

## REFLECTION

Of this chapter, it is expected to reflect on 'the scientific relevance and validity of the results, societal relevance and utilisation potential especially referring to the expected relevance as stated in the P2 report. The P2 report is the graduation plan which was submitted and approved the 18<sup>th</sup> of January 2016.

### *Relevance*

As to the scientific and societal relevance, this barely changed with the one stated in the graduation plan. The subject itself did not change compared to the graduation plan. Societal relevant did change to a small extent, as it was discovered during the research that District Heating is even more relevant than was expected during the time of the graduation plan. This mostly concerns the fact that the national government of the Netherlands is making plans to phase out most of the gas infrastructure, and make this legally binding. District Heat is said to be one of the main alternatives. This was not known during the phase of the graduation plan.

### *Objective and utilisation potential*

Regarding the objective of the graduation plan, surprisingly, this also to a large extent came true. The only change was that during that time, the focus was on so-called 'high potential areas' such as a Central Business District or other high density areas that are repeatedly seen across many cities. This focus could not be realised, as there are simply not that many DH cases to choose from, let alone comparable cases in these particular areas.

As to the utilisation potential, this did change significantly. It was stated this research' result would be directly usable by municipalities, utility- and energy companies and real estate owners. This of course is not the case, which is quite logical considering the exploratory state of this research topic. This research could only provide a broad overview, with a first analysis of changing business and collaboration models, leading to well-argued further study recommendations. This is by no means directly usable for the actors involved; it merely contributes in knowledge about an emerging research topic.

### *Validity of the results*

This research is an explorative and qualitative research. Hence, validity of the results is a difficult matter. The results will always have a high amount of subjectivity. For instance, although an interview protocol was developed for the semi-structured interviews, no interview fully followed the protocol. Reasons for this is the exploratory state of this research: when something was said that was found interesting, follow-up question were asked. Still, most of the intended subjects of the interview protocol were addressed in the interviews.

In addition, because of the short time-span of this research it was assumed that using software for the interview data analysis would be too time consuming. Hence, the data analysis (cross case analysis) and

thus the results is an own interpretation and comparison of the data. To be able to make this subjective process as objective as possible, the conceptual framework was developed so as to pin-point all the data into concepts that were identified upfront and are comparable. These are the concepts such as business model involvement, network and collaboration mechanism.

The challenge with these concepts used was that they are part of an emerging research topic. Hence, there was not much high quality and/or usable research. The business model concept for instance has extensive research into their structure, from a company perspective. Of the concept of a networked business model with a collaboration focus within the renewable energy business was much less research. Therefore, the development of a concise conceptual framework and its operationalization was difficult.

Reflecting on the formation and operationalization of the conceptual framework, it can be said this was a learning process in itself. The conceptual framework changed a lot since the graduation plan, it even changed after the P4, i.e. the GO/NO-GO moment for the defence. Of course, it would have been much better if right from the start, i.e. the graduation plan in January 2016, a final and fully operationalized conceptual framework was developed. However, main reasons that this was not the case are probably (1) no experience with forming and operationalizing conceptual frameworks for qualitative research, (2) the exploratory state of this topic and the concepts used to research the topic and (3) the fact that both District Heating and business models are not part of the MSc program that is followed, resulting in a lack of knowledge that had to be caught-up during the research itself. Still, it is believed that the conceptual framework as it stands now is quite useful and helps in understanding what is (to be) researched. The concepts used are extensively researched during the literature review and during the data analysis great care was taken to adequately pinpoint the data into these concepts. Although this process is difficult to show, because the steps of the conceptual framework are clearly laid down and followed, it can be said the results are to a high extent valid.