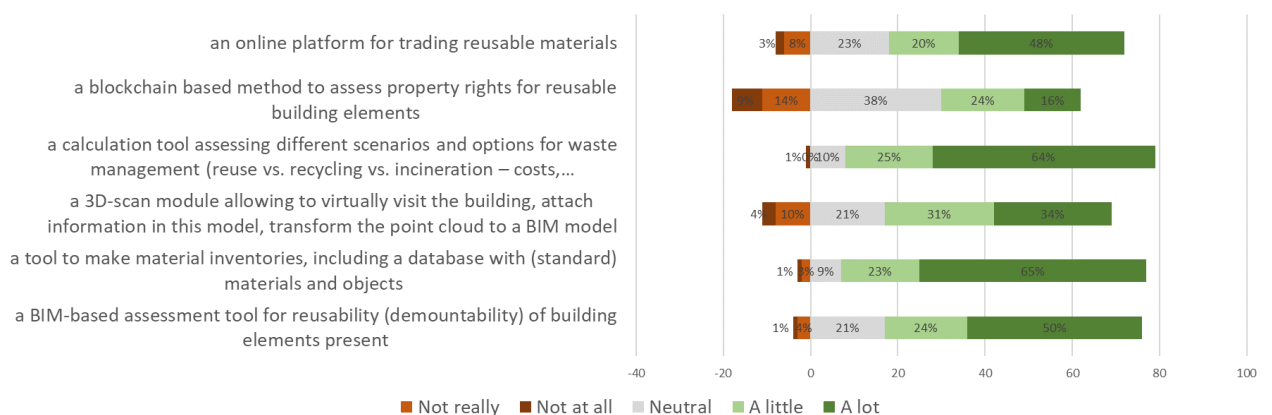
Belgium

The toolset will include the following elements. Can you assess your interest in



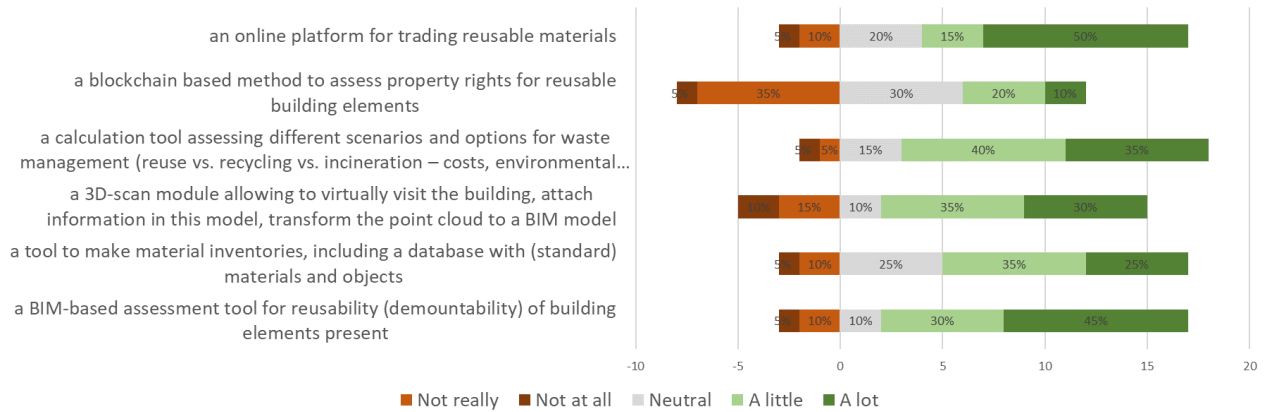
France

The toolset will include the following elements. Can you assess your interest in



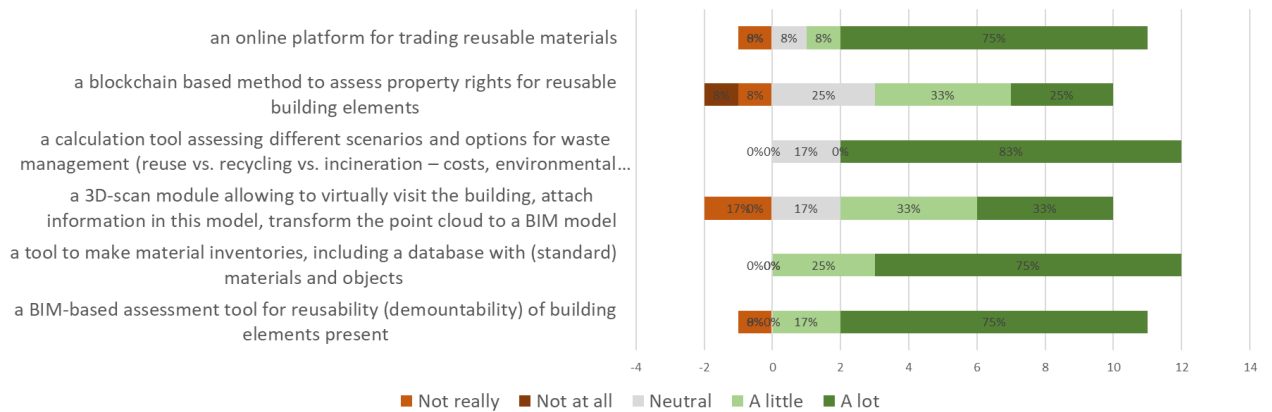
Netherlands

The toolset will include the following elements. Can you assess your interest in



Luxemburg

The toolset will include the following elements. Can you assess your interest in



7. GENERAL CONCLUSIONS & REMARKS

- DDC is addressing the right needs
- Needs & barriers are similar in the participating countries
- Although some differences, most actors in this sector have similar needs and knowledge (3 main groups: design&study – execution (contractors, material producers) - clients)
- Mind the gap: implementation rate today is really low – make sure that tools can be ‘absorbed’ and are useful
- Integration is important – within DDC-tools, but also with other existing & used tools (eg. TOTEM in Belgium, eg. REVIT in terms of BIM, eg. Madaster)