

REFLECTION

At the moment the P4 presentation is approaching, this also means that the final phase of the research design is coming to an end. Looking back on the graduation process I have learned a lot, related to the topic of my graduation research but also with respect to conducting a research. I experienced it to be very interesting to dive into the practice of circular building projects and I hope to expand my knowledge after graduating as well. In this document I will reflect on the research process and the position of my graduation research within its wider context.

Within the field of Architecture, Urbanism and Building Sciences, and the track Management in the Built Environment, this research deals with theme design and construction management. It specifically focused on the management of the initiation of a building projects that deal with a current innovation, the development of a circular building sector. By focussing on a specific approach to circular building, using reclaimed components in the development of new building projects, the research investigated design and management practices. Better insight into the management of this type of building projects would contribute to the acceleration of the development towards a circular building sector.

Scope of the research

Defining the scope of the research, at the early stage of the research, was perhaps one of the hardest parts of the graduation process. Due to the fact that circularity in the build environment is a very wide theme, the challenge was to determine what focus the research should have. The guidance of my graduation mentors was very helpful in this process and has eventually lead to a clear framing of the research topic. This framing helped me to guide me through the process and making sure that the research aim was not too wide.

Although I have tried to explain the definition of re-use at the start of the interviews, it turned out to be challenging to make sure that the interviewees understood this dimension of circularity, re-use of components, in the way I defined it in my research. This is in line with the literature by Venselaar, Heintz & Lousberg (2019) who describe the ambiguity of the discourse of project managers with respect to circularity.

Most of the projects that were discussed or studied, only included small amounts of re-use which fall within the scope of the research. This was due to the narrow definition of the re-use of components. It should be made clear that this doesn't mean the projects were not circular, as they often also included other dimensions of circularity. For instance, a renovation is already very circular due to the fact that the majority of the buildings service life has been extended by not demolishing the building. Therefore I should realize the positioning of my research within the wider idea of circularity in the built environment.

Research design

After conducting a literature study, the choice for qualitative research including interviews and case study, seemed quite obvious, due to the fact that the research was of a very exploratory nature and little data was available. Eventually this qualitative approach has resulted in a lot of data that enabled me to answer my research questions. The semi structured interviews have

given me a lot of insight in the practices of circular building projects, what difficulties are faced and how these kind of projects are actually taking place.

The choice for semi-structured interviews was experienced positive. As suggested in the literature, it showed the potential to steer on the topic, while also being open for new topics, suggested by the interviewee. This helped in developing new topics. However, I sometimes experienced it to be difficult to structure the interview as topics were often discussed interchangeably. This however, also demonstrates how the topics are closely related to each other.

Studying two cases in depth really helped in understanding how the three aspects work out in practice and how these aspects influenced the implementation of reclaimed components in the projects. It showed examples of how, for instance, re-use goals are defined in practice and offered the option to reflect on these goals by the interviewees. In addition, as one of the case interviews included multiple interviews I realized the potential of "focus groups" to study the cases as this leaves room for discussion and reflection between the actors as well. However, I also realized that this way of research, especially online, makes it more difficult to ask questions and respond to the participants. This might lead to interesting topics not being addressed, while semi-structured interviews leave more room for the researcher to address all relevant topics.

The interviews were very insightful and confirmed or discussed the topics that were identified in literature. It was really interesting to hear the response from the experts on the topics and that they often reacted very positive. Confirming that certain ideas, such as extending the initiation phase, would have really helped in their project. In that sense, the interviews also functioned as a reflection for the interviewees. Some of the interviewees mentioned that discussing the re-use topic during the interview brought some interesting reflection aspects for them as well and that they were very interested in my results. This suggests the relevance of the research in practice. In addition, the interviews and especially the case interviews, enabled me to test and check on preliminary findings from literature and previous interviews. This helped in creating a more complete understanding of these findings and their link to the practice.

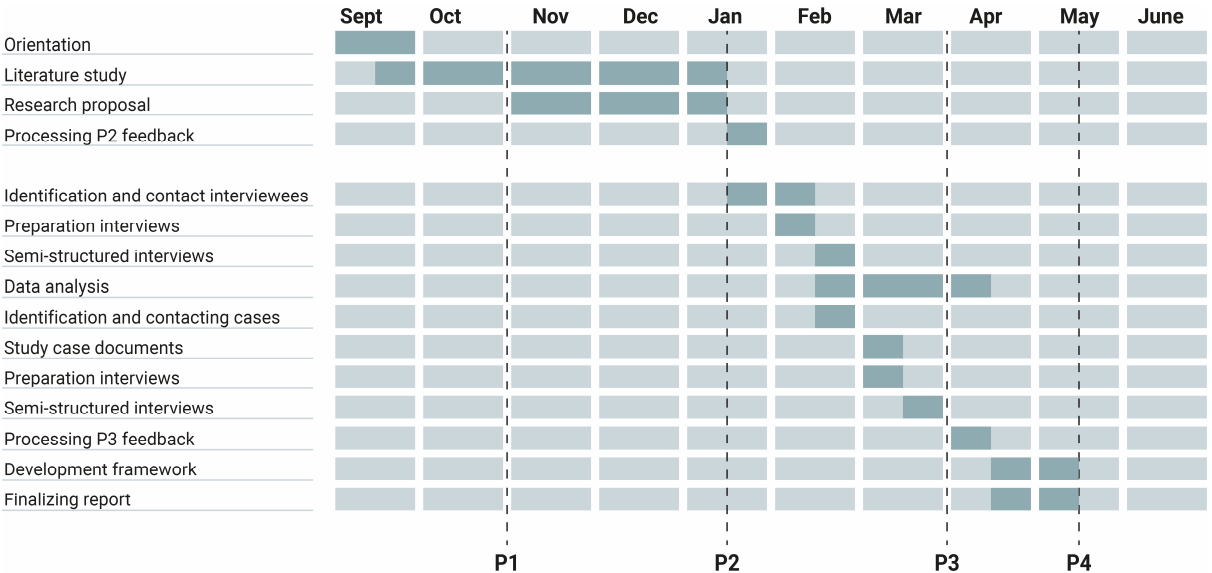
During the expert interviews it wasn't clear yet, what cases were to be studied. This has resulted in some overlap between the expert interviews and the case interviews. It might have helped when I would have been able to have a clear distinction between expert interviews and case interviews. Also, to avoid that some statements are overvalued.

In addition, the research outcomes are very much depending on the interviews, as they were a substantial part of the research. Although I also had conducted some interviews before this graduation research, I am an unexperienced interviewer and this limited experience might have limited me in getting the best out of the interviews as possible. In addition, as I sometimes try to be too polite and could have been more direct and critical, my personal characteristics might also have influenced the outcomes of the research. Throughout the research process, especially when analysing the interviews, I reflected on my interview skills and try to improve this in subsequent interviews. For example I learned that I should not be too afraid to steer the interview, I might be critical, and getting a bit more in depth and asking about some findings would sometimes really add to the interview outcomes. Although more experience with interviewing might have led to some deeper insight and understanding of the reasoning behind certain choices, I do not believe that it would have lead to significant other findings or conclusions.

It might have helped if I would have had some more time in between the interviews, especially the case study interviews. This would have enabled me to analyse the interviews more in depth in between interviews, and enabling me to ask more about some specific aspects in the following interviews. This would also have helped me in the development and maintenance of my coding in ATLAS.ti, which could have led to more structure in the empirical study. I know realize how clear codes help in reflecting on certain findings and tracing back to their origin. This showed for instance, that many of the themes trace back to the literature study.

The idea of having an imaginary experiment, as suggested by my graduation mentors, really helped me to combine the findings, connect literature and data, and made the research components coincide. Especially, it helped me to understand the impact of the types of re-use and the impact of the layers that components belong to on the opportunities for research and the related process. In general the visualisation of certain findings and process is experienced to be really helpful to structure the findings and creating a better overview.

The research was divided into three main phases corresponding with the examination moments. Below a detailed planning of the main tasks in the different phases of the graduation trajectory is visualized.



However, it turned out that I was not able to finish the case studies before the P3 presentation. This mainly had to do with the difficulty of identifying suitable cases as a result of the limited re-use projects that are known, in combination with the fact that the corona crisis led to some delay in the responses of interviewees. Although this has led to some extra work load at the end of the process, fortunately it has not resulted in not being able to finish the planned research components before the P4.

Due to the fact that the research includes a lot of interviews, a lot of personal data has been collected throughout the process. To deal with this in a responsible way I developed a data management plan and discussed this with multiple data experts. In my data plan I described that I would let the interviewees sign a informed consent form, however, as a result from the corona crisis multiple interviews were online or by phone. This has resulted in not all interviewees having physically signed the form. However, in case of no physical meeting, I have shared the details of the informed consent form with them verbally, and thereby obtained verbal or textual consent by all interviewees.

The final part of the graduation will focus on the optimization of the graduation report. This would include amongst others, optimizing the structure and readability of the text and adding and improving visualizations. It will also include the optimization of the processing of the interview data, including the filtering irrelevant information and the anonymization of the data. Discussing the findings and conclusions, including its visualizations with professionals will also help in validation and improvement of the research outcomes.

Research within its wider context

Apparently the research has focused on a topic of current interest. Regularly I notice new articles that are closely related to the topic of this research. These articles describe for instance, initiative that bundle actors for purchasing of circular goods, new circular ways of contracting based on collaboration, trust and transparency, and digital platforms that map the availability of building products (Cirkelstad, 2020a; Cirkelstad, 2020b; De circulaire bouweconomie, 2020).

I realize that my research only focusses on a small part of circular building and that the research should be placed within a wider context of circularity which require a very integral approach. In some cases the choice for re-using a component might be for example less sustainable than implementing a new product, due to energy efficiency issues or the inclusion of toxic materials. In addition, taking into account the ability to disassemble and re-use the implemented re-use components would add another level of circularity to the process, which would come with additional barriers and activities.

The re-use of components is also related to an interesting ethical dilemma. The research showed how the re-use of components comes with difficulties in meeting regulatory standards and require additional tests to prove the quality of the reclaimed components. Adjusted regulatory standards are mentioned to be needed to increase the re-use of components. This comes with questions such as how to ensure the quality of the components and what if it turns out that the quality is not as good as expected? This might lead to damage of buildings and could result in serious safety issues. I could imagine that it is difficult to find an appropriate balance in this, however I do believe that adjusted regulations are needed to increase the re-use of components. Tools that provide accelerated methods of testing might help in solving this problem. In addition a distinction between re-used components and new components, comparable to the distinction between renovation and new building in regulatory standards might work. However, better insight and research is needed to develop appropriate standards.

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