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**Track:** MSc Management in the Built Environment 2022-2023 | TU Delft

**Version:** P5 reflection

**Thesis title:** Energy transition in the retail sector. Revealing decision-making behaviours for Energy Efficiency Retrofits (EER) of shopping centres

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## REFLECTION

This thesis is part of the Management in the Built Environment track from the MSc in Architecture, Urbanism, and Building sciences (AUBS) at TU Delft. It aims to contribute to the creation of a more sustainable built environment, one of the main objectives of the master programme. By bridging the disciplines of Real Estate Management (REM) and Design and Construction Management (DCM), it investigates the decision-making challenges in strategic management for future-proofing building assets, as well as the design and construction process necessary to achieve this goal.

### Relevance

This thesis contributes to the acceleration of the energy transition of the existing building stock, specifically within the retail sector. This is highly relevant not only for supporting efforts towards the net-zero goals of 2050 but also due to the current energy crisis, which highlights the urgency to reduce energy consumption in buildings and transition into renewable energy sources. The scope of this research aims to catalyse retrofitting shopping centres, the building typology within the retail sector with the highest energy demand per m<sup>2</sup> and largest amount of floor area within the non-residential building stock in the Netherlands.

The scientific relevance of this research lies in addressing the gap found in the literature review about stakeholders' behaviours for EERs in the retail sector. By analysing these behaviours from a process-oriented perspective, taking into account the complex governance system involved, this thesis has allowed to create a systematic overview of stakeholder behaviours and interrelationships, offering valuable insight into the areas that require attention to mitigate these barriers in practice. The findings and proposed recommendations can benefit owners, professional practitioners in the field of real estate management, and policymakers.

### Methodology

The research approach was proposed from the beginning in a systematic manner, building upon the output of one phase to serve as input for the others. This allowed to work in a structured manner, maintaining the coherence along the different stages of the process. In terms of the methods used, the exhaustive literature review and theoretical framework at the beginning of the process laid the foundation to carry out the qualitative part of the thesis. This framework became the central tool of this research, used as a guideline for data collection during the interviews, providing a theoretical coding structure for the analysis, and a supplying a founded theory to reflect upon the findings.

The case study selection was a challenging part during the data collection stage. This was because in practice, no perfect case study was found to comply with all the initial selection criteria. Because these criteria were important to support the relevance, representativeness, and transferability of the findings, new criteria were added to compensate the shortcomings found in the process. Although challenging, adaptability and creativity in making the most out of the resources available proved to be key factors to achieve it.

On the other hand, data collection through the semi-structured and expert interviews was a straightforward process. They were conducted both online and in person, the online ones with a greater degree of challenge as interviews were dynamic and required active participation of the subjects with graphic materials. However, this limitation supposed no major challenges and helped to reduce commute times to further locations. Overall, this phase was the most enjoyable part of the process because I got to meet and have very interesting and constructive conversations with multiple professionals within the retail sector. Finally, I admit that analysing the data and synthesizing the results were the most difficult part of this process. Specially, because of the short time given between P3 and P4. However, this proved to be a challenge to learn to prioritise tasks to develop the most out of the resources available.

### **Personal reflection**

Reflecting on my thesis process, I must acknowledge the pivotal role that my three mentors from TU Delft and Colliers played in achieving the presented results. The feedback and guidance they provided from various perspectives, including research structure, fresh insights, networking opportunities, data sources, and emotional support were invaluable. I am grateful for their contributions, which significantly improved the quality of my work. Furthermore, I acknowledge the benefits of having the opportunity to conduct my research through an internship. Not only did it provide me with access to relevant data collection, but also allowed me to approach the process more experientially, easing the stress and making it less isolating.

This thesis has been a very insightful journey with numerous personal and professional challenges. The beginning was overwhelming as there were a multiplicity of options to choose from as a thesis subject, and just like a sponge, I got easily saturated by the amount of new knowledge and feedback I was getting from different angles. However, over time, the more structured my research design got, the less overwhelming the challenge became. There was no easy step, but with dedication and consistency throughout the whole academic year, it is very rewarding to look back and reflect on how far I have come.

In retrospect, this thesis journey has not only enriched me with valuable academic knowledge, but it has also equipped me with essential skills to navigate future challenges, embrace growth opportunities, and confidently advance in my professional journey. The process has allowed me to step out of my comfort zone, embrace new challenges, and improve my problem-solving abilities. It has taught me to be critical of my ideas while fostering confidence in my progress. I am certain that these skills will continue to serve me well as I embark on new endeavours.