

Reflection

The aim of this chapter is to reflect upon the research process of the last semester. This reflection hereby focusses on the research process, -topic, -methods and –outcomes (i.e. dissemination).

RESEARCH PROCESS

Preparation

In the months before I started with the graduation process I lived in Stockholm because of my Erasmus exchange program. During this time I decided to conduct a graduation research about Circular Economy in the real estate sector, because (1) I already had a lot of knowledge about this subject (due to my bachelor thesis on the University of Applied Sciences) and (2) because this topic stands high on my lists of interests. During a search for a part-time job when being back in The Netherlands a vacancy at OVG Real Estate for a Graduation Internship about Circular Economy came across.

Since this was already early in the graduation process this provided me the opportunity to design a research proposal in such a way that the outcomes of it would be scientifically relevant and relevant for the graduation company. Hereby the opportunity was created to conduct case study research on the projects I was working on for my internship at the graduation company. This implied that I could work on the implementation of circular business models during my internship and in the meanwhile use this knowledge to write my thesis about. This created a lot of insight in the different interests and perspectives of the involved actors in the implementation of PSSs in practice. This knowledge was very valuable while writing my thesis report.

Before P2

One week before the graduation process started I found out that there was – luckily – a graduation lab about Circular Economy. Although the intention of this lab was to focus on Urban Area Development, my personal interest lie more on a research on a project level. The main comment during the P1 was therefore that I should keep in mind to also reflect upon an area level at the end of the research. This has been done in Section 8.2 of the report, wherein a discussion about the outcomes of this research and the main problems of the REPAiR research is included.

The period until P2 was characterized by the iterative process in order to come to a relevant and interesting research topic and research objective. Although the research topic was found quite quickly, it took a while to define the research problem, research objective and research questions properly.

Towards P3

The internship made it possible to derive case study related information very easily and ask questions to people involved with the studied projects. This made it possible to ‘dive deep’ into the case studies and find out what they are really about. This background information made it very clear for me what the roles and positions of the involved actors in these projects were and what the implementation of PSSs would mean for the already existing (or intended) project organization.

The internship made it also possible to contact interviewees very easily and make them enthusiastic about my graduation research. This created the chance to interview people with high functions of involved organizations for the case studies. A good example was the interview with Matthijs Bierman, Managing Director of Triodos Bank The Netherlands.

Conducting the case studies took much more time than expected beforehand. Before I started, it was expected that it would take the most time to conduct the interviews and transcribe them. However, in retrospect, it took many weeks to read the case study documents, describe the case studies and make a concise and to the point description about it. This already took a month more than expected, hereby the case study analyses not included.

Towards P4

The actual analysis of the case studies took more time than expected as well. Main reason for this were the ill-defined research objectives, -questions and -methodologies. Secondly, in that period I also lost contact with the TU Delft mentors. Since the aim / outcomes of the analysis were not clear for me, I was struggling for quite some weeks to find a proper method to analyse the case studies. This method was in the end found in the 'Theory building'-method of Eisenhardt (1989).

This method was very straightforward, therefore were the findings presented in the P4 report maybe too much structured and way too detailed. These outcomes were not that relevant either as the research objectives were not well-defined and clear for me yet.

Towards P5

This resulted in a very lengthy report which was not really to the point. The time between the P4 and P5 was therefore for the most time spent in order to get 'an overview' of the subject and come to the core of this research; the role of the service provider.

In retrospect, the outcomes of this research could have been of a higher quality when the research objectives and -goals would have been better defined. The empirical findings related mostly to:

- The functioning of PSSs in real estate development projects;
- The tools actors have in order to implement these PSSs;
- The interaction between the service provider and the service supplier

The quality of the empirical findings and the quality of the overall research findings could have been better if the focus of the research during the entire research would have been on the role of the service provider specifically. This would have given me more time to sharpen the research outcomes and conclusion towards the P5. This time was now spent on re-writing the complete Synthesis.

Supervision

The contacts with both mentors from the TU Delft were good and become more intense towards the end of the graduation process. The feedback was – so far – always really supportive and helpful to make further steps in the process. The focus during these meeting was mostly on the process of graduation and used Methodologies. This helped me on the other hand to independently focus on the content of the research.

The contacts with the company supervisor were good and supportive. Hereby the cooperative approach during the first months of the graduation project helped me to find a relevant and interesting graduation topic. While conducting the case studies the company supervisor – and other colleagues – were good mentors to discuss content of the case studies with and to gain more insight in the new strategy of the graduation company. On the other hand, the contact with the graduation company became less tight during the last months of the research process. The main reason for this was my choice to work more often in the TU Delft Library or at the Faculty of Architecture. Working in Delft provided me with enough time to focus on the research. However, it also created a sort-of tunnel vision as I did not discuss my work with colleagues and the company supervisor that often anymore. I could have been a bit more proactive during these weeks in order to create some more moment of discussion and ask for feedback.

Motivation

Writing a master thesis is a one-year long journey towards 'destination unknown'. This journey has been characterized by lonely days – and weekends – working in the library or at the OVG Office. Always trying to reach my self-imposed deadlines while striving for a high quality of work.

Especially during the two months before the P3 and the P4 much time was spent on the internship and the graduation process. This resulted in a situation whereby I worked every day on the thesis and did not allow myself to take time off.

The quote: "People who are unable to motivate themselves must be content with mediocrity, no matter how impressive their other talents" from Andrew Carnegie has been chosen for a reason.

Hard work pays off, but also comes with a certain price. As much time and energy was spent on the thesis during the two months before the P3 and P4, it was difficult to find the motivation back after obtaining the P4. These six weeks could have been perfectly used for taking a step back and paying attention to the details. But, it was very difficult to find back the needed focus in order to increase the overall quality of the thesis. In retrospect, it would have been better if my energy was 'spread' more equally over the entire research process. Herewith some energy would have been left to make a proper final spurt towards the P5.

RESEARCH TOPIC

Position within the graduation laboratory

This research was conducted in the context of the 'Circular Urban Living Lab' graduation laboratory (the CULL-lab). The 'Graduation Research Projects'-handbook¹ stated that the final result of the graduation projects of this lab "[...] include tested decision-making, governance (other types of) models for circular development projects and urban living labs, and practical circular urban and real estate development guidelines for the building industry and municipalities". The end-result comprehends (sort of) guidelines how to implement Product-Service-Systems as a real estate developer and become a service provider. Herewith stimulating the incorporation of the Circular Economy in real estate development projects and perhaps in the wider real estate sector.

Position within Urban Development Management

The core of Urban Development Management (UDM) is the management of decisions of the many stakeholders involved in urban area development towards a high-quality outcome. One of the current research programs within this chair is the European Horizon 2020 research called REPAiR (REsource Management in Peri-urban AREas). "REPAiR integrates life cycle thinking and geodesign to operationalise urban metabolism" (Heurkens & Dabrowski, 2017).

Within the REPAiR research project, several challenges on 5 different scale levels were determined. In order to contribute to the knowledge created in the graduation laboratory and herewith to the REPAiR the recommendations are related to these 5 different scale levels. During this research, new models for circular development projects were created on an operational and inter-organizational level. This research took place within the 'Inter-institutional' context and the outcomes of this research mostly apply to this level as well. On the other hand, in order to implement PSSs in real estate development projects, several obstacles and barriers that could be related to the other 4 defined level have to be overcome as well.

¹ MBE Graduation Research Project – MBE Graduation Laboratory 2016-2017 – version Spring 2017, Department of Management in the Built Environment, Faculty of Architecture and the Built Environment, TU Delft

Position within Design & Construction Management

The domain of Design & Construction Management (DCM) addresses questions of process control in the development and realization phases of the construction of buildings. With building process innovation as a specific area of attention. This research related to the domain of DCM since this research applied to the development processes of servitized real estate development projects. These development projects are 'special' as Product-Service-Systems are implemented in them. The perspective of one of the 'central' actors in the project organization of a real estate development project was taken. The focus was on the role of this actor and the way this actor could interact during the development process with other actors in the supply chain. Much attention in this research was paid to the alignment of the supply-side of the supply chain.

RESEARCH METHODS

Literature study

The literature study of this research mostly focused upon a possible implementation of Circular Economy in the real estate sector. The role of the service provider and the general implementation of Product-Service were barely discussed in the existing literature. Only the theses of Van den Brink (2016) and Kazemi (2016) did this.

In order to gain more insight in the way organizations could collaborate for a longer period of time, I decided to read more literature about supply chain management and supply chain integration in the construction industry. Although much sources were read it turned out that the main sources that would be really useful were the sources related to the dissertation of my second mentor. This could be explained positively by mentioning that the outcomes of this research could build upon the already existing knowledge in the field. On the other hand, it could also be seen as a 'tunnel vision' within academic research, which could negatively affect the external validity of this research.

At the end of the literature study some articles about Performance Based Contracts were found. In the context of this subject also the literature review written by Reim et al. (2015). This literature review turned out to be a very good source. It provided me much insight about the consequences of the implementation of PSSs on an operational level and provided me with useful concepts to use in the conceptual framework of this research. It should on the other hand be admitted that the literature study could have been improved by using literature sources of fields outside the construction / real estate sector.

Thus, not many sources were available about the implementation of PSSs / Circular Economy in the real estate sector. This resulted in a concise literature study, which in the end provided enough background knowledge to create an a priori construct and knowledge about the topic.

Explorative interviews

Several explorative interviews were conducted to gain more insight in the graduation topic and define a possible research gap. Although these interviews are not really used in the main research report, it provided me with much background knowledge related the position and role of service suppliers. A side-effect of these explorative interviews was the creation of interest and enthusiasm for my graduation project. This made easier to collect enough experts for the expert panel and created support within other companies for this research as well.

Case studies

The case studies that were conducted for this graduation project were – as far as I know – the first projects whereby circular, servitized business models were applied in real life projects. Since I had the chance to be involved in these sub-projects I gained – as mentioned before – much insight in the interests and perspectives of different actors and the aspects that are important in order to implement PSSs.

As mentioned before could the outcomes of the case studies be enhanced if the research objectives and goals were defined clearer. This would have increased the focus of the case study research and would have created better outcomes.

Building theories

The analyses period started when the case studies were finished. Initially this analyses and synthesis was done with the use of “empirical based lesson drawing” (Huijbregts, 2017), which did not provide satisfactory outcomes. The mentors advised me hereafter to use the Building Theories process of Eisenhardt (1989). The underlying techniques provided proper support for the synthesis of the empirical findings. The outcomes of the different analyses were of a higher quality compared to the outcomes of the Lesson Drawing method.

Expert panel

The official goal of the expert panel was to validate the preliminary research findings. Although this goal has been obtained, the outcomes of the expert panel were not really satisfying as they did not bring much new insights. Secondly, on the moment the expert panel was held I was still too much stuck into the subject. Perhaps I was biased by my own research.

If the expert panel would have been held on a later moment, I could have taken an outside perspective during the preparation of the session. The statements used during the expert panel would in that case relate to the role of the service provider and not to the implementation of Product-Service-Systems on an operational level.

Ethical dilemmas

One week before the P2, the researcher filled in the “Ethics review checklist for human research’-checklist. The answers on all the questions of the self-assessment were ‘no’. Therefore, the researcher presumed there are no major ethical issues involved in this research project.

However, this research is conducted within the context of the new strategy of the graduation company. Strategically sensitive information has herewith been incorporated in the graduation report. Since the graduation report will normally be put online and herewith made publically accessible some parts will be put under embargo.

One of the major ethical dilemmas that exist is according to Bryman (2012) is the ‘harm to participants’. The summaries (i.e. transcription) of every interview was sent to the interviewees to validate them. This to prevent that interviewees are being interpreted incorrectly. Secondly, the actual interview transcripts will not be put in the repository either.

Personal learning goals

One of the determined personal learning during the P2 was to develop my scientific and research skills more. During the P2 I had the feeling that I almost figured out all the research methods I needed and no further development of these methods would be necessary. The contrary proved to be the truth, while conducting the case studies, analyses and synthesis many alterations were made to the research methods and many new insights in research methods were gained. Just by doing research. This resulted in a change of the conceptual framework, another report structure and new concepts to be researched. In retrospect, I think these research skills were developed quite a lot during the research process.

DISSEMINATION

Societal relevance

As mentioned in the first chapter of this research: one of the underlying aims of this research to introduce the Circular Economy within real estate development projects. The real estate sector is responsible for 30% of global energy usage, 40% of global solid waste streams and 50% of the world-wide raw material detraction (Antink et al., 2014). It is believed that with the introduction of circular business models and - principles the current unsustainable practices of the real estate sector could be ended.

The outcomes of this research support therefore the objective of the Dutch government to bring to transform the Dutch economy to a circular one before the year 2050 (Ministerie I&M en EZ, 2016). The societal relevance is hereby that the incorporation of PSSs could support the implementation of Circular Economy in the real estate sector, which eventually leads to lower emissions and raw material detraction.

Scientific relevance

Current PSS literature does not discuss business models extensively (Reim et al., 2015). Therefore, more scientific knowledge should be created before PSSs could be implemented in practice. This research created empirical knowledge regarding the implementation of PSSs in real estate development project, which created more scientific knowledge on an operational level regarding this subject.

This research took place within the Circular Urban Living Lab of the MBE-department, which took place within the REPAiR research project. As mentioned in the discussion of this research created this research knowledge on the inter-institutional level, which is one of the five levels on which problems and challenges were defined on which the REPAiR research focusses.

Sectoral relevance

The Circular Economy is already for several years a 'hot topic' within the real estate sector. This results in a lot of talking between practitioners on congresses and symposia about their vision on circularity for the real estate sector. Hereby creating a lot of marketing value for themselves. Therefore, is the implementation of the Circular Economy not taking place at the moment currently since the buildings that claim to be circular are rather gimmicks than building whereby circularity is guaranteed. This research could change this by providing more clarity about the consequences and needed steps related to the implementation of new circular business models in practice. The outcomes go beyond gimmicks and target at what the Circular Economy is about: closing material loops