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主　論　文　の　要　旨

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論文題目　Analysis on short-lived and vacant houses in Japan toward a sound material cycle
(健全な物質循環に向けた日本における住宅の短寿命と空き家問題に関する研究)

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論　文　内　容　の　要　旨

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Today's world faces pressure on its resources and troubling levels of waste generation, impacting global resource security and survival of natural ecosystems, among others. Cities represent particular hotspots of resource consumption and waste generation, and the problems will increase in the following decades. Inspired by a circularity approach, this dissertation zooms in on the potential of the materials embodied in short-lived and vacant houses.

Chapter 2 discusses the practical and methodological challenges and limitations. This dissertation is based on secondary data from previous research, on empirical data from interviews and observations collected in a few neighborhoods in Honshu, the main island of Japan, in the period of 2018-2019, and on empirical data from GIS calculations.

Chapter 3 (based on Wuyts et al. 2019) summarizes the reasons behind the high amount of short-lived and vacant houses in Japan. These problems can be partly explained through the history of the change of housing regimes since the Second World War. Statistical data about housing, connected with historical events, like the introduction of laws, new technology, building materials and knowledge after the Second World War, mainly due to American influence, illustrate the different regimes: quantity-oriented, quality-oriented and then single-oriented. The problem is wicked because many different stakeholders with different motivations are involved. A content analysis of recent media articles, complemented with interviews, provides a list of the stakeholders. Another objective was addressing the gap for circularity strategies for the inefficient material use implied by short-lived and vacant houses. The same content analysis and interviews resulted in a retrospective list of countermeasures that could be labeled as circular, but also critiques about these actions. Based on these learnings, this chapter provides a conceptual framework for strategies for these problems.

Chapter 4 (based on Wuyts et al. (2020) addresses the objective of estimating the potential of obsolete housing stock. This chapter and objective focus only upon vacant houses because

circularity strategies are about end-of-life solutions, while the wicked of short-lived require beginning-of-life or middle-of-life solutions. It introduces a tool to identify, map and manage vacant housing, applied to the case of Kitakyushu. The first step is a combination of an estimation model to estimate the floor space of vacant houses and a material stock calculation to separate the in-use stock from the obsolete stock (vacancies). In 2018, some neighborhoods had a higher percentage of obsolete stock than others. This qualitative data help to understand which end-of-life strategy to apply to which obsolete material stocks: which vacant houses could be reclaimed because their quality answers current housing needs, and which houses should be deconstructed for urban mining, as they are slums or do not satisfy the cultural and family norms and needs.

This dissertation concludes with a general discussion of the main findings in chapter 5. It discusses, for example, how representative this study is in material stock studies and circular area development and that the findings should not be seen as representative for the whole of Japan. The estimation model is compared with a local survey of 2014-2015 vacancies in different neighborhoods. There are divergences between the results of the specification and the local survey, which could mean that the estimation model is not perfectly representative: a missing temporal aspect or personalized estimation models for lower-level (of the district) might be the reason. The quality of this obsolete stock cannot be derived from GIS data; therefore, a complementary study of local history in a few neighborhoods and history of economic structures and housing needs and norms in Kitakyushu and Japan was conducted. Bottom-up material stock studies retrieving data from GIS can provide information on the material availability, but these data types do not show which materials are available for circular actions like urban mining or adaptive reuse. These results confirm that a material stock study is insufficient to develop a material sound cycle strategy for obsolete stock. Findings from other studies are needed to complement the gaps in these methods.