

Case study analysis

As underlying method to change material cultures

Our current economic system is responsible for depleting the earth's resources in terms of raw materials and fossil fuels. Meanwhile, we see a lot of materials ending up in landfills after being taken from demolished buildings. We need to follow the ideas of the circular economy and rethink the ways we currently use our materials. Architects can play an important role in addressing this global challenge. I believe, that as designers, working for clients, we can strongly influence the choice of materials for building designs for example. The architect should be aware of this position and, in my opinion, utilize it. However, this requires knowledge of materials and particularly on the material culture of the society in which the architect is practicing. In her lecture, Eireen Schreurs explains that "*the study of material culture centers upon objects, their properties, and the materials that they are made of, and the ways in which these material facets are central to an understanding of culture and social relations.*"¹ Based on this statement, researching - and therefore knowing - what this material culture entails can help architects in making design decisions and, more specifically, decisions concerning the choice of material that in turn can be utilized to address the challenges stated above.

So why is knowledge of this material culture important right now? Because there is a new phenomenon that can potentially form an answer in addressing our global problem. Urban mining can be defined as the process of reclaiming raw materials, metals mostly, from used products and waste. The goal of this process is to lower the need for new raw materials in reaction to material depletion. This phenomenon had not been introduced into the field of architecture and the built environment yet, until just a few years ago. Instead of focusing on reclaiming metals from used products only, the focus here lies more on reclaiming construction materials and components from (vacant) buildings that are up for demolition or transformation. One can think of large elements such as walls and floors, but also of smaller components such as windows, doors and stairs for example. Given that the built environment is responsible for 50% of the world's total resource use,² urban mining can potentially be very impactful when applied effectively. If we can make the reuse of building materials and components part of our culture, part of the way how we think we should create buildings, we can make an impact. Because until today, these reclaimed materials are reused in a small number of architectural projects, resulting in little to no impact.

It is my goal to find out, how the reuse of used materials in construction projects can be scaled up and how urban mining can enhance this. To achieve this, I believe it is necessary to understand the material culture of our current society. Therefore, my research question is how to find out why and how stakeholders are currently engaging in urban mining and the reuse of building components?

A praxeological approach will be employed to find out how stakeholders are engaging in urban mining and component reuse. Therefore, conducting interviews with these stakeholders, pioneers, felt as a logical first step. They could give me insights in what their motivation was or had been, and why they chose the specific materials and components they used to create architecture with. This qualitative research methodology, as described by Lucas³, allowed me to take a context-led approach, whereas the contexts were the phenomena of urban mining and reuse.

As I spoke with pioneers, such as architecture firm Superuse Studios, and asked them about their motivation, I learned about their idealistic view on the reuse of materials and building components. They approached the design from a material standpoint based on the qualities of

¹ Eireen Schreurs, Lecture on Material Culture at Faculty of Architecture, TU Delft, 18-10-18

² Circle Economy (2017), <https://www.circle-economy.com/circle-economy-launches-circle-built-environment-programme/#.XAKD-mhKhQA>

³ Ray Lucas, *Research Methods for Architecture* (London: Laurence King Publishing Ltd, 2016), p. 36

the materials and components, and their ecological footprint especially. Other stakeholders, like New Horizon, got into urban mining because of more financial reasons. Their approach was less ecological, and more economical.

Eventually, I had not conducted enough interviews, preventing me from drawing reliable conclusions. I needed to find an additional method to acquire information and knowledge. “A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident.”⁴ Reading this definition of the case study and Groat and Wang’s slightly adjusted definition (“an empirical inquiry that investigates a phenomenon or setting”⁵) made something clear to me. The praxeological approach of interviewing these stakeholders and receiving insights on the current state-of-the-art applications only was not enough. To get a better idea I had to analyze the context as well. By the assumptions of the critical discourse methodology I could analyse the current state of the art through case study research.

By diving into the field and looking at existing, successful, projects that had engaged in urban mining and the reuse of building components, I was now engaging in both qualitative and quantitative research methodologies.⁶ The case studies allowed me to find out what separated these projects from conventional ones, what made them unique. Each project was analysed on facets including, for example, project size, location and the types of reused materials and components that were applied. Next, I decided to go for a text and image-based methodology, by creating a catalogue that contained the researched projects and would be used to quantify my findings: how many of what type of component had been reused in each project and where were these components reused most? This resulted in a straightforward compilation of exemplary projects, that each turned out to be quite unique.

I was able to establish an idea of *why* and *how* certain stakeholders are engaging in urban mining and reuse and, additionally, *what* types of materials and components are reused. In other words, it gave insights in a part of our current material culture, regarding the introduction of new materials and components, and their reuse.

As Lucas states, qualitative research, or the understanding of qualities, is often understood to be subjective rather than absolute, so that the categorization of facts becomes somewhat contested and based on individual or group perspectives, whereas quantitative research, by contrast, is measurable and most often associated with objectivity. Quantitative research often involves large numbers of participants or significant data sets that can be analysed for tendencies.⁷ In my research, it was important to realize that a small number of opinions does not stand for a largely adopted opinion.

Many have defined the case study. Abercrombie et al. have defined it as follows: “Case study: the detailed examination of a single example of a class of phenomena, a case study cannot provide reliable information about the broader class, but it may be useful in the preliminary stages of an investigation since it provides hypotheses, which may be tested systematically with a larger number of cases.”⁸ Although this seems to be a sound definition, Flyvbjerg points out it is in fact “grossly misleading.” He states: “A case study is a ‘detailed examination of a single example,’ but [...] it is not true that a case study ‘cannot provide reliable information about the broader class.’ It is also correct that a case study can be used ‘in the preliminary stages of an investigation’ to generate hypotheses, but it is misleading to see the case study as a pilot method to be used only in preparing the real study’s larger surveys, systematic hypotheses

⁴ Robert K. Yin, *Case Study Research: Design and Methods*, 2nd ed. (Thousand Oaks, CA: Sage Publications, 1994), p. 13.

⁵ Linda N. Groat and David Wang, *Architectural Research Methods* (John Wiley & Sons, Inc., Hoboken, New Jersey, 2013), p. 418

⁶ Ray Lucas, *Research Methods for Architecture* (London: Laurence King Publishing Ltd, 2016), p. 36

⁷ Ray Lucas, *Research Methods for Architecture* (London: Laurence King Publishing Ltd, 2016), p. 36-37

⁸ Abercrombie, Nicolas, Hill, Stephen and Turner, Bryan S. *Dictionary of Sociology*. (Harmondsworth: Penguin, 1984)

testing, and theory building.⁹ With this example (and more) Flyvbjerg shows that there are different ideas on how a case study should be used.

Moreover, Souza points out that the methodological approach of case study research is a difficult one to characterize. According to him, this has partly to do with the fact that many different fields use the 'case study' and characterize the words quite differently.¹⁰ The logical effect of this, is that the scientific validity of the case study is being questioned. Does this mean that case studies cannot be used as sole source of information? Can we not translate the outcome of case studies into scientific results?

Yin describes another reason why researchers sometimes prefer the case study approach: "*In general, case studies are the preferred strategy when "how" or "why" questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context.*"¹¹ This statement clearly corresponds to the situation of my personal research. Although comparing my approach to Yin's statement sounds quite obvious, it is important to mention it, since it also explains the fact that the phenomena I am engaging with are of a contemporary nature.

I know from my personal experience and collaboration with Kasper Jensen from 3XN/GXN architects, that doing case study's is a common research method for architects to get a grip on the state of the art. In a collaboration, 3XN architects combined a great amount of materials, picked up from different case studies, into a building design. This building, the circle house, was created to set an example of modular, circular housing.¹² They took a step out of the box and experimented with these new materials and their application. In a sense, I would say they contributed to a new type of architecture, not per se based on the form of the building (it's still rectangular, with rectangular windows and doors), but rather in the material use. As Eireen Schreurs shows in her presentation (figure 1), in some cases we are not creating a new form of architecture per se, but we are changing the materialization, in order to make a statement.

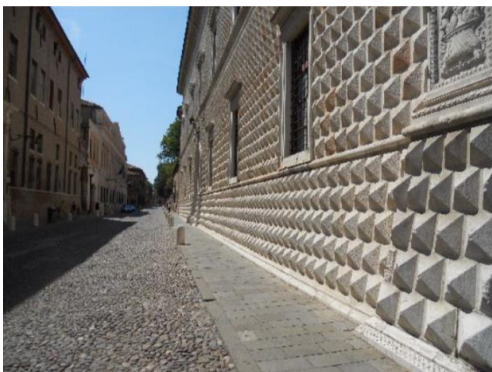


Figure 1: on the left we see the Palazzo dei Diamanti, Ferrara (1503) by Biagio Rossetto, on the right we see a printed garden house (2016) by DUS architects.

My goal is not to create a new architecture form per se, however, I do want to address our material use. Entering a series of case studies made it possible to approach the subject from an emic as well as from an etic standpoint, as Lukas describes them.¹³ Talking to each stakeholder and approaching a certain aspect from the emic, allowed me to gain some insights in their motivations. However, it was necessary for me to create an overview of the state of the

⁹ Bent Flyvbjerg, Five Misunderstandings About Case-Study Research. (Qualitative Inquiry, vol. 12, no. 2, April 2006), pp. 2-3

¹⁰ Renato César Ferreira de Souza, *Case Studies as method for architectural research* (Escola de Arquitetura da Universidade Federal de Minas Gerais, 2005)

¹¹ Robert K. Yin, *Case Study Research: Design and Methods*, 2nd ed. (Thousand Oaks, CA: Sage Publications, 1994), p. 1.

¹² Vandkunsten, Lendager Architects and 3XN/GXN, *Circle House* (2018)

¹³ Ray Lucas, *Research Methods for Architecture* (London: Laurence King Publishing Ltd, 2016), p. 10.

art. I would therefore also argue for a combination of the etic and emic when researching. This does require the researcher to take great care, as Groat and Wang's also stress: "*regardless of the type of case study, investigators must exercise great care in designing and doing case studies to overcome the traditional criticisms of the method.*"¹⁴ When doing case studies, one should be aware of the fact that opinions are not the truth per se. One should use the information gathered from case study research for coming up with hypotheses and testing these with other sources of information. In that sense, the case study will be essential to start up a research, but will not suffice as sole method.

As Flyvbjerg states: "*a scientific discipline without a large number of thoroughly executed case studies is a discipline without systematic production of exemplars, and a discipline without exemplars is an ineffective one. Social science may be strengthened by the execution of more good case studies.*"¹⁵ If we want to upscale urban mining and the reuse of building components, more examples need to be made. Because right now, many architects and designers do not really know what the options are. They need to engage in studying existing cases and they need to understand how a change can be made. They need to understand the process of urban mining and what potential it has.

Be it that we look differently at what materials mean in terms of environmental impact, or at what the value of materials is. I have found, that to acquire knowledge on what drive people, one needs to interact with these people, study what they have done and why and try to understand this. This praxeological approach has therefore been very important to my personal research.

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¹⁴ Robert K. Yin, *Case Study Research: Design and Methods*, 2nd ed. (Thousand Oaks, CA: Sage Publications, 1994), p. 1.

¹⁵ Bent Flyvbjerg, Five Misunderstandings About Case-Study Research. (*Qualitative Inquiry*, vol. 12, no. 2, April 2006), p. 1