

12 REFLECTION

12.1 REFLECTION ON DESIGN AND THE PROJECT

The relationship between research and design

one must have a clear image of what design and what research compels for adequately elaborating on the relationship and the difference between research and design. This research states a strong difference on design as a process of blueprinting an artefact and design as a method to understand urban planning problems. By assessing design as such, design is part of the research act. Design is different from other research acts as it distinguishes itself from the scientific discipline.

This study shows that design is an important aspect within research in urban planning problems. Urban planning problems are always influenced by the societal context and therefore carries value-based decisions, which in turn influence the problem. Design is one of the few approaches that can evaluate this complex context and comprehend the wide range of variables attached to the problem, especially in problems where other research approaches provide no answer. Design takes on a holistic approach to problems but proves in this research also a mean to generate data. Where other research approaches would be required to make assumptions, or generalise findings, a design approach can provide answers through abductive reasoning and a close relation to the context.

From a personal perspective, I think that not everything is a design problem unlike many designers might believe. The engineer in me is eager to further explore the possibilities of quantitative methods to understand the built environment from a model perspective. By understanding urban development as a system, one learns the impact of different variables. Many of the variables are outside the domain or consciousness of the designers and therefore design cannot pose answers to all research questions. I do however think that there is always a role of design somewhere in the research process because all urban planning problems relate context and values.

The relationship between the project and a wider societal context

Cities will face many transition challenges in the future and automated driving is only one of those challenges. This research provides for a strategic framework on which cities can take a plan of action. In a wider societal context, the research helps to explain which position society should take on technological transitions. A certain degree of optimism can be observed in this matter. In the case of automated driving, it is often propagated as a solution to many urban mobility problems. However, this research shows that not all this optimism is

justified. The main lesson this research gives to society is to not wait for technological transitions, but use contemporary methods and ideas to improve cities as of today.

Within the societal context of the professional and academic world in the domain of the built environment, this research shows the importance of collaborative attitudes between different specialisations and attempts to give an example how this collaboration can be established. Integrated research approaches will become increasingly important in urban planning problems and this research attempts to cast a light in the dark.

The methodological line: considering the city as a complex city

One of the most determining decisions in this research is the problem perspective of cities as complex systems. This decision was the single most design decision in this research. Although this perspective triggered the use of engineering methods, it asks for a holistic vision to urban planning problems. Cities as complex system is a beautiful and fascinating paradigm and can provide an important bridge between various domains within the realm of urban planning.

12.2 EVALUATION OF THE PROCESS

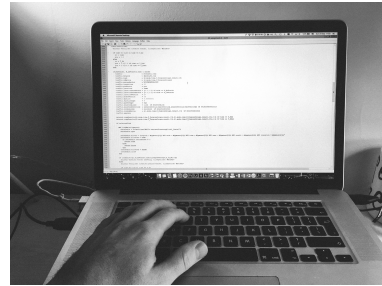
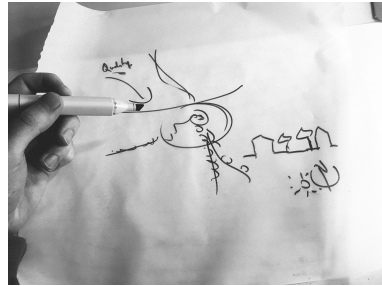
Using computational models in urban planning and design is challenging. It asks the researcher to learn a lot of theories, programming languages and computer programmes. Making a computational method operational is a design process itself. Within a design process, the solution is always part of the iterative process and therefore the relation with the context is something that keeps the researcher involved with the actual study topic. Within a computational modelling research, the iteration process is not related to the solution but to the method itself (Figure 12-1).

I started this research with the idea that I would be able to use a model within an iterative design process. However, due to errors, data incompatibility, long runtimes and any other problem people using software and programme languages face this full iteration process has never been reached. The method became an obsession and up to a month before submission of this report I have made attempts to get the method working. This has compromised other research steps. By taking on a holistic approach together with models, the modelling process becomes increasingly complex. Together with a case study relating to automated driving everything became more difficult. Next time, I would take on a case under a less hypothetical context. This would allow for more time and energy to focus on the aspects of an integrated research methodology.

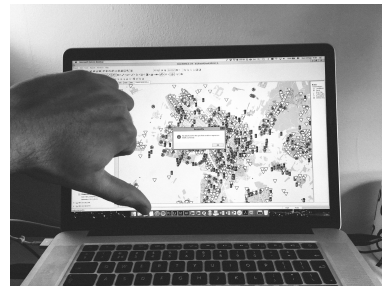
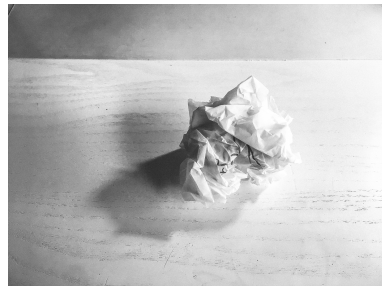
I was always charmed by the optimism by which design takes on urban challenges. Through an engineering approach I might have become more sceptical and have been thinking more in limitations. To put plans into actions, design can prove for great inspiration. However, some questions are of such challenge that design alone cannot answer questions.

If I would have accepted earlier that it would not have been feasible to construct a fully operational model, I might have derived the similar conclusions earlier in the process and provide more efforts in the development of the strategy and design. This is a price a pay for considering the model construction process as a design itself. In that sense, I feel slight disappointment about that I have not been able to show a final design on the level I wanted and could. However, the topics I grasped in this research have led me to more uncharted

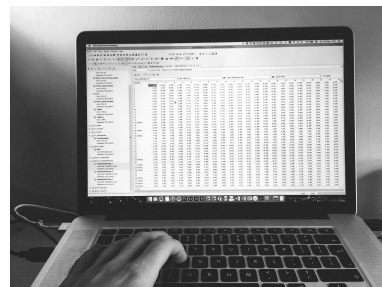
territory than a conventional research might have done. I am thankful for all the insights obtained and I am eager and curious to use this insights in the future.



Prototyping



Rejection



Result

Figure 12-1: The iterative process of design (left) and the iterative process of engineering (right).