



Promoting co-housing

A multi-level analysis of challenges and opportunities

Title page

Type of Thesis:	Master's thesis
Project title:	Promoting co-housing: A multi-level analysis of challenges and opportunities
Characters incl. spaces:	168.959
Programme:	Msc Sustainable Design
Department and Study Board:	Department of Planning Aalborg University, AAU-CPH
Project duration:	February 2020 - August 2020
Supervisor:	Susse Georg
Authors:	Nicoline Nørup Sillesen Study no. 20180442
Date:	August 3rd, 2020

Abstract

In the 60s, an alternative housing form, co-housing, arose as a rebellion against the isolation of the individual and the family. In the recent years, a new revival of co-housing has occurred. Using multi-level perspective as a frame of reference, the reasons behind co-housing's latest revival are sought to be uncovered, in this master thesis. Moreover, the existing housing market is analyzed, using multi-level perspective and strategic niche management, to understand why co-housing has still not gained a larger penetration in the housing market of Denmark.

It is concluded that the revival of co-housing in Denmark is due to societal changes, such as an increased number of elderlies, singles, lonely people, changed family patterns, and a growing wish for community.

The above-mentioned societal changes beg the question of whether the dominant housing types in Denmark, single-family houses, and apartments, are still the most optimal ones.

Furthermore, it is concluded that the reasons that co-housing is not more widespread, among others, is that the real estate market is structured around a cost-efficient and profit driven mindset, with a lack of innovation. Locked legislation and practices that have been structured around individual ownership of housing units, together with a lack of knowledge, makes it difficult for alternative housing forms to gain entry.

A website meant to facilitate structured information sharing and networking is proposed as a mechanism of promoting co-housing and making it more common than is currently the case.

Acknowledgements

First of all, I would like to express my gratitude and thank all the people who took the time to answer my questions, through interviews and emails, and give me an insight into the building sector and the challenges that can typically be encountered in connection with creation of a co-housing community. Furthermore, I would like to thank Rambøll, for sparring and for helping me with connections to relevant experts through their network. In addition, I would like to thank my supervisor Susse Georg. Her guidance and professional contributions have been of paramount value in this process.

Lastly, I would like to thank my boyfriend, family and friends for sparring and support during the preparation of this master thesis.

Table of contents

Abstract	1
Acknowledgements	2
1. Thesis introduction	1
1.1 The field of co-housing.....	4
1.1.1 The definition of co-housing	4
1.1.2 Co-housing as a niche.....	4
1.2 Research question.....	5
1.3 Relevance of topic.....	6
1.4 Thesis structure.....	7
2. Theoretical framework	8
2.1 Transition of socio-technical systems	9
2.2 Multi-level perspective	9
2.3 Strategic Niche Management.....	12
2.4 Sub-conclusion	14
3. Methodology	15
3.1 Researching the field.....	15
3.1.1 Literature review	16
3.2 Accessing the field.....	16
3.2.1 Semi-structured interview.....	16
3.2.2 Interview guide	17
3.2.3 Selecting the interviewees	18
3.3 Theory-driven analysis	20
3.4 Design methods	22
3.4.1 Persona	22
3.4.2 Storytelling	22
4. Transitioning to co-housing -a literature review.....	23
4.1 Main technologies of the literature	23
4.2 Main challenges and barriers of transitions.....	24
4.2.1 Challenges and important processes of transitioning in general	24
4.2.2 Challenges and important processes of transitioning in the building industry	27
4.3 Debates, conflicts and contradictions of the theories	28
4.4 Sub-conclusion	30
5. Co-housing: a historical perspective	31
5.1 A bird's eye view of the development of co-housing.....	31
5.1.1 The first phase.....	33
5.1.2 The second phase.....	35
5.1.3 The third phase	36

5.2 The revival of co-housing	38
5.3 Sub-conclusion	40
6. Understanding the lock-in.....	41
6.1 Theory-driven analysis	41
6.2 Findings – the housing regime	42
6.2.1 The Policy dimension.....	43
6.2.2 User practices and application domains(markets)	47
6.2.3 The industry structure dimension	51
6.2.4 The culture and symbolic meaning dimension	53
6.2.5 Other dimensions	54
6.2.6 Sub-conclusion	54
6.3 Findings – promoting co-housing.....	55
6.3.1 Expectations	55
6.3.2 Learning processes	56
6.3.3 Social networking	58
6.4 Sub-conclusion	59
7. Discussion	60
8. The concept	70
8.1 The user group	71
8.2 Opportunities today	72
8.3 Storytelling	72
8.4 The prototype	74
9. Conclusion.....	79
References	81

1. Thesis introduction

An increasingly aged population, changing family constellations, more single person households, climate change, urbanization, loneliness and social isolation. These are just some of the changes, which we are currently facing in the 21st century. The question is whether the dominant single-family house is the optimal housing type in terms of handling these changes.

According to the United Nations, the part of the population aged 65 and over will make up 16% of the global population, and 25% in Europe and Northern America by 2050 (United Nation, 2020). For comparison every fourth Dane will be over 60 years old by 2040 (Realdania, 2020). According to Elizabeth Burton, professor in sustainable building design and wellbeing at Warwick University, the problem is that there are few housing options for the aged population, they can either choose between a normal house or a care home (Smedley, 2012). It therefore seems that we need a new type of house that suits the wishes and needs of the growing aged population.

Another change we have experienced in recent decades is a significant change of the Danish family constellations. According to The Danish Ministry of Immigration, Integration and Housing, families with children (two adults and at least one child) made up 60% of all households in Denmark in 1950. Today this family constellation only accounts for approximately 18% of all households in Denmark (Udlændinge-, Integrations- og Boligministeriet, 2016). Furthermore, there are currently 37 different family constellations, according to a survey by Statistics Denmark (2020). The nuclear family with a father, a mother and children, is increasingly supplemented by other forms of cohabitation. Currently the dominant family constellation is still the classic nuclear family (a parent couple with shared children), and the second most common constellation is a single mother with children (Dansk Statistik, 2015).

In relation to these changes, the group of single adults has grown significantly, in the last decades. According to Organization for Economic Co-operation and Development, single person households will make up around 40% or more of all households in the OECD countries by 2025-30 (OECD, 2012). In comparison, the number of single adults in Denmark is 1.6 million (Dansk Statistik, 2016). This corresponds to 37% of all adults in Denmark, and is the highest number measured in the 30 years it has been counted (Dansk Statistik, 2016). This development can be assumed to put pressure on the existing housing mass. Simultaneously it can be assumed that this development can call into question

whether the dominant single-family house is still the most optimal type of housing, or whether we should rethink the way we live and build.

According to the European Commission, the increased aged population and number of people living alone have contributed to an increased population who feel lonely (European Commission, 2018). The European Commission found that 7% of European adults often feel lonely and 18% are socially isolated (European Commission, 2019). This is according to Anne P. Glass (2019) important because loneliness includes health and mortality risks that are considered equal to or worse than smoking and obesity. Again, this can bring into question whether the individualized real estate market is optimal.

Another challenge that we are currently facing in the 21st century, is an increased urban population. According to The United Nations more than half of the planet are living in cities today, which is expected to have increased up to 68% by 2050 (United Nations, 2018). According to Sofie Thorsen, PhD at Gehl Architects and the Techno Anthropology Lab, many countries will face challenges in meeting the needs of the growing urban population. According to her it will put an enormous pressure on the existing housing market, with increased house prices and a lack of access to affordable housing (Thorsen, 2019). This means new cities and housing opportunities must be built, to provide sufficient housing for the fast-growing urban population.

According to Kathrine Nykjær Brejnrod, Pradip Kalbar, Steffen Petersen and Morten Birkved, the construction sector accounts for 40% of the global energy use and everyday operation, and around 30% of the global greenhouse gas emissions (Brejnrod, et al., 2017). The growing urban population, and the extension of the city can therefore be assumed to result in environmental problems as well.

The demographic change, the increase in the number of single-person households, the changes in family constellations, the climate change and the growing urban population etc. put pressure on the existing housing market. Radical changes in the way our housing is structured, could be assumed to be an answer to these challenges. One solution could be co-housing. Although co-housing can occur at a variety of scales, it is generally, according to Anitra Nelsen (2018), connected neighborhoods of multiple households in which each household has its own private dwelling, but shares common areas, resources, and common household activities with their neighbors.

In the last couple of years there has been a rise of co-housing in (and outside) North America and Europe. In Denmark we are also experiencing a revival of the co-housing model. According to the Danish Ministry of Immigration, Integration and Housing (2016), co-housing communities are

currently being planned and built at a level that has not been seen since the golden age of housing in the 70s and early 80s.

Several Danish municipalities and urban development projects have seen the co-housing model as an opportunity to attract resourceful and enterprising citizens and strengthen the social sustainability of the municipality (Realdania By & Byg, 2019). Besides the Danish municipalities and urban developers, The Danish Government, has also shown an increasing interest in this alternative housing form in recent years. The last centuries' movement from countryside to the city has left many homes and commercial buildings empty in the small towns (Udlændinge-, Integrations- og Boligministeriet, 2016). The Danish Ministry of Immigration, Integration and Housing (2016) have therefore seen a potential in combining the growing interest for co-housing using the many empty buildings. The ministry's hope is that the transformation can create more life and growth in the smaller towns and villages.

Despite the growing interest in co-housing, only approx. 1% of the Danish population were living in co-housing in 2011 according to Sargisson cf. Jakobsen and Gutzon (2018). Furthermore, Nina Kovsted Helk, philanthropic director of Realdania, cf. Dahl(2020) states that despite the radical change of our family constellations, the building industry continues to build housing designed for the classic nuclear family. So, it may seem that the current housing stock does not reflect our society. According to Helk cf. Dahl(2020), this is partly due to the fact that construction is an extremely linear process, with no or very few feedback loops. In the building industry, there is a general tendency to think in traditional solutions, which can be assumed to be a result of the given financial and temporal pressure. This can be assumed to make it difficult for the sector to deviate from current processes, which minimize the innovative thinking.

In this master thesis, I will investigate the Danish housing industry, and the revival of co-housing in Denmark. To do this I will draw on the multi-level perspective theory (Geels, 2002), which was developed to explain technology change and transition. In addition, I will investigate how co-housing can be made more common. I will do this by using strategic niche management (Kemp, et al., 1998), which emphasizes the need to experiment in incubation rooms protected from the normal market forces, to promote learning and research.

1.1 The field of co-housing

1.1.1 The definition of co-housing

According to Henrik Gutzon Larsen (2019), senior lector at Lund University, the revival of co-housing we have experienced in recent years, has resulted in significant academic interest. But according to Yael Arbell, PhD student at University of Leeds (2016), researchers have been so fascinated by the growing interest, that there today probably exist more co-housing studies than co-housing projects. This imbalance could be due to difficulties with establishing co-housing units in the current housing market.

There is also disagreement of the definition of co-housing in the field. This could be because no general definition of the co-housing model exists according to Roskilde municipality (2020) and “Bofællesskab.dk” (2019) (a Danish interest organization that tries to promote co-housing in Denmark). Based on collected empirical literature, in this master thesis I am going to define co-housing as:

A housing community made up of several individual units, where each household has a private dwelling area, but shares extensive common space(such as a shared kitchen), resources (such a cars) and activities(such as cooking and childcare) with their co-housing neighbors

Aspects such as tenure and ownership forms can vary. According to Pernilla Hagbert, Henrik Gutzon Larsen, Håkon Thörn and Cathrin Wasshede (Hagbert, et al., 2020) the Danish co-housing communities are based on three main tenure forms: Owner occupation, housing cooperatives (in Danish *andelsforeninger*) and non-pro rental housing (in Danish *almene boliger*). Among those forms, the dominant tenure form today is, according to Hagbert et. al (2020), the owner occupation. In this master thesis, because of the delimit field, I will focus on all the three tenure forms.

1.1.2 Co-housing as a niche

Looking at the housing statement for 2020 made by Statistic Denmark (2020), approx. 43% Danish citizens are living in single-family houses today. By comparison approx. 39% are living in tower blocks (in danish *etageboliger*) and 15% are living in terraced house, linked houses or a double house (in danish *række-, kæde- og dobbelthuse*).

As a result of a lack of a shared definition of co-housing, comparing studies becomes difficult. This might explain, why different sources state that different numbers of co-housing arrangement exist in Denmark. In the renowned book by Kathryn McCamant and Charles Durrett (2011, p. 5), the two authors state that more than 700 co-housing communities were created in Denmark in 2010. For comparison Henrik Gutzon Larsen (2019) suggests that there are no more than 150 “traditional” co-housing communities in Denmark today. By traditional he means “..communities that maintain a balance between the common and the private and are not reserved for particular group” (Larsen, 2019, p. 1361). Besides the “traditional form” Larsen (2019) suggests that approx. 250 senior co-housing communities, are established in Denmark today. For further comparison, Sargisson cf. Jakobsen and Gutzon (2018), states that 1% of the Danish population in 2011 were living in co-housing. According to Larsen (2019) the disagreement could be due to municipal residential accommodation for adults with extensive physical and psychological disabilities is also being defined as co-housing. Despite differences in the counting of co-housing projects and the amount of people living in co-housing communities, it generally seems that the percentage of citizens living in co-housing communities is significantly smaller than the percentage of citizens living in e.g. single-family house, tower blocks and terraces-, linked- or double houses. Based on the data presented above, I choose to define co-housing communities as a niche.

1.2 Research question

“How can co-housing become more common?”

To answer the research question, as aids, I have created sub-questions, to investigate and discuss the complexity of the question.

- Which factors have historically and are currently having an impact on the current spread of the co-housing communities?
- What current barriers limit the prevalence of co-housing communities?
- How are expectations, learning and networking involved in promoting community living?
- How do we as sustainable design engineers help overcome these challenges?

In the investigation process my focus is on the professional actors in the housing industry, and what they experience as challenges for co-housing to become more common.

1.3 Relevance of topic

In this master thesis I am investigating co-housing as an alternative housing form in relation to a sustainable transition of the housing industry.

As a result of the increased aged group, more singles, and the 37 different family constellations, that have arisen in the last decades, it may seem that the dominant single-family house no longer matches the need. Still, it seems like the construction sector continues to build this type of house. This indicates that radical change is needed in the housing industry.

In the literature, co-housing is often lauded as an alternative housing form, with the potential to meet these present and future challenges (Hagbert, et al., 2020). But as mentioned above only 1% of the Danish population were according to Sargisson cf. Jakobsen and Larsen (2018) living in co-housing in 2011.

For this reason, I found it interesting to investigate, what the reasons are for there being so few co-housing communities established at present, and how it is possible to promote this alternative form of housing. This article will hopefully be of interest to people that want to promote or establish co-housing communities, and who want to understand and overcome the challenges related hereto. By doing so, this thesis is meant to increase the supply and demand of co-housing in Denmark.

1.4 Thesis structure

The thesis is structured in nine chapters. Each chapter will consist of a brief introduction, and closed with a sub-conclusion, where relevant findings will be highlighted, that is passed on to the next chapter.

Chapter 1 consist of the introduction of the master thesis.

Chapter 2 the theoretical frameworks selected to investigate the field and analyze the findings, is represented.

Chapter 3, the methodology chapter, provides the methods and procedures chosen for conducting the empirical data collection, and the analysis.

Chapter 4 consist of a literature review, where an overview of current knowledge in the field of housing and transition is represented, together with an identification of relevant general challenges in relation to the transition processes.

Chapter 5, consist of a representation of the co-housing model in a historical perspective, based on the theoretical framework the Multi-level Perspective.

Chapter 6 consist of findings from a theory-driven analysis of the collected empirical material from the interviews.

In chapter 7 the findings are discussed in relation to the theoretical frameworks, and the existing literature in the field of housing and transition management.

Chapter 8 consists of a proposal for a solution to the research question, based on the findings.

In chapter 9, the entire thesis, and my contribution within the field is concluded.

2. Theoretical framework

As described in the introduction, it may seem that some of the many changes we are currently experiencing, may call for a new housing structure. Therefore, I have chosen to make use of two different theoretical framework tools within the transition theory, the Multi-Level Perspective (MLP) and the Strategic Niche Management (SNM). These tools should help me understand what barriers prevent the alternative form of housing, co-housing, from breaking out of the niche position, as well as how co-housing can be promoted. The multi-level perspective theory will be understood from Geels (2002), and the strategic niche management will be understood from Rene Kemp, Johan Schot and Remvo Hoogma (Kemp, et al., 1998).

The Multi-level perspective is a tool used to analyze the development in and of technologies, in socio-technical systems. In this master thesis, I choose to consider co-housing communities as a technology, a socio-technology, that can make people settle in a more sustainable way (use of fewer resources, sharing economy, etc.). In the dictionary, technology is defined; *“Technology refers to methods, systems, and devices which are the result of scientific knowledge being used for practical purposes”* (Collins, 2020). On the basis of this definition, I assume that co-housing can be considered a technology.

In addition to MLP, I have chosen to use the analytical tool Strategic Niche Management (SNM), which provides tools to support the societal introduction of radical sustainable innovations, in this case the co-housing community. The reason why innovations are referred to as radical is because there is a broad consensus in the literature that for a sustainable change, radical changes are required.

In the following, I will briefly explain the general reasons for the challenges that arise in conversion processes. Hereafter, I will describe the two theories, first MLP followed by SNM.

2.1 Transition of socio-technical systems

According to Geels (2005) societal functions, in this case co-housing, are fulfilled by socio-technical systems, which consist of configurations of interlinked elements such as regulation, user practice and markets, infrastructure, cultural meaning etc. According to Marjolein Caniëls and Henny A Romijn (2008) radical sustainable innovations, often face a mis-match with the existing socio-technical systems. In this case co-housing, could be seen as a radical innovation, which will have to overcome the resilience of the current housing socio-technical system to be implemented widely. The advantage of these configurations is that it creates efficient operation, but it can also lead to what, in the transition literature, is called lock-ins and path-dependencies (Weber, et al., 1999).

2.2 Multi-level perspective

MLP is a framework that distinguishes between three interconnected levels; The macro-level of the socio-technical landscape, the meso-level of regimes, and the micro-level of niches (Geels, 2010). In MLP, transitions in society are seen as a result of interactions between the three levels, and action at each individual level (Bilali, 2019; Geels & Schot, 2007).

The socio-technical landscape refers to technological trajectories of external factors, such as demographic change, climate change and changed family constellations, which we are just experiencing presently (Bilali, 2019). Change at the landscape level can put a pressure on the regime. This can, for example, be the changes in family constellations, which put pressure on the existing house regime. In addition, the change can create opportunity for niche innovations to break out of the niche level (Bilali, 2019). Change at the landscape level, usually takes place slowly (decades), because of the high degree of alignment (Geels, 2002).

The socio-technical regime refers to the dominant culture (thinking), structure (organization) and practice (doing), in the form of heterogeneous elements such as infrastructure, regulation, networks, routines and more (Arentshorst & Peine, 2018). Linkage and alignment between those heterogeneous elements, as well as shared structures and coordinated actions among large groups of stakeholders, create stable configurations (Geels, 2002; Geels, 2019).

Reproduction, maintenance and incremental improvement of the linkages, by the alignment create over years path-dependence due to various lock-in mechanisms such as existing regulation, standards

and political networks (Geels, 2002; Geels, 2019). Further powerful actors can contribute to a repression of niche innovations through lobbyism or market control (Geels, 2005).

The stability of the configurations is dynamically stable. Tension and problems inside the regime can “loosen up” the configuration and, in some cases, create a “window of opportunity” for radical innovation to break out of the niche-level (Geels, 2002). It can thus be assumed that the changes that are currently taking place at the landscape level, such as the changing demographics and increasing number of singles, have resulted in problems and tensions inside in the house regime, that have likely “loosened up” the existing configuration. This can be assumed to have led to the revival of co-housing. But the lock-ins and path-dependence in regimes, means regime shifts do not occur easily, it is a gradual process of reconfiguration (Geels, 2010).

According to Geels (2002) the regime functions as a selection and retention environment. Radical new technologies have a hard time breaking through the niche level, because of the existing socio-technical configurations. Transition will only occur if the radical innovations are robust enough to challenge the dominant socio-technical regime (Geels, 2002).

Geels distinguishes between seven dimensions in the regime “...*technology, user practices and application domains (markets), symbolic meaning of technology, infrastructure, industry structure, policy, and techno-scientific knowledge*” (Geels, 2002, p. 1262). The dimensions are linked together in an internal dynamic. The theory omits explanation of the different dimensions.

The niche acts as an “incubator room”, where radical innovations are generated and developed (Geels, 2002). According to Geels (2002) the niches are important because they offer a protected space from the selection environment in the regime, and provide location for learning processes, and establishment of social networks. Because of this, niches are crucial for technological transition, but niche innovations rarely create regime transformation alone, connections with ongoing processes at regime or / and landscape level play an important role (Geels & Scot, 2008). In relation to co-housing, it could be related to these currently occurring changes at the landscape level, such as the increased number of singles, and the elderly that create some tensions and problems within the existing housing regime.

Niches are created when a technology or concept is taken out of the R&D phase and tested under special conditions that provide the necessary protection (Weber, et al., 1999). The protection is

provided by a group of players who care for the technology and finance its further development (Weber, et al., 1999). In relation to co-housing, it could, for example, be provided by interest groups, such as Realdania, which is a fund whose goal is to create quality of life for everyone through the built environment.

Many niches do not survive, because they need to compete with and surpass the dominant regimes. Their success depend, according to Arentshorst and Peine (2018), on the involvement of powerful actors from regime level.

Opposite the regime and landscape level, the niches are characterized by small and weakly linked networks of actors (Geels, 2005). Activities can go in many directions and the area is uncertain (Raven, 2005).

The key insights of the multi-level perspective is that the transition is not a result of dynamic at the specific level, but happens through interactions between process at the different levels (Raven, 2005; Geels & Scot, 2008). Niche innovations build momentum in the protected space, a destabilization of the regime create window of opportunity for the niche innovations to break through (Geels & Scot, 2008). The timing is very important (Raven, 2005). If the niche innovation has not gained enough momentum, it could thus be assumed that the innovation will fail when introduced into the existing socio-technical systems. In relation to co-housing, this could conceivably happen if the form of housing does not live up to the expectations and needs that exist, which could, for example, be an expectation of a larger social community.

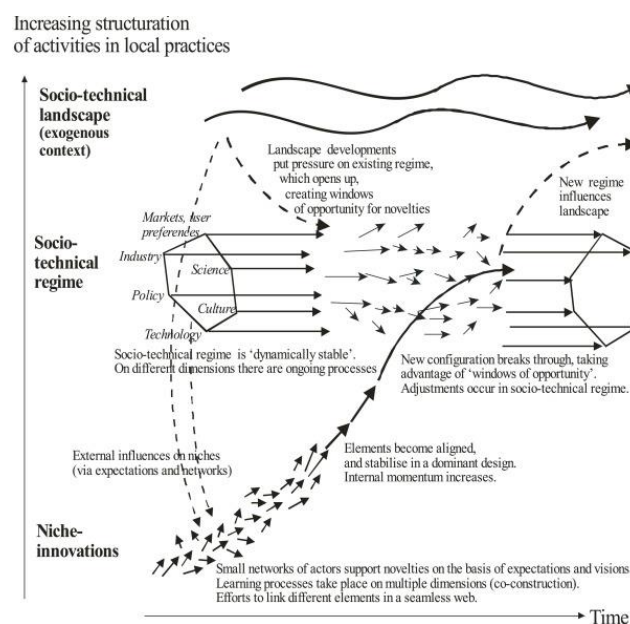


Figure 1 The multilevel perspective (Geels and Schot, 2007: 401)

2.3 Strategic Niche Management

Strategic Niche Management is a tool, that helps to understand, how the transition of an innovation from niche to regime level can be governed (Kemp, et al., 1998). As described above, radical innovations can often encounter a mismatch, with the existing socio-technical system, partly due to the existing configurations that create lock-ins. In relation to co-housing, it could be assumed that this technology could meet challenges in the form of existing regulations in the housing regime.

The core idea is to facilitate the introduction and diffusion of new sustainable technologies, through experiments, within protected niches (Caniëls & Romijn, 2008). SNM is mainly focused on how governments can achieve widespread technological change, within well-established socio-technical systems, by launching experiments, within these protected niches (Kemp, et al., 1998). However, the strategy can still be valuable, for other actors who want to manage a radical technology from niche to landscape level.

The purpose of the protected space is to give the new technology a chance to become robust enough, to eventually replace the existing system (Kemp, et al., 1998). The protected spaces, not only offer test of the design of the new technology, but simultaneous makes it possible to establish an open interactive learning process, interaction with users and learning about limitations and requirements in an isolated environment (Kemp, et al., 1998; Loorbach & Raak, 2006). At the same time, the protected space provides the opportunity to build a network around the new technology (Kemp & Scot, 2007; Loorbach & Raak, 2006).

In that way, it differs from the dominant “technology-push” approach in technology promotion policies, by bringing knowledge and expertise from users and other actors into the process of technology development (Loorbach & Raak, 2006). The SNM approach is thus based on the understanding that user needs and wishes are not fixed (Loorbach & Raak, 2006). For example, in terms of housing types, it can be assumed that the changes in family constellations that has occurred in recent decades may lead to new housing needs.

SNM encompasses three key processes, which are considered to be significant for the successful introduction of a new innovation (Kemp & Scot, 2007). The three processes are, according to R.Raven and R.Mourik defined as “..1) *the voicing and shaping of expectations and the power of these expectations in turning promises about the innovation into requirements that contribute to the*

embedding of the innovation, 2) the importance of creating networks involving different kinds of actors in the project, and 3) the importance of first and second-order learning processes in projects” (Mourik & Raven, 2006, p. 4).

According to Kemp et al. (1998) in the first years, the advantages of the new technology is not obvious. The value of the technology still has to be proven, and therefore expectations are important for making promises and raising expectations. According to Kemp et al. (1998), promises are especially powerful if they are: *“shared, credible(supported by facts and tests), specific (with respect to technological, economic and social aspects) and coupled to certain societal problems which the existing technology is generally not expected to be able to solve”* (Kemp, et al., 1998, p. 189).

According to Raven and Mourik (2006), networking is important for successful niche management, because it can help reduce complexity, scope, investment, risks and uncertainty, among others, because the network allows for an aggregation of knowledge. In addition, networks can create coordination of the heterogeneous actors involved, which can be assumed to strengthen the management of the niche innovation (Mourik & Raven, 2006).

As mentioned earlier, new radical innovations often face several barriers in the meeting with existing socio-technical systems in the regime. According to Kemp et al. (1998), it is important to learn more about these barriers and how they can be overcome. According to Kemp et al. (1998), many of the barriers arise, among other things, due to uncertainty. Therefore, an important process for successful niche management is learning about needs, problems and possibilities (Kemp, et al., 1998). Experiments is a way of stimulating this learning.

The Multi-level perspective insights have later on led to changes of the SNM understanding of the breakthrough of sustainable technologies (Geels & Scot, 2008). Previously the technological development where conceptualized as a bottom-up process, where novelties build momentum in the niches, and then conquer the market, which could lead to a replacement and transformation of the regime (Geels & Scot, 2008). Today, the niche development is seen as a result of interaction between the three layers.

2.4 Sub-conclusion

Throughout this master thesis, the two theories will be used as a frame of reference to understand why co-housing, which I consider to be a socio-technology, has still not managed to break out of the niche level. In addition, I will use this knowledge, as well as my knowledge from SNM about important processes for successful transition, to prepare a proposal for how co-housing can become more common.

Onwards, I will, among other things, take the concepts of landscape, regime and niche, which describe the three main levels in MLP theory. In addition, I will further take the concepts of lock-ins and path-dependencies, to explain the reason for some of the challenges that the co-housing, as a niche innovation, encounters in meeting the existing socio-technical systems.

3. Methodology

In this chapter, the chosen methodology for the project will be described, together with the considerations and justifications of the methods. Firstly, I will describe my methods for collecting empirical data, then I will describe which methods were used to analyze the collected empirical data, and lastly, I will describe which design methods have been used to prepare design proposals.

The data was collected in the year 2020, from the start of February to the end of July. Because of the worldwide corona crisis, that resulted in a lock-down of Denmark, all of the empirically gathered data were collected through the diverse online meeting platforms, emails, and phone call.

3.1 Researching the field

In preparing the thesis, different kinds of sources have been used. Peer reviewed journal articles have been used to get an overview of the scientific debate on transition studies, transition and co-housing. In addition, historical sources have been used to get an overview of development within co-housing. Furthermore “grey literature” such as reports, conference papers, website, book chapter etc. have been used to get an understanding for current developments relating to co-housing.

To collect material, I have primarily made use of the two search platforms “EBSCOhost” and “Scopus”. The reason for this choice is that the platforms provide multidisciplinary and subject-specific databases, which allows for searching broadly. In additions the research platform offers reliable and peer-reviewed content.

I have tried to incorporate the latest literature, and most of the sources used, especially the journal articles, they have all been published within the last 5 years. Of course, in chapter 5, that represents a historical retrospect of co-housing, it was necessary to use older sources, in the same way as in my theoretical framework (chapter 2).

In addition, retrospective research from the reference list, in the literature I found in the search, have also been used in the collection of empirical material. The collected secondary sources have, among others, been used to gain insight into the existing transition literature in the field of housing. In

addition, it has been used to gain an understanding of the origins of co-housing, as well as the subsequent two revivals.

3.1.1 Literature review

To get informed of the already existing knowledge of co-housing in the transition literature, and to form a basis for further analysis and development work, a systematic literature review has been carried out. The literature review was conducted in the research platform “EBSCOhost”, and the keywords used for the research were; *Cohousing/co-housing, co-living/coliving, shared living, cooperative housing, housing, housing market, multi-level perspective, strategic niche management, niche development and transition theory*. The keywords were combined in 36 search combinations, this resulted in 27 different research articles in the EBSCOhost database

Based on my reading of the abstract, introduction and conclusion of each article, I rated the articles based on whether the articles concerns transition processes and/or niche management either about housing or the construction sector in general, as well as whether the articles contained multi-level perspectives and / or strategic niche management. They were rated from 0-5, where 0 means no or low relevance, and 5 means high relevance (see appendix 1.). The articles rated over 3, I read, and based on the knowledge gathered, I prepared my literature review (chapter 4). Due to the few results of articles, I also chose to include literature that was not necessarily about transition of the housing regime.

3.2 Accessing the field

3.2.1 Semi-structured interview

For empirical data collection, semi-structured interviews were conducted. The reason for the choice of the qualitative approach is because this is an exploratory study. I have sought to do an in-depth analysis of the topic to obtain information on what creates these path-dependencies and lock-ins, and I considered qualitative interviews to be the most appropriate method to obtain this knowledge.

The reason for the choice of the semi-structured interview is that it allows for a systematic data collection, that ensure that all desired topics are touched upon. At the same time, it allows for some flexibility, as the order of the questions and the way they are treated may vary. In addition to the flexibility, the semi-structured interview also allows pursuing some interesting topics that the

surveyed addresses that have not been known in advance, which may lead to new insights. The interview is conducted in a deductive approach as the interview guide is heavily informed by the theoretical frameworks, MLP and the SNM concept.

3.2.2 Interview guide

Based on the collected knowledge from secondary sources and the two theoretical frameworks, an interview guide was developed (Brinkmann & Tanggaard, 2015) (see interview guide in appendix 2).

For the qualitative interview, an interview guide was prepared. I chose to use a thematic interview guide, to obtain a semi-structured interview. That is, the interview guide was structured in such a way that, on the left, it contained an overview of topics to be covered, and on the right suggestions for questions (Brinkmann & Kvale, 2015).

An interview guide can be based in a topic, which can act as a form of guidance, that helps ensure that the researcher touches on all topics and obtains the necessary information (Brinkmann & Tanggaard, 2015). In addition, the guidance offers flexibility and gives the researcher the opportunity to choose the question in a different order depending on the flow of the conversation. The idea of the guide is also to foster a positive interaction, to keep the conversation going and to motivate the interviewees to talk about their experiences in establishing co-housing communities. In order to achieve positive interaction, I acquaint myself with the companies, from which the interviewees are from, as well as the co-housing project where they have participated. As Pierre Bourdieu, renowned French sociologist and anthropologist, states: *"Researchers only have a chance of completing their task if they have extensive knowledge on the topic, which often requires a long researching career, as well as past interviews with the same respondents and informants"* (Bourdieu, 1999, p. 613). Beyond that, I conducted a pilot interview to test the questions, and see how the questions were understood (Brinkmann & Kvale, 2015). The pilot interview was tested on a construction architect, in my circle of acquaintances, who did not know about the master thesis in advance. The pilot interview taught me that the questions were too theoretical and needed to be more context specific to be understood.

The idea of the interview is to understand the socio-technical lock-in and path-dependencies in the existing housing regime, so to formulate the questions, I had to find a clear definition of the regime. To find a definition of the regime, I investigated the different descriptions of the regime in the various articles, I have used in this thesis. The different regime definition, from the different sources, was copied into a framework, to get an overview of the variations of the definitions (see appendix 3). I

ended up choosing the definition of the regime in the text by Geels from 2002 because, according to Google Scholar, it is the most cited text and the text with overall most influence and impact within the field of multi-level perspective. However, it must be said of the individual dimensions and what they include remain ill-defined in his texts.

Similarly, I investigated the description of the (internal) processes for successful development of a technological niche, in the various articles, I have used in this thesis to describe the strategic niche management theory. Similarly, to the different definitions for the regime, the different definitions for the internal processes were copied into a framework tool and compared (see appendix 4.). The definition of the three processes for successful development, where very similar in the various text. Some explanations were more detailed than other. I ended up choosing the definition of the processes from the text by Kemp, Schot, and Hoogma (1998). This is partly because, according to Google Scholar Metrics, it is the most cited, influential and impactful text in the SNM literature. In addition, the various processes are explained in great detail. However, in the creation of the questions, I also used the knowledge I gained from the other texts.

3.2.3 Selecting the interviewees

For the selection of people for the interviews, I first prepared a framework, based on the 7 dimensions that Geels (2002) describes the regime consists of. Underneath the seven dimensions, in the framework I wrote down the professions and stakeholder groups, I thought might be relevant to investigate, based on my knowledge from the theories.

After discovering the professions and stakeholder groups, I tried to find the relevant actors in each of the stakeholder groups, by relevant, I mean actors who have worked on projects with co-housing, and therefore have gathered some knowledge in the area.

To find the most relevant actors for the interviews, I mapped all existing co-housing communities in Denmark, where I could find data on whom was involved in developing and building the projects. The co-housing communities I found via the only database of co-housing communities in Denmark, which can be found on the website "Bofællesskab.dk". The database on "Bofællesskab.dk" contains primarily non-commercial co-housing communities, therefore I also did further searches on the web. The data on whom was involved in developing and building the projects, I gathered among others from local newspapers, as well as the various actors' websites, which have participated in the different co-housing projects. In appendix 5. the full mapping can be seen.

From my mapping, it was possible to see that the two Danish architectural firms “Vandkunsten” and “Mangor og Nagel” have participated in many co-housing projects and were therefore important actors to contact. Another stakeholder that appeared several times was “CASA A/S”, a project developer and turnkey contractor, which has been the contractor for many co-housing communities established within the last 10 years, which also makes them a very relevant player.

The selection of municipalities was slightly different from the other actors. In addition to researching in which cities most communities are established, in the database at “Bofællesskab.dk”, I also examined the value programs of various municipalities. I did this to find those municipalities that not only have a lot of co-housing communities, but also try to promote co-housing.

In appendix 6. is an overview of all the actors I was trying to get in touch with. In total, I approached 30, and got a total of 19 interviews. Due to COVID-19, large sections of the population worked from home, which among other things made it very difficult to get in touch with actors from the planning departments in the different municipalities. For example, Roskilde municipality, Lejre municipality, Odsherred municipality, Høje Taastrup municipality, Frederikssund municipality, and Køge municipality were all contacted but only Roskilde, Lejre and Frederikssund municipality answered the email, phone, or phone message.

Since my mapping consists only of co-housing communities where it has been possible to find at least one of the five stakeholder groups (consultant, contractor, developer, architect, or engineer), my mapping is not a representation of the total number of co-housing communities in Denmark. It is just a sample of those, it has been possible to find data on.

As mentioned earlier, there are no statistics on the exact number of co-housing communities in Denmark. At “Bofællesskab.dk” there is register 108 co-housing communities, 79 senior co-housing communities and 12 ecovillages. This database is probably the closest we can get to a listing of the number of co-housing communities in Denmark.

However, according to one of the employees of “Bofællesskab.dk”, this database is focused on the user-driven co-housing communities. This means that some commercial ones probably have been overlooked. This was also my experience in my further research, where I discovered some co-housing communities that were not registered in the database. Hence, there is most likely a greater number of co-housing communities than registered in the database, but how many are not known.

After conducting 19 interviews over a period of 3 weeks, I felt that a data saturation had been achieved as the interviews stopped providing additional insights. The interview was taped, with accept from the interviewees, and subsequently transcribed. I chose to transcribe the interviews, as I saw it as an opportunity to get deeper into the material, and thus probably gain some new insights. The different interviewees were asked the same questions based on the interview guide, however, there is a significant difference in the lengths of the interviews. The shortest lasts 5 minutes, the longest lasts 1 hour and 7 minutes. The large variation reflects, among other things, how big a difference there has been on how many and what challenges the various actors are experiencing in a co-housing project.

For the qualitative interviews the interviewees were selected from a pool of professionals. This is because I assume that the professionals first and foremost have a greater overview of the general challenges of establishing co-housing, as they have participated in the establishment of several different co-housing communities. They will therefore probably be able to see if a challenge is stand-alone or general. In addition, they probably have experience from traditional constructions, and can therefore see through the challenges, only apply to the establishment of co-housing communities, or are general in the construction. In addition, the self-grown co-housing communities are typically 5 years in the making, i.e. the regime may have changed. The challenges they have experienced may be different today.

In addition to consultants, developers, contractors, engineers and municipalities, it could also be beneficial to have talked to the financial institutions as a profession. However, it was not possible to find information on where the self-grown groups loaned their money from, instead I chose to contact Curt Liliegren, cand.polit. and director of the "Housing Economics Knowledge Center". He gave me an insight and explanation of the challenges such a co-housing community may encounter in the financial world.

3.3 Theory-driven analysis

After the transcription, an analysis of the collected data was performed. Theory-driven analysis was used to organize and structures the collected data. Theory-driven analyses is based on predefined categories drawn from the underlying theories of the project from which deductive knowledge is derived (Thisted, 2018). The method is also called etic-coding or coding from above (Brinkmann &

Tanggaard, 2015). In this case the predefined categories are based on the Multi-Level Perspective and the Strategic Niche Management.

As a start, the transcripts were systematically reviewed to get a general feeling and reflect upon the data collection. After the systematic review of the material, I began the analysis slavish. I reviewed the individual transcripts, and selected quotes that described something about elements within the seven different dimensions of the regime, or the three internal processes in SNM. The quotes were copied and pasted into the framework, to the dimension or internal processes that the text segment matched (see appendix 7.).

After copying the text segments into my theory-driven framework, and dividing them into the seven different dimensions, the quotes were printed and cut out, thus the quotes were distributed to each own paper lab. This subsequently provided an opportunity to organize and group the quotes within the different dimensions, and the three internal niche processes. This also provided an opportunity to see what challenges in my collected empirical material are mentioned most frequently and provide in addition an opportunity to see which actor groups that are experiencing the different challenges.

Based on this grouping of the quotes from the interviews collected, the quotes got reduced to keywords in the framework.

The analysis allowed me to structure the data collected and find pervasive patterns and themes. Furthermore, it gave me a deeper insight into the collected data. The simplified keywords and the selective selection of the text segments can result in loss of detail. The advantage, however, is that the keywords can help provide a quick overview and understanding of the individual challenges of the existing housing regime found in connection with the field work.

In the analysis the actors have subsequently been anonymized by their job title distributed into the five different groups of actors: architects, developer, contractor, engineer and municipalities (in danish *arkitekter, bygherre, entrepenør, ingeniør og kommuner*). I have chosen this simplification because, based on the theory, I am not interested in the individual actors, but are trying to create an overall understanding of the challenges that the five different actor groups in the housing regime are experiencing. In addition, I wish the actors were as honest as possible, which I hoped to promote by anonymizing them.

3.4 Design methods

3.4.1 Persona

Based on the theoretical knowledge, as well as knowledge gained through analysis of collected empirical data, I prepared a design proposal for a website, as a proposal for how to optimize an already existing platform, to promote co-housing.

To create the platform, I made use of personas, introduced by Alan Cooper (1999). According to Nigel Cross (2008), a persona is a well-defined but fictional user that represents the different user types one could imagine might be particularly interested in the product. In this case a platform with, among others, access to information on establishing co-housing. According to Blomkvist (2002), the persona is not a representation of a real or average user, but instead prepared on the basis of data, in this case interviews and research. According to Blomkvist (2002), in order to make the persona tangible and alive, the persona consists of fictitious personal information such as name, age and picture. In addition, the persona also consists of the potential user's needs, behaviors and motives.

According to Nielsen (2004), persona is a help to the designer to gain an understanding of the needs of potential users. In addition, it is a way of creating a common, as well as holistic understanding, which facilitates communication (Nielsen, 2004) .

3.4.2 Storytelling

In preparing my design concept, I investigated what possibilities currently exist for as a private person to find knowledge digitally about establishing a co-housing community etc. To make my observations more tangible and interesting, and to put the reader in the elaborated persona situation, I used the storytelling method.

Storytelling is typically used to make business models more tangible, as well as effectively conveying what the business model is about (Osterwalder & Pigneur, 2013). Instead of conveying a business model, I have instead tried with the model to convey the challenge itself.

4. Transitioning to co-housing - a literature review

In this chapter, a review of the relevant literature, in the field of housing, multi-level perspective and strategic niche management, will be presented. The keywords used for the literature search are listed in the methodology chapter 3. The purpose of this review is to create an overview of the existing knowledge within the field, and to investigate how this master thesis can fill a gap in the existing literature.

First, it will be described which technologies are typically described in this field. Then I will briefly describe which technologies that is analyzed, in my literature review. Next the different challenges mentioned in relation to transition processes and niche management in the literature will be presented. Finally, important critiques of the theories MLP and SNM found in the literature will be presented, so that these can be accounted for, when employing these theories.

4.1 Main technologies of the literature

According to Marlous Elisabeth Arentshorst and Alexander Peine (2018), there is a growing body of literature dealing with the analysis of transition of socio-technical systems and the innovations that this requires. The majority of the literature focuses on socio-technical transition in the field of transportation, energy, agriculture, health care, water, and water management etc. (Arentshorst & Peine, 2018).

However, in what follows emphasis will be given to analyses of transitions within housing and construction, with particular focus on; Age-friendly homes and neighborhoods, community-led housing, low-carbon housing refurbishment, zero energy homes, wooden multistory construction, and energy efficiency technology. In addition, I have also chosen to include an article with a particular focus on the transition of the Dutch water management, as I thought the text had points that also apply to housing.

4.2 Main challenges and barriers of transitions

The body of the literature review have been thematically organized in challenges, and elements of great importance in regard to successful transition. At first the general challenges, as well as important processes in relation to transition, will be presented, subsequently the more specific ones in connection with the housing industry will be described.

4.2.1 Challenges and important processes of transitioning in general

In the literature several of the authors state that one of the challenges of transitioning is a silo-based approach, with no or very little collaboration between different disciplines, across different sectors. This can be assumed to be the same challenges within the building sector. For successful transition Arentshorst and Peine (2018), and Rutger van der Brugge, Jan Rotmans and Derk Loorbach (2005) state that there is a need for system change, in the form of a cross-sectoral collaboration (Arentshorst & Peine, 2018; Brugge, et al., 2005)

For example H.Strasser, J.Kimman, A.Koch, O.Mair am Tinkhof, D.Müller, J.Schiefelbein and C.Slotterback (2018) explain that the energy and urban planning in many countries are often separated disciplines. This means that decisions are often based on limited views and insights from own professional practice. Strasser et al. (2018) states, in the case, that for successful urban energy planning, the disciplines energy planning and in urban planning should be integrated.

One of the advantages of the cross-sectoral collaboration and interactions of stakeholders from different disciplines is according to Arentshorst and Peine (2018), and Strasser et al. (2018) that it often result in new insights and interdisciplinary decision-making, which makes it more likely that all important aspects, will be included. It can thus be assumed that a cross-sectoral and more holistic perspective can be an important element in successful transition management. However Strasser et al. (2018), and Brugge et al. (2005) also stress that a cross-sectoral approach has to deal with the increased complexity, as a result of the many stakeholders involved with different interests and high stakes. This can make the process complex and difficult to manage.

Another challenge of the silo-based thinking, is according to Strasser et al. (2018) that every department often has its own data pool, and data management concept. This can be assumed to make exchange and merging of data across departments more difficult.

Other barriers and challenges mentioned in several of the articles are the lack of shared visions, targets, languages and definitions. According to Richard Lang, Paul Chatterton & David Mullins (2019), Arentshorst and Peine (2018) and Strasser et al. (2018) shared visions and targets are central element of a successful transition management process. Which could seem to be well aligned with one of the internal processes in the SNM, the importance of shared expectations. Shared visions help create a common understanding between different stakeholder groups and guides the field in the same direction (Strasser, et al., 2018). According to Arentshorst and Peine (2018) a shared vision is also important in order to mainstream practice and facilitate knowledge sharing. Lack of visions might according to Arentshorst and Peine (2018) result in incompatible and confusing projects within communities. Likewise, a lack of targets might according to Arentshorst and Peine (2018) result in visions that is difficult to achieve. Like shared visions and targets, a common language is according to Arentshorst and Peine (2018) and Strasser et al. (2018), also stressed to be important to guide the field, and facilitate knowledge sharing in the transition. According to Arentshorst and Peine (2018) the shared visions should be developed in a multi-stakeholder process.

Another central element of successful transition, mention in the literature, is shared structuring elements, such as standards, guidelines, key performance indicators etc. (Arentshorst & Peine, 2018). According to Arentshorst and Peine (2018) structuring elements makes visions measurable in order to monitor and evaluate.

Regarding successful transition management, several of the authors in the literature stated the importance of stakeholder involvement. According to Strasser et al. (2018) the involvement of the stakeholders helps building consensus, improving the outcomes of planning efforts, building support for the implementation, creates a stronger business case, and strengthens the linkage between the stakeholders. Strasser et. al (2018) stress the importance of the engagement as soon as possible in the process.

Besides the importance of the stakeholder involvement, in regard to successful transition management, Arentshorst and Peine (2018) stress the importance of the engagement of powerful actors at the regime level, as well as a mobilization of their resources and networks. Likewise, Gavin

Killip (2013) argues, that it is the interaction between the niche and regime actors that brings about change. This could seem to be well aligned with one of the internal processes in the SNM, the importance of social networking.

Other elements, in the literature that is highlighted of great importance for successful transition, is education and learning, which likewise seem to be well aligned with one of the internal niche processes in SNM, the importance of learning. Stephen Berry, Kathryn Davidson and Wasim Saman (2013) stress the importance of niche events for facilitating learning and education, as well as providing the opportunity for new ideas, artifacts and practices to evolve without the exposure of selection pressure from the regime.

According to Brugge et al (2005), the creation of space for innovation is crucial to challenge the dominant perspective and practice in the regime. For example in the case of Lochiel Park, Berry et al. (2013) states that the niche events have provided the opportunity to communicate new opportunities and understanding. But it has also been stated in the literature among several of the SNM authors, that niches alone are unlikely to transform regimes, instead the potential benefits of multiple niche projects has been highlighted of great importance (Berry, et al., 2013).

Another challenge mentioned in the literature is a lack of market, to support the implementation of an innovation. In the case of the age-friendly homes and neighborhoods in the UK, Arentshorst and Peine (2018) states that the lack of market is probably not a result of a lack of interest but rather a result of an unawareness of the opportunity of the age-friendly housing, because of a lack of information of the opportunity, and no access to services where the opportunities is provide. This situation also prevents the citizens from expressing their needs, wants and desires (Arentshorst & Peine, 2018). According to Arentshorst and Peine (2018) the lack of expressed demands, needs and desires from the citizen, results in a lack of initiative to produce knowledge within involved sectors. Arentshorst and Peine (2018) stress that this might then result in “waiting games”, where the various actors require actions from other actors in the sector to take the initiative to improve themselves. In the case of the age-friendly housing, the participants in the research stated that information of the available solutions needs to be available, to channel existing capital and consumables for the age-friendly housing domain or create functioning markets (Arentshorst & Peine, 2018). Generally, it seems that information and communications with potential users, is an important element in creating a market.

4.2.2 Challenges and important processes of transitioning in the building industry

In the section above, the general challenges and important processes mentioned in the literature in relation to transition processes are described. In this section, the challenges mentioned in relation to transition processes within the building sector are described, based on knowledge gathered from the literature.

Anne Toppinen, Miska Sauru, Satu Pätäri, Katja Lähtinen and Anni Tuppur (2018) stress that in order to manage the complexity of construction processes, roles and tasks of the different actors have become highly standardized and routinized. As a result of the established interconnection of current technology, institutions and society, the current system has gained momentum, which makes attempts to change the dynamics of the sector difficult (Berry, et al., 2013; Toppinen, et al., 2018). This is what is defined as lock-ins and path-dependencies, in the MLP literature.

The construction sector is according to Toppinen et al. (2018) affected by aspects of the industrialization, such as routines and efficient labor use. This aspects have improved the cost competitiveness, but research has shown that the project-based structure and strong culture traditions in the construction sector hinder the innovation in the case of the Finish construction sector (Toppinen, et al., 2018). It can be assumed that the Danish building sector likewise has been affected by aspects of the industrialization, that has hindered the innovations as well.

Research also show that the project-based structure in the construction sector, which is based on temporary cooperation between different actors, have result in a lack of mechanism to transfer experiences from individual projects to company-level decision making (Toppinen, et al., 2018). This could probably be assumed to create barriers in the sector for, e.g., continuous learning.

4.3 Debates, conflicts and contradictions of the theories

In several of the articles, the multi-level perspective has been used to analyze the different historic case studies. Berry et al. (2013), Brugge et al. (2005), Arentshorst and Peine (2018) and Toppinen et al. (2018) argue that the framework helps to understand the mechanism and dynamics of a socio-technical system. In addition, it is argued that the framework can help to obtain insights and identify barriers that hinder the development and implementation of innovations (Arentshorst & Peine, 2018).

Although several of the authors in the literature argue that MLP is a good framework for understanding how transitions from one socio-technical system to another one come about, the framework is also criticized. For example, Berry et al. (2013) criticized the framework for staying outside the transition process, and looking down, rather than inside. According to Berry et al. (2013) this results in a lack of focus on the specific impacts and the interaction between niche event and the established regime, during the development of the niche or the transformation of the regime. Often the process of the regime shift is instead explained based on the historic record. In this thesis, I will try to make reservations about this by examining the regime from within.

According to the strategic niche management concept, it has been used in the articles as an analytical tool to investigate and understand system transformation through innovations, as well as how transitions from niche to regime level is managed. In the literature, it is argued the concept provide a framework for how the government can promote the introduction of new radical innovations, through the establishment of experiments in protected niche (Lang, et al., 2019; Lovell, 2007).

Like the MLP framework, SNM has also been criticized in the literature. In the article by Lovell (2007), she investigates some of the tensions in the concept of strategic niche management, drawing on research of low-energy housing niches within the UK. According to Lang et al. (2019) their research shows some limitations of the SNM concept. The limitations are, among others, stated to be the result of the SNM concept being proposed to help governments understand and manage transitions of innovations from niche to regime level (Lang, et al., 2019). However according to Lang et al. (2019) the case of low-energy housing in the UK highlights that the niche not only could be a product of a coherent strategy by the Government. In the case of the low-energy housing in UK, the niches are mainly developed by non-governmental actors, but have even though affected the policy.

In general, the concept is criticized by several authors for paying too little attention to the diversity of the way in which niches emerge and are used by governments. Heather Lovell (2007) stresses that the literature has to pay much more attention to the messiness and complexity of the socio-technical system change, and the variety of ways in which niches emerge and could be used by governments. Lovell (2007) also stresses the fact that the SNM literature consist of very few case examples, which according to Lovell, is likely due to the fact that well-planned and long-term management in real life is rare. In this thesis, I will try to make reservations about this, by focusing on the different ways niches can arise, and the messiness of complexity.

Lovell (2007) also states the fact that privatization in the UK, has decreased the government's ability to implement sector-wide legislation to achieve radical change within socio-technical systems. The privatization has resulted in the government no longer being the only actor in the regime with the resources to manage long-term fundamental change (Lovell, 2007). Based on that, the author stresses the importance of the niches as an attractive political goal, because the Government's political power and capacity to create system change has diminished. According to Lang (2019), niches are instead less likely to threaten powerful interests embedded within the existing socio-technical change, and act as more productive ways of incorporating new technologies.

In relation to the privatization and the reduced policy capacity, Lovell (2007) also stressed the fact that governments tend to be deeply embedded within the existing socio-technical systems, and it therefore must be assumed that the government face challenges in creating radical change. Lovell (2007) also stresses the fact that heavy lobbyism is taking place in the construction industry, which, in the case of low-energy housing in the UK, has resulted in regulation being toned down.

I would imagine that the government in UK has less political power than the Danish government, in the building sector, and therefore experiences these challenges with SNM. The power of the Danish government is probably more like the Dutch government, where the theory has just emerged. This means that we probably do not experience the same problems of reduced resource and political power in Denmark, however, I assume it is still important to account for.

In the article by Lang et al. (2019) they are also addressing some gaps in the SNM literature, together with some suggestions for improvements. In the article the authors state that the intermediaries' role, is crucial for successful SNM, to understand how path-breaking innovations escape from their protective spaces and interact with wider regime change processes. However, the authors point out

that the intermediary's role according to the niche development and up-scaling of grassroots innovations, takes up very little space in the literature.

In general, several of the articles in the literature also emphasize that the transition processes are often much more chaotic and messy than mentioned in the MLP and SNM framework, and that future literature on the subject should focus more on this (Berry, et al., 2013; Lovell, 2007; Brugge, et al., 2005).

4.4 Sub-conclusion

The literature review has provided me with an understanding of the general challenges associated with transition processes. In addition, it has given me an insight into how to handle these challenges, as well as an insight into important processes for successful transition management. This knowledge will be used in my study of how co-housing can be made more common. In addition, it has given me an insight into the disadvantages of the applied MLP and SNM theories, which I will try to make reservations about in my study.

In addition, it may seem that the literature generally focuses on technologies and tech systems, and not on "social technologies" such as co-housing. It can therefore be assumed that this master thesis can bring new knowledge to the field.

5. Co-housing: a historical perspective

To make co-housing more common, it may be important to understand why co-housing has not managed to break through the niche level yet. One way to do that is by examining the technology in an MLP perspective. As previously described, MLP is good at examining developments in and of particular technologies.

In this section, it will be investigated how co-housing came into being. Furthermore, movements and change, at the regime as well as the landscape level, during the arise of co-housing and the following two revivals, will be investigated. The mainstream building and planning sector will in MLP terms be regarded as a part of the regime.

In preparing this section, I have taken my starting point in the book, “Creating Cohousing: Building Sustainable Communities” by Kathryn McCamant and Charles Durrett (2011), and “Contemporary Co-housing in Europe: Towards Sustainable Cities” by Pernilla Hagbert, Henrik Gutzon Larsen, Håkan Thörn and Catrin Wassheden (2020) in addition, I have supplemented with knowledge from articles, Danish history books, and webpages.

Hopefully, this investigation can give a historical insight into why co-housing has not managed to break out of the niche level, despite the two revivals. Insight gained is hoped to help understand how to increase the market penetration of co-housing.

5.1 A bird’s eye view of the development of co-housing

Denmark and Sweden are often seen as co-housing pioneers, when it comes to co-housing (Hagbert, et al., 2020). In the literature the Danish co-housing has been described as taking place in three phases(Hagbert, et al., 2020). According to Hagbert et al. (2020), the first phase took place from about 1970 to 1981, the second from 1981 to 2004, and the third from approx. late 1990s until today. In the following sections, I will use an MLP approach to describe the movements and changes at the landscape, regime, and niche level in the three phases.

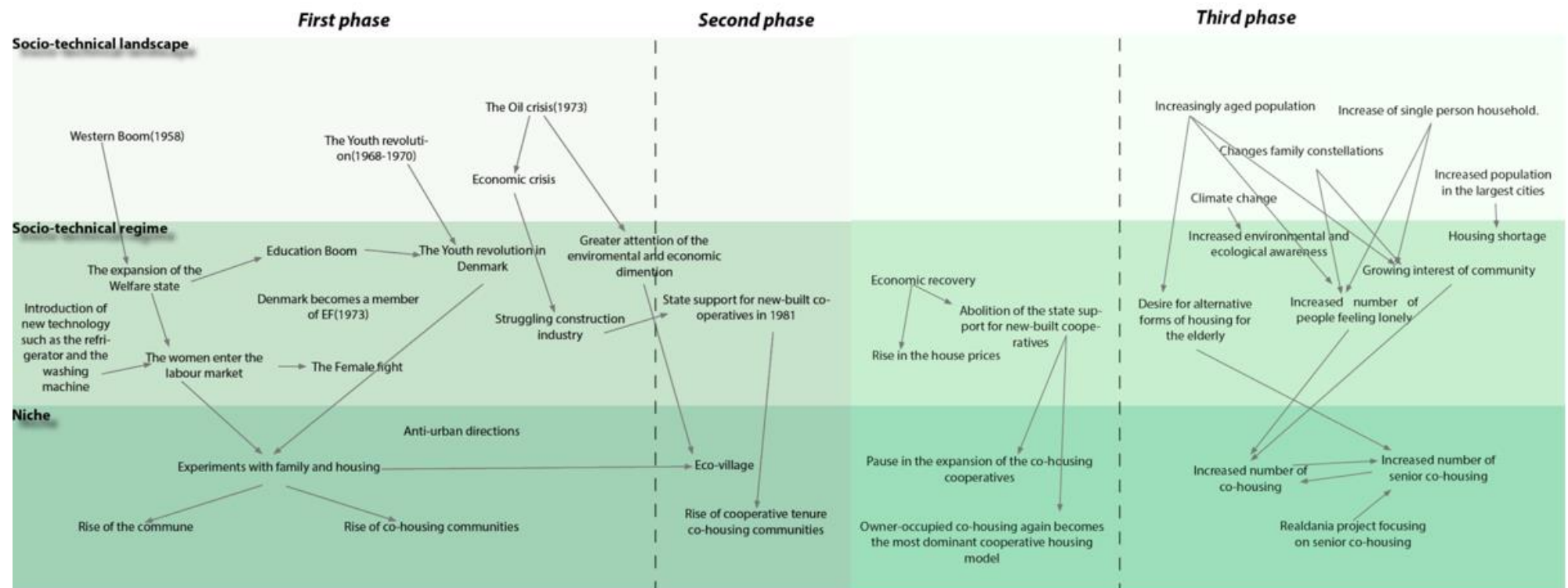


Figure 2 MLP mapping of co-housing in a historical context

5.1.1 The first phase

In the 1950s and 1960s, Denmark experienced an economic boom. Under the Social Democratic government, the initial development of the welfare state occurred (Rasmussen & Brunbech, 2009). The economic increases, which can be seen as changes at landscape level, may seem to have led to changes in the housing regime, where the wider middle class, in these years, could realize the dream of moving into a single-family house, with car and television (Feldbæk, 2010). The increased prosperity that resulted in more people being able to realize the dream of moving into a single-family house, led to a pressure on the existing housing stock. This can be assumed to be the reason for the explosive increase in the construction of single-family houses in the subsequent period (Andersen & Jensen, 2019). Better and bigger houses started to get mass produced (Andersen & Jensen, 2019). The mass production of the series manufactured houses, entail that they become more affordable for a wider group of the population, and played according to Vibeke Andersson Møller (2019) an important role in the construction of the welfare society. Unlike, the movements from the countryside to the city, in the previous century, in this period the Danish population started to move from the city and out into the suburbs, where similar houses lay side by side (Andersen & Jensen, 2019).

According to Astrid Elkjær Sørensen (2018), the 1960s was also a time where there was a significant increase in students taking youth education and university programs. The new prosperity and education boom, opened according to Sørensen (2018), up for the youth to be critical of the design of society, as well as their parents lifestyle. This change at the regime level, resulted, in protest against the isolation of the nuclear families, consumerism and the authoritarian and capitalist society (Hagbert, et al., 2020). As a result, dissatisfaction with the existing house regime arose. This could be assumed to be the reason why experiments with alternative family structures and the form of housing emerged during the same period. For example, during this period, an alternative form of house called communes (in Danish “kollektiver”) started to emerge. This alternative house form could be considered a niche.

The mass production of standard houses, and the expansion from the city to the single-family house in the suburbs, continued in the 70s, despite changes taking place at the landscape level, such as oil crisis and economic downturn (Andersen & Jensen, 2019). One of the reasons for the continued mass production and expansion of single-family housing, were the tax benefits the state introduced to make it a good investment to buy a house (Andersen & Jensen, 2019).

Closely related to the emerging of the communes, the first co-housing initiatives started to pop up in the suburbs outside Copenhagen in the 1970s (Hagbert, et al., 2020). Like the communes, the co-housing model was according to Hagbert et al (2020), and McCamant & Durrett (2011) a protest against the isolation of the individual and the nuclear family, in the dominant single-family houses, in the housing regime. According to Hagbert et al. (2020) the idea was to reconstruct some of the qualities associated with the Danish village, and to achieve a greater sense of community.

The co-housing projects were generally placed in the suburban and quasi-rural environments (Hagbert, et al., 2020; Larsen, 2019). According to Hagbert et al. (2020) one of the reasons for this was the price of land, another was a general “anti-urban” movement in the 1970s. Since then, the majority of the co-housing communities have remain the village-like form (Hagbert, et al., 2020).

The co-housing communities were typically organized as a combination of individual housing unit and common areas, as the key pillar, typically it was a kitchen and dining room (Hagbert, et al., 2020). The structure of this co-housing communities was affected by the dominant “dense-low” architecture in the 1970s (Hagbert, et al., 2020). The idea of the “dense-low” architecture was to limit the height of the buildings to preserve close contact to the nature, and dense to preserve the social contact (Kulturstyrelsen, Realdania, 2015). To increase productivity throughout the 1960s, the housing regime were dominated by standardization and industrialization which resulted in monotonous building stock and a lack of flexibility (Kulturstyrelsen, Realdania, 2015). The “dense-low” architecture could probably be assumed to be a result of a dissatisfaction, within the housing regime, with the monotonous building stock.

In the 70s the co-housing communities were mainly based on owner occupation. To a large extent this may seems to be a result of lock-ins in the existing housing regime, that made the owner occupation the only possible opportunity to finance such housing experiments. The non-profit housing sector, and the state support for public housing were not ready to leave room for such experiments (Hagbert, et al., 2020). Because of the often higher housing cost of the privately owner occupied co-housing communities, these communities were primarily restricted to the higher income group (Hagbert, et al., 2020).

5.1.2 The second phase

After the boom of single-family housing construction between the 1960-1980 within the housing regime, the 1980s and 1990s were a period with a decrease in the construction (Andersen & Jensen, 2019; Videncentret Bolius, 2004). This were probably due to change at the landscape level, such as an economic crisis, that partly was the result of the oil crisis in the 1970s.

To support the sagging building industry, the Danish Ministry of Housing introduced a state support for new-built cooperatives in 1981 (Hagbert, et al., 2020). This resulted in changes in the housing regime that created some favorable conditions for the co-housing communities. The support was not aimed to co-housing communities, but has an significant impact on a multiplication of them, because it became possible to establish co-housing communities based on cooperative tenure with support from the state (Hagbert, et al., 2020). More precisely the state support made it possible for the housing cooperatives to cover 80 percent of the total construction cost through loans, they paid back through index-linked instalments (Hagbert, et al., 2020). To qualify for the loans, the co-housing projects had to limit the construction cost pr. square meter, and the average unit size could not exceed 95 square meters (McCamant & Durrett, 2011).

Probably as a result of the state support, that result in change in the housing regime, the amount of co-housing communities in Denmark did according to McCamant and Durrett (2011) nearly doubled, from 12 to 22 between 1980 and 1982.

The co-housing communities were in the beginning of the 1980s criticized for only being affordable for high income groups, but the state support led according to McCamant and Durrett (2011) to more affordable co-housing communities.

As a result of change at the landscape level, such as the oil crisis in the 70s and series of major pollution cases, a greater environmental awareness grew at the regime level (Hagbert, et al., 2020). This new awareness could probably be assumed to be the reason for the arise of new alternative housing models with an environmentally focus, such as the eco-village and environmental co-housing, which could be considered as a niche.

Due to an economy recovery during the 1980s, the quota for the state support for the new-build housing cooperatives phased out, and in 2004 the law came to an end (Hagbert, et al., 2020). The

termination of the state support, could be assumed to be due to one of the main factors to the pause in the expansion of the cohousing cooperatives in the 1990s

Since the 1990s the owner-occupied co-housing communities again have become the most dominant tenure, like in the 1970s (Hagbert, et al., 2020). This is probably for the same reasons like in the 1970's. Looking at the Danish co-housing history, it appears as if cooperative tenure only were in majority in the years it was possible to get the state support.

The beginning of the 80s was also a time where, many in the Danish population had had enough of the 70s ecology and community. Privatization and individualism became the new keywords, and property speculation became a part of the housing regime (Videncentret Bolius, 2004).

5.1.3 The third phase

In the 2000s a new wave of co-housing has been identified within Europe and the United States. Like in the first and second phase, the revival could probably be assumed to be a result of changes at the landscape and regime level.

As described in the introduction (chapter 1), we are in Denmark currently, experiencing several changes at the landscape level. Among other things, we are experiencing a demographic change, with an increasingly aged population, which can be assumed to be the result of increasing economic prosperity and welfare. Research shows that in 2040, every 4. Danes will be over 60 years (Realdania, 2020). In addition, we are experiencing change in the family constellations, which among other things, have resulted in the number of single parents having increased by approx. 11 percent, since 2010 (Dansk Statistik, 2020). Furthermore, the total number of singles in Denmark has increased (Dansk Statistik, 2016). In 2040 statistics assume, that the single group will be the most dominant household in Denmark, especially in Copenhagen (Udlændinge-, Integrations- og Boligministeriet, 2016). For comparison 38% are according to Anna Falkenstjerne Beck living alone today (Beck, 2019).

All these changes can, as explained in the introduction (chapter 1), be assumed to be part of the reason, of the rise of loneliness in Denmark. According to "Folkebevægelsen imod ensomhed", approx. 350.000 today in Denmark are often feeling lonely (Folkebevægelsen mod ensomhed, 2020). Prolonged loneliness can, as explained in the introduction, increase the risk of poor mental health, as well as a number of illnesses and premature death (Statens Institut for Folkesundhed, 2017).

Specifically for the elderly, research shows that the elderly who feel lonely find it more difficult to overcome illness, than the elderly with strong social conditions (Sundhedsstyrelsen, 2020). In addition, research show that that the feeling of loneliness increase with age, and is greatest among the oldest age group (Statens Institut for Folkesundhed, 2017). It can thus be assumed that when the elderly population increases, the number of people who feel lonely will increase as well. This will probably at the same time lead to greater pressure on the healthcare sector in the coming years.

The increased amount of people feeling lonely can at the same time be assumed to be one of the reasons for the growing interest for community, and social relation, which has occurred in recent years (Realdania By & Byg, 2019). According to The Ministry of Immigration, Integration and Housing, this increased interest for community, and a growing desire to recreate meaningful social relationships and communities, is a result of that it is either no longer covered by the nuclear family, or lost in modern society, where we no longer have any relation to our neighbors (Udlændinge-, Integrations- og Boligministeriet, 2016). Likewise, it could be a result of that we today, according to Beck (2019), are living more scattered and separated from our families and friends.

Several of these changes at the landscape level can thus be assumed to have put a pressure on our regime, including on the housing regime. Today the majority of our houses are still designed for the classic nuclear families, but it could be assumed that change, such as the 37 different family constellations, and increased number of singles, does not fit the one-size-fit all housing. These trends can thus be assumed to put pressure on the housing regime. According to The Ministry of Immigration, Integration and Housing, is it especially the divorced families and the families with children from different marriages that result in a pressure, as well as the increased number of single parents. As a result of the increasing number of single parents, there has, according to The Ministry of Immigration, Integration and Housing (2016), also been an increased need for a form of relief in relation to practical tasks that are no longer covered by the partner in a nuclear family.

Furthermore, the change of family constellations, and increase of singles and elderly people, could also be assumed to put a pressure on the housing regime. According to The Ministry of Health and the Elderly, there is a need for a paradigm shift around how we live in all stages of life, especially for the life phase where the children have moved out from home, where one gets retired, but where people neither have the desire nor the need to move into nursing home (Sundheds- og ældreministeriet, 2019).

The increased population in the largest cities, and a privatization of former municipal rented flats, have also resulted in changes in the form of rising housing prices, and affordable housing shortages in the metropolitan area, and other larger cities in Denmark (Jensen & Stengaard, 2017). The increased population has resulted in that the larger cities growing while rural areas are depopulated (Udlændinge-, Integrations- og Boligministeriet, 2016). These changes could also be assumed to put a pressure on the existing housing regime.

Another pressure on the existing housing regime, is the increased awareness on sustainability in the society, as a result of climate change at the landscape level. Sustainability has become a great part of the agenda in most of the Danish homes. Research performed by Rambøll with 4700 participants, shows that sustainability is very important for the Danish population. The Danish population has a wish for sustainable buildings. It is actually so important that the majority are willing to pay a higher housing cost for more sustainable and eco-friendly buildings (Rambøll, 2019)

5.2 The revival of co-housing

It appears that the mentioned changes at the landscape level and the regime level, respectively, have put pressure on the housing regime and the dominant technology, the single-family house. This has probably loosened up certain lock-ins, which has led to a revival of co-housing.

As previously described, there are no precise statistics on the number of co-housing communities. But in addition to several in the field pointing to an increase, Statistics Denmark also show an increase in the number of people living in a household with more than one family. From 2008 to 2018 the number has increased by 44 percent (Dansk Statistik, 2018).

While the co-housing communities in the 1970s and 1980s, was partly the result of a critique of the design of the society's, and a resistance to the increasing private consumption, today's revival of co-housing seems to be cause more by a desire to recreate meaningful social relationship, and share practical tasks (Udlændinge-, Integrations- og Boligministeriet, 2016; Hagbert, et al., 2020). This is likely the result of the changes at the landscape level, such as the increased number of singles.

Apart from the fact that the reasons for moving into a co-housing community have changed since the 1970s, it may also appear that the form of establishment has changed. According to Beck (2020), in the 1970s the co-housing communities were mainly established in a bottom-up process, i.e., they were primarily established by the citizens. Today, according to Beck (2020), it may instead appear that more

and more projects are established in a top-down process. That is, more and more are established by developers. According to Beck (2019) the developers have tackled the climate crisis and incorporated a sustainable focus in these co-housing concepts. This focus can probably be assumed to be a result of the increasing environmental focus in the regime.

The recent years increased interest, has especially taken place within the type of co-housing targeting seniors. As you can see from the graph below, it has especially risen after 2016. This can be assumed to be a result of Realdania, an association that works to create quality of life for people through the built environment. In 2016 they made an effort to kickstart the construction of new senior co-housing communities in collaboration with the private and public sector. Among other things, they launched a number of analyses, and supported the development of 10 new senior living communities around the country (Realdania, 2020).

Through an MLP lens, Realdania's project can probably be considered a form of niche event that has disseminated learning and given several organizations the opportunity to gain a more detailed and practical understanding of senior co-housing. This has probably given actors in the industry, more confidence to establishing senior co-housing.

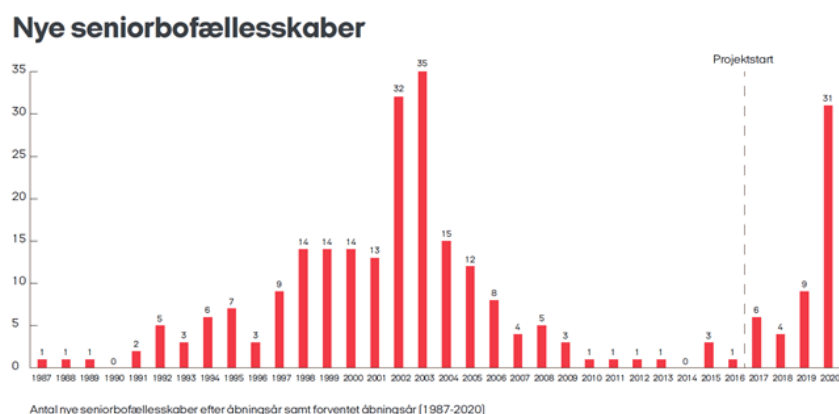


Figure 3 Graph of the number of established senior co-housing communities

According to Realdania (2019) 28 elderly people, on average, are today on a waiting list for each senior co-housing community, and the number is increasing. Social community with neighbors, lower risk of loneliness and keeping an eye on each other, are the three most important key words for the movement according to research by 'METHODS' (Nielsen & Pedersen, 2017).

In addition to the fact that the building industry has shown greater interest, it may also appear that there has been an increased interest in this alternative form of housing in the municipalities. For example, Roskilde Municipality, the municipality with the highest number co-housing communities in the country, has chosen to offer help and guidance for new co-housing initiatives (Udlændinge-, Integrations- og Boligministeriet, 2016).

5.3 Sub-conclusion

In this section, I have tried to reconstruct the historical narrative of co-housing, by using the transition concept of multi-level perspective.

In the MLP literature, it is described that when there are tensions at the regime level and uncertainties at the landscape level, it provides opportunities for transitions to flourish. This can help to explain the origin and the subsequent two revivals of co-housing. In the 70s, it was, among others, a result of a dissatisfaction with the design of the system. Today, it seems to be a solution to the various changes at the landscape level, such as the changed demographics and family constellation as well as the increased environmental awareness at the regime level.

Despite co-housing having been shown to be a solution to problems at the regime and landscape level, several times, it may seem that the co-housing has never reached beyond the niche level. Based on the theory, this is probably due to some heavy lock-ins and path dependencies. In the next section, I will dive into the existing housing regime and examine which lock-ins and path dependencies that probably maintain co-housing in a niche position.

6. Understanding the lock-in

In the previous section, I found, based on my reconstruction of the historical narrative of co-housing, that we in Denmark have experienced three phases of the co-housing model. Despite the three phases, it does not appear that the co-housing model has at any point reached beyond the niche position.

With an exploratory deductive approach, I have conducted semi-structured interviews with professionals within the housing regime. In this chapter, I will try to answer my research questions 2 and 3, based on an analysis of the semi-structured interviews. I will use Geels (2002) definition of the regime, and the seven dimensions within the regime, as a framework to investigate what current lock-ins and path dependencies that limit the prevalence of co-housing communities. Furthermore I will use Kemp, Schot and Hoogma's (1998) definition of the three interrelated processes of the Strategic Niche Management concept, to investigate whether expectations, learning and networking is, or have been, involved in promoting the co-housing communities in the building sector.

6.1 Theory-driven analysis

At first the interviews were transcribed, further the material was processed in a theory-driven analysis. The analysis was guided by the two theories the Multi-Level Perspective (MLP), and the Strategic Niche Management (SNM), that is further explained in the theoretical chapter (chapter 2). In the chart below a condensation of the applied analysis tool is visualized. The chart is inspired by the seven dimensions Geels (2002) distinguishes between in the socio-technical regime. The column at the left consist of the seven dimensions distributed on each row. The column in the middle consists of quotes from the various interviewees describing the challenges of establishing a co-housing community.

The quotes are organized and distributed within the seven dimensions. The column on the right consists of key words and shorts sentences that summarize the main challenges in each dimension identified in the quotes.

Regime dimensions	Quotes	Keywords
Policy	<p>Examples:</p> <p>"..There are such requirements sentences in such a district plan, as one must adhere to, and some of them, they are very difficult to be allowed to compromise with without the process have to drive again, and it takes some time "- Engineer no.2</p>	<p>District plans</p> <p>Public procurement</p>
Market and user practice	<p>Examples:</p> <p>"Then you go to the bank to borrow money to build for, and then they look at you wide-eyed and that's the third barrier. And say, we do not have such a product where 20 families can borrow to build for. This means that obtaining financing is completely impossible"-Consultant no. 1</p>	<p>Challenge of maintaining community</p> <p>Financial challenges</p>
Industry structures	<p>Examples:</p> <p>"One thing we experience is that with co-determination, there are not many contractors who want to make such big changes in what they do. They found it a bit cumbersome with involving people"-Developer no. 2</p>	<p>Committed customers</p> <p>Many questions, and demands for co-determination</p>
Cultural and symbolic meaning	<p>Examples:</p> <p>"And then, of course, the fact that knowledge about co-housing communities, it has not always reached the administrations. So when we come and have to give a presentation on co-housing, people think it's something for the mentally handicapped"-Developer no.2</p>	<p>Lack of knowledge about the housing form</p>
Technology	<p>Examples:</p> <p>"So we also make terraced houses at the same time, and basically a terraced house project is exactly the same as a co-housing communityu.."-Constructor no. 1</p>	
Infrastructure	<p>Examples:</p> <p>"It's just quite ordinary block of flats, with different kinds of apartments and then with communal houses. So it everywhere it can be placed"- Constructor 3</p>	
Policy and techno-scientific knowledge		

Figure 4 Condensation of the theory-driven analysis

6. 2 Findings – the housing regime

In the deductive analysis, described above, various barriers have been identified that could be assumed to limit the penetration of the co-housing form. In the section below the challenges mentioned by most interviewees, together with those challenges that seems relevant for the investigation, will be described within the different dimensions. Despite the fact that Geels (2002) distinguishes between seven dimensions, in my analysis I have only identified challenges within; The Policy, Market and user patterns, industry structure, and Culture and Symbolic meaning dimensions. However, some of the challenges can be assumed to be categorized within more than one of the dimensions.

Figure 5, illustrates my findings. The white bubbles indicate the different dimensions of the regime. The red ones illustrate the various challenges, mentioned among the interviewees. The color saturation indicates how large a number of interviewees, that have mentioned it as a challenge.

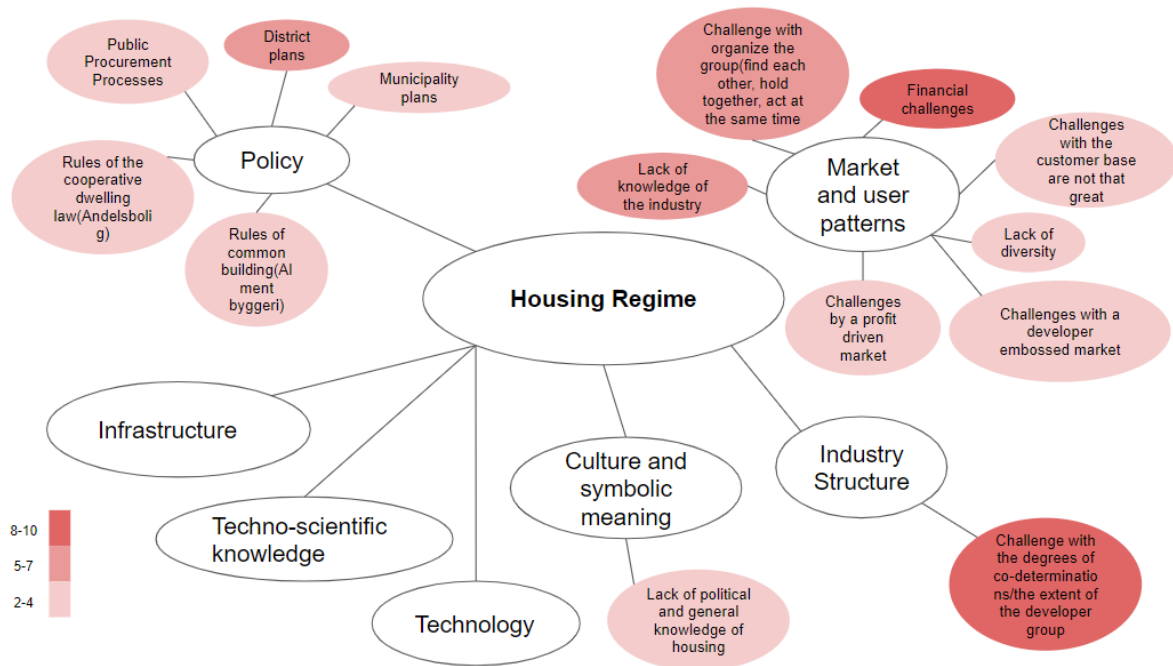


Figure 5 Visualization of the findings

6.2.1 The Policy dimension

One of the dimensions in the regime is the policy dimension. Policy consist of elements such as regulations and standards that in a regime typically is structured around the dominant technology. In the housing regime, policy that effects the housing and the housing market exist in many forms, but those affecting the co-housing the most and mentioned mostly by the interviewees, is challenges with the district plans (in danish *lokalplaner*). In addition, challenges with the municipality plans, challenges with the rules of the public procurement processes (in danish *Udbudsprocesser*), challenges with fixed financial framework for non-pro rental housing (in Danish *almene boliger*) and challenges with change in the Cooperative Housing Act, is also mentioned among the interviewees.

Municipality and district plans

One of the challenges mentioned by several of the interviewees is the municipality and district plans. The municipal plan includes, among other things, overall visions and goals for urban development, as well as guidelines for land use and for how the city should be used and developed (Odense Kommune, 2020). District plan instead determines, according to Videncenteret Bolius how the development should be in a specific area (Videncenteret Bolius, 2015).

According to an engineer (no.2) and several of the other interviewees (consultant no.2, and architect no.1) the requirements in the district plans, can be very difficult to compromise with, without having to change them. As engineer no.2 states:

"There are a certain type of requirements for district plans that need to be lived up to, and some of them are very difficult to compromise without having to redo the process, which takes time."

Engineer no.2

In relation to this, one of the consultants(no.2) also stresses that there is very little flexibility within the district plans. Consultant no.2 explains that the co-housing communities from the start can often not say how many m² of housing there will be, because not all residents have been found when the projects start, and because they wish new residents also have a say in the final design. According to the consultant (no.2), the municipality may find it difficult to give this flexibility and openness.

Another challenge mentioned by two of the consultants (no.1 and no.3), is that this process of changing a district plan can be long lasting. They both state that the process generally lasts for between one or two years, because the change of the plan must go into resident consultation, and a whole lot of other actors should be heard as for example the coastal protection and environmental preservation, etc.

In general, several of the interviewees state that most of the municipalities are very interested in the co-housing communities and would like to formulate offers that suit the co-housing communities. However, there is challenges with resources and time. For example, the interviewee from municipality (no.2) mentions, that they are very busy in with the task of defining new district plans and can only do so to the extent that they have the resources to.

The municipality plan is also mentioned by one of the interviewees (consultant no.2) as a challenge. For example, in the municipality plan of some municipalities, there is according to consultant no. 2 a

law stating that there must be two parking lots for every detached house. This also applies to the co-housing communities, which according to consultant no.2, is not necessary in a sustainable co-housing community, where the cars are shared among the families. But due to the municipal plans, they are required to create all these parking lots.

Public Procurement Processes (in Danish *Udbudsprocesser*)

Another challenge mentioned by several of the interviewees, that can be categorized within the policy dimension, is the Public Procurement Processes. When the municipalities sell their properties, they may not be sold without prior public tender (Retsinformation, 2017). In addition, there are some rules that it must be sold at a minimum price, which corresponds to the highest total assessed basic price (Kommunalbestyrelse Skanderborg, 2007). The municipality is not forced to sell at the highest purchase offer, if a lower bid contains greater municipal interest (Social- og Indenrigsministeriet, 2011). However, the municipality must handle the citizens' money sensibly, and must not support the private sector.

The whole process of how the municipality is obliged to sell municipality property gives the co-housing communities a handicap, according to the interviewee from municipality no. 2. According to the interviewee (municipality no. 2), this is because, before the group of private actors, who want to establish a co-housing, get organized, pool capital and bid on the site, that is put up for sale, it is often already sold to others, often private developers. The interviewee from municipality no.2 explains that especially in times where there is a boom in the building industry and the developer and construction companies have funding, it is a big challenge for the co-housing groups. The interviewee from municipality no. 2 explains:

"So this whole process, which is normally about how a municipality is required to sell land gives them a handicap, because they have to organize themselves"- Interviewee from municipality no.2

Another challenge, in relation to the Public Procurement Processes, is according to architect no.2 that it is not possible in the same way as before Denmark joined the European Union, to trade with the municipality and buy a site and make some repayment agreements once the loan has been put in place. Architect no. 2 explains:

".. And we were not part of the EU, there were no tenders and so forth, so you could actually buy land and make an agreement on when you should pay in regard to when you received the loan. So life was a little simpler like that in terms of realizing it." Architect no.2

Alternative tenure forms

As mentioned in the introduction (chapter 1), the Danish co-housing communities are based on three main tenure forms: Owner occupation, housing cooperatives (in Danish *andelsforeninger*) and non-pro rental housing (in Danish *almene boliger*). But according to some of the interviewees recent change of The Housing Cooperatives Law, and fixed financial framework for the non-pro rental housing, makes this alternative tenure forms, financially difficult.

According to one of the consultants (no.1) and architect(no.2) the housing cooperative form has previously worked well and is seen as a really nice structure for the co-housing communities. But due to legislative changes, both interviewees point out that the financial form has become more difficult. Consultant no.1 explains:

"So, housing cooperatives, which was a nice structure, has been completely demolished legislatively. Because it, in principle, has been compared to individual home ownership(...) but the way in which it was done, was actually to liberalize them and put them on the housing market. And that has completely demolished the community."- Consultant no.1

This could be assumed to be a result of that the assessment of the housing cooperative form, in the last couple of years has been equated with the owner-occupied dwellings. This has among other things meant that, they have had to pay more in property tax (Andelsportalen, 2020). However, since the collection of the interviews, there have been changes in the legislation.

The other alternative tenure form, the non-pro rental housing, is also considered by several of the interviewees to be a more financially difficult option, because of a fixed financial framework. The non-pro rental housing is built with public support, this includes rules of a fixed financial framework. According to developer no. 1 and contractor no. 2, it is not possible to build co-housing within this fixed financial framework, as the residents, according to the two interviewees, want something of a higher quality. Developer no. 1 explains:

"The state has made some limits on non-pro rental housing, so they have put some limits on the price per square meter incl. all these expenses(..) The challenge is that the type of co-housing that we want to build cannot be built with the given economic framework."- Developer no.1

It may seem that for several of these current barriers within the policy dimension that limits the prevalence of co-housing, could be assumed to be due to a lack of flexibility and a liberalization of municipal processes, such as the public procurement processes.

In relation to the rules of the public procurement processes, the grassroot groups have a handicap, because they must first have organized themselves and raised capital before they can make a bid. It gives developers an advantage, since they likely have the capital earlier, and since less organization between actors is required.

The lack of flexibility in district and municipal plans, where for example, the exact m² has to be determined before the construction processes can start, may appear to favor the developer-driven market, as well as the general linear construction process, as previously described. Whereas it does not fit so well with this co-housing community mindset, where you build and design together, and there are some changes along the way, because families are added or dropped out.

6.2.2 User practices and application domains(markets)

One of the other dimensions is the “User practices and application domains(markets)”. Elements within this dimension could be housing preference and patterns, as well as supply and demand, and market potential. There can be a lot of challenges within the market, but those mentioned the most, among the interviewees, are challenges as a result of the financial structure and the profit driven market. Furthermore, challenges of organizing in a grassroots group, and a lack of knowledge about the field, is also mentioned by several of the interviewees as a huge challenge. Below the challenges will be elaborated.

Financial challenges

The challenges that across the dimensions have been mentioned the most by the interviewees, is challenges as a result of the current financial structures.

In general, it seems that the financial challenges are a result of the banks and mortgage lenders (in Danish *realkreditinstitutter*) according to consultant no.1 and several others, are not willing to create an opportunity for a loan that fits the co-housing communities. As consultant no.1 states:

“Then you go to the bank to loan money to build, and then they look at you speechless, that is the third barrier, and they say, we do not have such a product where 20 families can loan to build. This means that acquiring a loan is completely impossible”-Consultant no.1

Two of the architects (no.2 and no.3) and several others (developer no.2 and interviewee for municipality no.2), explain that you can get something financed if it already is built, but if you have to get financed something, there is not yet built, enough guarantees must be provided in order to the banks or mortgage lenders will provide construction financing.

“..They go to the banks to try and get a loan to pay off the consultant and all those engineers and so forth. Here, they run into a wall because you can only get a loan for something that has already been built, or if you have a lot of capital for collateral, which is difficult for private persons.” Architect no.2

The quote above leads to two other challenges which are, 1) the challenge of bridge financing, and, 2) the challenge of being able to provide guarantee for the loan.

There are some who must finance the entire construction period and the entire investment period, this is the bridge financing. But if you do not have all the money for the financing, and cannot provide the financial guarantee, so you can get a loan, the bridge financing can, according to architect no.2, be a huge challenge. In relation to this, two of the architects (no.2 and no.3) have experienced, that they have had to take part in, start-up of project for almost no money, just to get a job later. As architect no.2 describe:

“We have put a lot of effort and hours into it that we haven’t been paid for, just to be part of developing it and getting it up and running. And we did this because we thought it was interesting, but, of course, we can’t continue to do it. We can’t make a living off of it.” Architect no. 2

The second challenge is to be able to provide enough financial security to be able to borrow such a large amount of money before the construction is completed. According to two of the interviewee’s (developer no.2 and architect no.2) this can create challenges as such grassroots groups typically cannot provide enough financial guarantee. This means, according to an architect (no.2) and an interviewee from a municipality (no.1), that some of these groups will have to ally themselves with a developer who can make the necessary financial guarantees. However, according to a contractor (no.2), this can also be a major problem to find investors, who believe in the project as much and will put the necessary capital in the project. If it succeeds in aligning with a developer, the group must,

according to several of the interviewees (municipality no. 1 and 2, and architect no.2) expect that the developer takes at least 15-20% on top of the price for the risk. This means that the project quickly can become an expensive process.

It is not just the groups that may need to ally themselves with a developer. The interviewee from municipality no. 3 explain, that even through it would clearly be the best, to sell the municipality property to self-grown groups that want to establish a co-housing community, for economic reasons the municipality have had to sell to developers.

The claim for financial guarantee and the cost by ally with a developer, can be assumed to lead to some other challenges, such as the lack of diversity, as it can be assumed that only resourceful families have the opportunity to provide the financial guarantee. Contractor no. 4 and the interviewee from municipality no.1 points out the same issues:

"I would say I think they are resource strong residents, and that it was it requires. It requires resource strong residents before you can make these types of buildings."- Contractors no.4

In general, the financial challenges could be assumed to be a result of the existing individualized real estate industry, where the banks are used to individually owned square meters. According to consultant no.1 and contractor no. 3 the shared square meters that typically exist within a co-housing community scares the banks and mortgage lenders. It can be assumed that they are afraid of losing money on the investment, and that they are not experiencing the same earnings effect. And this could be due to a lack of knowledge and lack of demand.

It is important to point out that some interviewees do not experience these challenges (Developer no.3, contractor no.1 and no.2). Common for these is that they are all companies that probably have a large equity. It can therefore be assumed that this is the reason why, they do not experience the same financial challenges. It may therefore appear that the financial challenges, primarily are experienced by those private actors and grassroot groups, who do not have the same financial strength.

The challenges of a developer-driven market

As mentioned above, groups can be forced to go to a developer, if they cannot provide enough financial guarantee themselves for the banks and mortgage lenders to lend them the money for the

project. According to one of the consultants (no.1) and the interviewee from municipality no.2, this has made the developer dominant in the market.

As mentioned in chapter 5, currently we are experiencing a revival of the co-housing communities, which means more people have become interested in this alternative form of housing. This has according to one of the architects (no.3) led to that the developers almost stumbling over each other. But according to one of the consultants (no.2), the developers are just interested in making money, and do not have experience with the housing form and the mindset. According to two of the consultants (no.1 and no.2) this can result in a poor quality and reputation of the model. Consultant no. 1 explains:

"Because right now, we see how many developers also try getting into this market, because they see that they can sell houses, but they risk ruining the housing form because they might disappoint a lot of people who thought they were signing up to be part of a meaningful community, but ended up getting a house with a shared room in the basement. (..)It is not common spaces that create community." -Consultant no. 1

Based on the statement, it could appear that the developers are trying to adapt the co-housing form, to the existing individual consumer approach. According to several of the interviewees, this means that the idea of community, around which the model has just been built, is lost.

The challenges of organized in the grassroots groups

In addition to the financial challenges and challenges of the developer-driven market, the interviewees mention several challenges that all are related to the challenge of organizing multiple families at the same time. Several of the interviewees point out that getting the families to agree, stick together, and continue to preserve the community, and get all families' finances ready at the same time, can be a big challenge. Consultant no. 1 explain:

"..agreeing and finding a group of people. A good group of people and agreeing at the same time is very difficult(..) That is the first barrier, and it stops most people. Because they are actually individual consumers on a real estate market and the entire market is geared towards that. It is geared to fit individual consumers and that is why there is no real place to go, or no way to do it if you want to live together with other good people." – Consultant no.1

The quote leads to another challenge, which is about finding a group of people, you can establish a co-housing community together with. According to consultant no.1 and architect no.2, there is a strong lack of options today where this is possible.

Another challenge, mentioned by several of the interviewees, is a lack of knowledge of the building industry and processes within the grassroot groups. According to the interviewee from municipality no. 1, the problem with such a grassroot group is that, the group are “happy amateurs” in this area. Both the interviewee from municipality no. 1 and no.3, and developer no.2 point out that such a building project is very lengthy and demanding, and requires enough knowledge of the industry to manage, which can therefore create challenges for the private players, who do not have a prior knowledge of the processes. The interviewee from municipality no.1 explain:

“Then they have another challenge which is that if you are in the other end, where they want to build themselves, then the problem becomes that they are happy amateurs in this field, so how do you acquire sufficient understanding to the field and build an organization that can manage a building project?.” Municipality no.1

The customer base

Another challenge, mentioned by several of the interviewees, is the lack of demand. Developer no. 3 and contractor no. 3, indicate that the customer base is not as large as they had expected. According to contractor no.3, the reason is that there are not many yet, who dare to take the plunge, and this means that they in the company are now considering whether to continue to build co-housing communities.

“So, I can be a little worried that the co-housing wont spread across Denmark, I don’t think they will. And that is why we sit with the thought that it will be expensive and require many manhours and the potential demand is not as big as one would think.”- Contractor no.3

6.2.3 The industry structure dimension

One of the other dimensions in the socio-technical housing regime is the industry structure. The industry structure describes the operations and conditions within a given industrial sector, in this case the building industry. Findings from the analysis, show that the challenges mentioned by most interviewees, that can be categorized within the industry structure dimension, is the extent of the

builder group, and by extent is meant the duration in time. Below the barriers discovered within the industry structure dimension, will be represented.

The extent of the builder group

All four contractors as well as developer no. 1 mentioned the extent of the builder group as a challenge. Both contractor no.2 and no.3 states that the processes are significantly longer and more expensive, than typically terraced house projects. According to contractor no. 1 and no. 4, this is due to the fact, that there is an incredible amount of curiosity from the co-housing groups and that many more questions are being asked about the process, than in the traditional projects. Contractor no. 1 states:

"There are many, many, many more questions from the buyer of a co-housing unit than for a terraced house, and it takes more time."- Contractor no.1

In addition, according to developer no. 1 and several others (contractor no.2 and architect no.3) the groups have a desire to be allowed to have influence in all of the processes, and this is typically not an option the developer and contractor companies can, or want to give. In relation to this, consultant no.2 states that the entrepreneurs are generally not very happy about co-determination, and too many big changes in the projects. Developer no. 2 explain:

".. it is, after all, more troublesome than asking yourself. Then I just ask myself, do I think the cost is fair, should I drop these square meters or these. But here, I suddenly have x amount of people to ask."- Developer no.2

Despite the lengthy processes and many questions, both architect no. 1 and 2 point out that they would prefer to work for these grassroots groups. The reason is, according to the two architects, that it is more fun to draw for a co-housing group, than for a developer. Architect no. 1 explains why:

"The building sector is in many ways stupid and old-fashioned, in the way that it is structured like a machine; Optimize, optimize, down with the costs(..) It is the reverse situation where we works for those who build. This means that we constantly only must draw, what is necessary, and in that process, there is no room left for thinking."- Architect no.1

Based on the knowledge gained from the literature review and the reconstructed historical narrative, it may seem that the industrialization of the building industry, which among other things has resulted in a cost-effective focus and a linear mindset, currently creates barriers for the distribution of the co-housing form. This could be due to the fact that democratic and iterative processes are a large part of the co-housing thinking, and this clashes with this existing cost-efficiency and linear structures in the construction industry.

6.2.4 The culture and symbolic meaning dimension

Another dimension in the regime is the “Culture and Symbolic meaning”. According to Geels (2002) the culture and symbolic meaning of housing is a product of the interactions between the users, societal groups and the media. Through the analysis, the main challenges I have identified within the “culture and symbolic meaning” dimension, is a lack of knowledge within the housing regime, about co-housing.

Lack of knowledge within the regime

According to consultant no.2 and engineer no.2, one of the barriers that limits the spread of the co-housing form, is a lack of knowledge in the community about this co-housing form. For example, consultant no.2 explained that when they give talks in the administrations, there are still some who think co-housing communities are only for adults with disabilities. At the same time, the interviewee from municipality no. 3 and constructor no.2 explain, that in some municipalities there is a lack of political understanding of the quality this type of citizens bring to the local communities. For example, the interviewee from municipality no.3 explains:

“It may be that there is not that much economy from day one, because you buy a large area which they don’t build a lot on, but as a group they come with all sorts of stuff that people who live in an apartment don’t come with.”- Interviewee from municipality no.3

This may indicate that there is a lack of knowledge and information in the society in general, and this can be assumed to limit the spread of the co-housing.

6.2.5 Other dimensions

Two other dimensions within the regime is the “Technological” and “Infrastructure” dimension. The technological dimension is specifically about the artifact, in this case the actual construction of the co-housing, and the infrastructure can in relation to the co-housing be about the site preparation.

Looking at the interviews, there is a broad consensus among the interviewees that, in relation to building techniques, there is not the big difference between an ordinary house and a co-house. All three engineers as well as three of the contractors (no.1, no.3 and no.4) state that technically, co-housing communities are not more difficult to build than ordinary residential constructions. Looking at the infrastructure dimension, there is in the same way, agreement among the contractors (no.2 and no. 3), that according to the site preparation, there is no difference. It can therefore be assumed that there is only very few or no barriers, within the technical and infrastructure dimension.

6.2.6 Sub-conclusion

Based on the knowledge gained from chapter 4 and 5, several of the identified barriers, within the different dimensions, can be assumed to be a result of the cost-efficiency mindset and the linear processes, which according to the literature, emerged as part of the industrialization of the building industry. For example, the financial challenges as well as the developer dominated housing market, where the mindset is optimizing and pushing the prices, could be assumed to be a result of this cost-efficiency and linear mindset.

In addition, a lack of flexibility, and standardized processes and plans that seems to adapt the individualized real estate market, also seems to create barriers. An example could be the district and municipality plans. In addition, it may seem that a liberalization of, for example the Public Procurement Processes, have resulted in barriers for the spread of the co-housing.

At present, in Denmark we are experiencing a growing interest for the co-housing form among developers, but the problem is that it may seem that the developers do not really have any understanding or focus on the democratic, flexible and iterative mindset relating to co-housing. Instead, it seems that the developers try to adapt the co-housing form to the existing linear and individualized way of thinking.

In addition, it may seem that several barriers are associated with organizing oneself as a group. As previously described, establishing a co-housing community can take up to several years. During that period, it may seem that challenges can arise such as agreeing, sticking together, and being patient in the group. In addition, the building industry is very complex, and as several point out, it requires a certain prior knowledge of the industry to manage such processes. In addition to the fact that it may seem that there may be some challenges in organizing as a group, it may also seem that just finding someone to create a co-housing community with, can be a big challenge.

6.3 Findings – promoting co-housing

As described in the theory section (chapter 2), the transition literature also emphasizes the conscious efforts to control niche formation processes through, e.g., real-life experiments. These processes are called Strategic Niche Management. The primary aims of the Strategic Niche Management is according to Kemp, Schot and Hoogma (1998, p. 189) *“..stimulating learning about problems, needs and possibilities of a technology, building actor networks, alignment of different interest to a goal, altering the expectations of different actors and fostering institutional adaptation”*.

In the previous section, based on the analysis, I tried to answer the research question no.2, and understand current lock-ins and barriers in the existing housing regime, that makes it difficult for co-housing to become more common. In this section, informed by the SNM literature, I will try to answer research question no.3, focusing on the three internal processes; The voicing and shaping of expectations, the importance of learning and the creating of social networks – and how they affect the development of co-housing. Below the findings of the analysis will be presented.

6.3.1 Expectations

As described in the theory section (chapter 2), the benefits of the new technologies in the first years are not clear. The value of the technologies must therefore be proven. To do this, it is important that the interested stakeholders make promises and raise expectations for the new technologies. According to Kemp, Schot & Hoogma (1998) the promises are particularly powerful, if they are robust (shared by multiple actors), specific (in terms of technological, economic and social aspects) and linked to certain societal problems that existing technologies are not expected to solve.

Based on the knowledge that expectations are important elements in niche development, I chose in my interviews to examine what expectations for co-housing communities, the stakeholders are currently trying to create. My findings show that, overall, there are five "different" expectations that the different interviewees are trying to create. Generally, amongst the stakeholder groups, the main promise is the community you get in a co-housing. Developer no.3 explains:

"so there is the entire benefit of moving into a community which is different from a normal residence."- Developer no.3

Besides this, there is a variation across the actor groups of the other promises. For example, architects 1, 2 and 3 also emphasize the promise of the shared economy. Architect no.3 explain:

"There are all these things, all these shared things, banal shared things, such as making food for each other in the co-housing unit"- Architect no.3

In addition, two of the architects (no.1 and no.2), and developer no.1 also emphasize the promise of a more sustainable way of living. In relation to senior co-housing communities, contractor no.2 also focuses on the increasing number of lonely people in the senior age group and promises, with the co-housing community, security and the opposite of loneliness.

Several of the five expectations may seem to overlap, and in general it may seem as if they fall within the same category. It can therefore be assumed that overall, it is the same expectations the stakeholders are trying to create.

6.3.2 Learning processes

Another important subprocess of the SNM is the learning process. As described in chapter 2, experiment-based learning is an important part of the SNM process. This means that it is important to learn about barriers and how they are overcome. To investigate whether this kind of second order learning takes place in the building industry, I asked the interviewees how they have acquired their current knowledge of the co-housing form.

Based on the statements, it may seem that several of the interviewees see or have seen co-housing communities as ordinary project sales. This is maybe the reason why several interviewees explain that

they have not allied themselves with others, for knowledge sharing and therefore describes their knowledge as self-taught. As contractor no. 3 describes:

"We have not looked into who can help us with making a process for this, because we have perceived this to be a normal project sale. And it may have surprised us how much time is used on such things."- Contractor no.3

However, based on the statement, it may seem that it has come as a surprise that the co-housing projects may take longer, which could be assumed to be a result of the many questions and curiosity, as previously mentioned (section 6.2.3).

Statement from the interviewees indicate that the projects have created new internal knowledge within the companies, as for example the extent of grassroot groups. But generally, based on several statements, it seems like there is no tradition for active knowledge sharing within the building industry. This assumption is supported by statements from architect no. 1:

"..In terms of knowledge sharing, it is actually quite special, and a little sad, that we have no tradition in this country. As in, when you are done with building something, you don't invest resources into looking into whether it works, whether the residence feels good and extract experience from it."- Architect no.1

The statements could be interpreted as a general lack of structured knowledge sharing within the building industry. Which is supported by that the only form of knowledge sharing identified in the empirical material is talks, and information events. Three of the interviewees (consultant no.2, developer no.1 and architect no.3) explain, that they participate in events and conferences, where they give lectures on co-housing communities, among other things to expand the housing form, but also to get customers. Based on the statements from the interviewees from the municipalities, it also seems like they are trying to disseminate knowledge about the co-housing as an alternative housing form, to their citizens.

However, based on the empirically collected data, it seems like much of the "knowledge sharing" that is currently taking place is informing about this type of housing, with the focus of expanding the market and customer base. But based on statement by consultant no.2 and architect no.1, it does not seem like much second order learning is taking place. This can be considered problematic because it is mentioned as an important process in the SNM concept.

However, one of the consultants (no.2) explained that their company participate in a European project, which is an incubator room for community lad, which also include ecovillages and co-housing. Consultant no.2 also explains, the association "Bofællesskab.dk" has begun to make a knowledge bank. It may therefore seem as if there are some beginnings of an increase in structured knowledge sharing within the field.

6.3.3 Social networking

As described in the theory section, forming a new actor network is important for the development of a niche, and users have a particularly important role to play. Therefore, I asked the interviewees about their cooperation with other actors in the industry, to promote co-housing.

Municipality no. 3 described that they are trying to engage their citizens through dialogue, as well as enter cooperation with developers and consultants. Constructor no.3 also explained that they have partnered with two architects and an engineering company, to promote this type of housing. In the same way architect no.2 explained that they have a cooperation with consultant no. 2, and consultant no. 2 explained they have a cooperation with consultant no.1, and constructor no. 3 explained that they have cooperation with developer no.1. From this, it may seem that alliances and collaborations have been created internally, however, according to consultant no.2, it may appear to be several small collaborations, rather than a large structured one across the industry. As consultant no.2 explain:

"..I hope that we in some way can unify. We stand stronger together, if we work together more so we get a larger amount of knowledge sharing and help each other," - Consultant no.2

In addition, it may seem that not all interviewees agree on the definition of a co-housing community and the extent to which future occupants should be involved in the process. This could be assumed to result in a lack of networking. Several of the interviewees, that are focused on the importance of the user involvement, express that they do not agree with the more commercial actors' way of creating a community. Consultant no.1 explain:

"Because right now, we see how many developers also try getting into this market, because they see that they can sell houses, but they risk ruining the housing form because they might disappoint a lot of people who thought they were signing up to be part of a meaningful community, but ended up getting a house with a shared room in the basement. (..)It is not common spaces that create community." -Consultant no. 1

According to Hoogma (2000) it is an important process that the actor's strategies, expectations and visions with more go in the same directions. This lack of greater interdisciplinary collaboration in the sector, as well as the disagreement in the industry, between the more user driven focused actors and the more commercial ones, could be assumed to create barriers and limit the spread of the co-housing form.

6.4 Sub-conclusion

Based on the deductive analysis, it may appear that these are generally the same expectations that the actors are trying to create. However, some may be more focused on sustainability, than others, especially those building senior co-housing communities, may be more focused on security and less loneliness.

In relation to learning processes, it may seem that there is not much knowledge sharing in the industry, and it seems that it is not only within co-housing, but in general. Based on my knowledge from my literature review, it can be assumed to be a result of cost-efficiency and linear processes. The knowledge sharing that takes place, however, may in principle appear to be first-order knowledge sharing. However, based on a single statement, it can be seen that there are a few examples of attempts at greater knowledge sharing, within the field.

In relation to networks, it may seem that there are several small networks where different actors try to work together. However, it may seem that the more user-driven actors do not completely agree with the more commercial ones about the extent of user involvement, and this may be the reason why there probably does not exist a larger network around promoting co-housing.

7. Discussion

The analysis of my empirical material (interview material) shows that there are a number of challenges and barriers in the existing housing regime that 'stand in the way' of co-housing becoming more widespread. In this section, based on my theoretical knowledge, as well as knowledge from the literature review, I will discuss my findings vis-à-vis those found in the literature to assess the development of co-housing

Which factors have historically and are currently having an impact on the current spread of the co-housing communities?

The investigation of the Danish co-housing in a historical context, made it possible to identify three phases of Danish co-housing. Analysis of the phases in a multi-level perspective shows that the origin and the following two revivals of co-housing, may be the result of changes at the landscape and regime level.

In the 1970s, when the co-housing form arose, changes at the landscape level such as increases in prosperity, a growing welfare state, as well as an education boom, opened up for younger generations to be able to be critical of society's design and lifestyle. The younger generations began to question whether rising private consumption was the way to a happier life. At the same time, alternative forms of housing began to emerge in the niches, including co-housing. This can be assumed to be the result of dissatisfaction with the existing housing regime.

In the early 1980s, as a result of a political change at the regime level, the co-housing form experienced growth. Actually, the political changes, were not aimed at the emergence of co-housing communities. Nevertheless, it created some favorable conditions that led to the above-mentioned growth. Simultaneously, there were some changes at the landscape level, such as the oil crisis. In the niche a new type of co-housing started to arise, the so-called eco-village, which could be assumed to be a result of the greater environmental and ecological attention at the regime level, which were likely a result of the energy crisis.

As a result of a shift in the state's priorities the support for housing cooperatives that were introduced in the early 1980, was terminated. From an MLP perspective, this change at the regime level could be assumed to be an answer to the decrease in the prevalence of the housing form in the following years.

According to Gutzon, Denmark has experienced a new revival of the co-housing form, since the late 1990s, and especially in the last decade. Change at the landscape and regime level could be assumed to be an answer for this. For example, in the last decade Denmark and the rest of the world, has experienced climate change, an increase of the elderly population, urbanization, change in the family patterns, more singles, and more loneliness. Thus, it may appear that the changes at the landscape level mean that one-size fits all buildings such as the single-family house, no longer match society. Despite the revivals, it seems that the co-housing form has never moved beyond the niche level. The question is why.

To understand the historical development of the co-housing form, I have made use of MLP. In this context, it is important to mention that there has been some criticism of the theory in the literature, which is important to consider. In the literature, MLP is criticized, for seeing the transition processes too much from above, resulting in a lack of insight and focus on the interactions that take place between the niche and the dominant regime. In my historical retrospect, I have been forced to look only at the overall, and it is therefore conceivable that interactions could have taken place between niches and the dominant regime without my knowing them. However, in my deductive analysis of my interviews, I have tried to lay them out.

What current barriers limit the prevalence of co-housing communities?

Through the deductive analysis of collected interviews (Chapter 6), I identified various barriers that can be assumed to be the cause of the co-housing form not having reached beyond the niche level yet. In this discussion, I have only chosen to discuss the challenges mentioned by most actors, and thus can be assumed to be probably some of the biggest.

One of the challenges, mentioned by several of the interviewees, is that the grassroots groups may have difficulty organizing. Organizing, agreeing and being patient can put such a group to the test, especially in a stressful everyday life. In addition, it may seem that just finding someone to establish a co-housing association with can be a big challenge. Lack of knowledge within the field, is also mentioned as a huge challenge. Several of the interviewees state that managing the construction itself can be difficult for private individuals, as the construction is too complex. These challenges can thus be assumed to be the first barrier, the grassroots groups face in establishing a co-housing community.

The fact that there is a lack of a places to go to find other families to live with, can be a result of the market being geared towards the individual consumers. In addition, based on the interviews, it may

appear that the building industry in the last few years has been overtaken by professionals rather than private persons. This may be the reason for the lack of knowledge about the industry and the processes. Moreover, it seems that there is a lack of places where you can specifically seek knowledge about establishing a co-housing community.

The second barrier is the challenge of getting a plot of land, and being allowed to build a co-housing community there, based on co-housing community principles. Based on the statement from the interviewees it seems like there is not much flexibility in the municipalities' plans and district plans, in addition, it may seem that the plans are adapted to the dominant family housing type. An example could be the rule that there must be 2 parking spaces per household, depending on whether it is inside or outside the urban area. This seems to clash with the concept of co-housing communities, where the cars are often shared. In addition, there appear to be some challenges with the municipal tendering processes. The municipalities are subject to public tender, this means that the co-housing communities are up against the developers, when buying land. This seems to present a challenge, since they have to manage organizing and collecting the required capital before they can bid, whereas it can be assumed that the developers already have large equity.

Looking at the literature review, one of the authors, Toppinen et al (2018), states that due to the complexity of the construction processes, the sector has become highly routinized and standardized, which makes it difficult to change the dynamics of the sector. Thus, it can be assumed to be a reason behind the lack of flexibility within the district and municipality plans, which may limit the prevalence of the co-housing form.

Through the lens of MLP, the high standardization and routinization of processes which results in barriers, seem to be much well in line with the description of the lock-ins and path dependences, that are related to regulations and behavioral patterns which stabilize the socio-technical regime, but provide bias against innovative practice or new technologies.

The third great barrier, seems to be financing. At present, it may appear that the services of banks and financial institutions are primarily geared towards the individual consumer. It may therefore be expected, based on the interviewees' statements, that several families getting together and acquiring funding is troublesome. This may be due to the fact that banks and other financial institutions find co-housing communities more risky, partly due to lower demand, but also a lack of knowledge about this form of housing. Several interviewees point out that, the banks and financial institutions find it difficult

to count on shared square meters. In addition, it is conceivable that for the same reasons they do not see the same earnings effect as ordinary homes.

Banks and mortgage lenders live on investments, and it may therefore seem that the lack of demand and knowledge about the housing associations, together with creditworthiness, and likelihood to finish the repayment, makes the co-housing communities riskier. From an MLP perspective, this financial standard that may appear to be tailored to the individual consumer, can be assumed to result in lock-ins.

The third barrier could be assumed to be the great enthusiasm and demands for co-determination from the grassroots groups. Based on the interviews, it may appear that the grassroots groups, generally have a large commitment and demands for co-determination, which the developers and contractors are generally not used. According to a consultant and an architect, there is not many contractor or investors that is interested in it, because they are not interested in the big changes, which takes time and costs money.

Looking at the article by Toppinen et al. (2018) one might find a causal explanation in industrialization. Toppinen et al. (2018) explains that aspects of industrialization, such as a cost-efficiency mindset and a project-based structure focused on routines and efficient labor, and best practices and standards management of value chain activities, have affected the building industry. In the literature this is regarded as one of the reasons for the lack of innovation and can probably also be assumed to be the reason for the lack of interest in user involvement within the field. The many questions, the demand for flexibility and the high level of commitment that the developer and contractor in the interviews indicate that they are experiencing from the grassroots group, can probably be assumed to clash with the non-iterative processes, and the cost-efficiency approach.

As I said, MLP is criticized for seeing the conversion processes from above rather than from within. In this thesis, I have used my interviews and Geel's 7 dimensions, to examine the regime from within.

It can generally look like the challenges that are mentioned most often, stem from lock-ins where existing regulation, such as the municipality and local plans, or services, and loan options, are adapted to the individualized and developer dominated real estate market, and the dominant technology, the single-family house. In addition, it may appear, based on interviews, that the construction industry is strongly profit-driven, and that the actors in this industry therefore heavily focus on optimizing and pushing price. This can be assumed to result in a lack of innovation, and this could also be assumed to

be one of the reasons why it may seem that the existing housing stock does not reflect the image of society.

How are expectations, learning and networking involved in promoting community living?

As described within the theoretical framework (chapter 2) strategic niche management (SNM) is an approach, that is designed to facilitate the introduction and diffusion of new sustainable technologies, through protected spaces. SNM literature focuses on three internal niche processes contributing to the success of niche formation; Expectations, learning and networking. Through my analysis of the transcribed material, I tried to uncover whether any of these processes are taking place today, as an attempt to promote co-housing.

Since there is typically no one who knows the value of innovation, in the beginning, voicing and shaping expectations is considered important for niche development. Based on the statements of the interviewees, it may seem that stakeholder have tried to raise expectations, to promote the co-housing. It seems that the expectations held by different stakeholders are generally, which makes the expectations stronger. In general, most stakeholders focus on community, the practicalities of being more to share tasks, and sharing economy. Next, if it is a senior living community, it may seem that there is an additional focus on security and community (to combat loneliness). Lastly, there is a greater focus on sustainability.

Furthermore, it seems like some of the expectations that are voiced, are coupled with certain societal problems, which the existing technology is not expected to solve, such as community, security, sharing economy etc. According to the theory, this also helps to strengthen expectations.

Another important element that is believed to strengthen the expectations, is that they are supported by facts and tests. However, several of the things that are promised can be difficult to measure, and that may be where the challenge lies. For example, one of the expectations that is raised is sustainability. Sustainability can be many things, some aspects of which are easier to test and support with facts. Elements such as security, togetherness and less loneliness, as well as a vulnerable need for care, which is mentioned among the interviewees as benefits of living in co-housing communities, one can probably argue that housing associations are socially sustainable. In relation to sharing economy and communal dining, which several of the interviewees also mention as benefits of living in a shared home, it can be assumed that living communities can be considered to be both economically and environmentally sustainable. However, there are no studies in the field, and it is assumed without reservation for rebound effect.

Another important internal process in relation to successful niche management, is learning. In the SNM literature, Mourik and Raven (2006), niches and local projects are proposed to structure the learning processes. In addition, four phases are mentioned as part of a learning cycle, in SNM. The first phase is about practical and concrete experiences, the second phase is about reflection on the experiences, the third phase is about a generalization of these experiences, and the fourth phase is about translating the generalized experiences into local projects, which in turn provide new practical and concrete knowledge.

Looking at the statements from the interviewees, it does not seem as if learning takes place beyond phase 1. For example, one of the architects pointed out, that there is no tradition of investing resources into evaluating whether a project was successful and whether the residents are satisfied with the result. Based on the interviews it seems like the only form of knowledge sharing that takes place are lectures and fairs, and it can be discussed how much knowledge sharing and reflection take place at those.

In the literature, Toppinen et al. (2018) states that the typical construction projects consist of a one-off nature. According to Toppinen et al. (2018) this results in a lack of knowledge development and knowledge sharing within and among the organizations. Likewise Karen Manley and Aleth Blayse (Manley & Blayse, 2004) states this one-off character thus limits the likelihood that a given innovation will be applicable in other situations, and this reduces the incentive to innovate.

Based on the literature, it can be assumed that this lack of knowledge beyond the first phase, could be assumed to be a result of the one-off nature and probably also the cost-efficiency mindset mentioned earlier.

According to the third important internal process, network formation, not much knowledge has been gained through interviews. But it seems like, based on the statements, not much has been done in the field to create a constituency behind the new technology, in order to facilitate the interaction between relevant stakeholders and provide it with new resources.

Overall, it may seem that there is a need for a greater focus on learning in the other phases, which are about reflections of experiences, as well as generalization of experiences that are translated into other projects, in order to provide new practical and concrete knowledge. In addition, it may seem that there is a need for a greater focus on creating networks where there could be a focus on knowledge sharing.

How do we, as sustainable design engineers, help overcome these challenges?

In the last couple of years more developers have become interested in co-housing. The question is whether the greater interest in co-housing communities among developers solves the barriers and can help make co-housing more common. According to two of the consultants, the challenge is that the developers do not take into account the factors that underlie the natural development of a strong community, but instead try to use the same formula as for the single-family houses. This means, according to one of the consultants, that today we see several "co-housing communities" which consist of a number of terraced houses that are individually rented out or sold, in addition there is a form of common space, such as an orangery. The question is whether a common orangery or similar common space creates community, several of the consultants and architects do not think so. According to one of the consultants, instead of spreading the form of housing, this can instead give false hopes that end up disappointing a lot of resident, and thus instead create a bad reputation, which can eventually end up with a reduced prevalence. Based on collected empirical data, it may appear that this challenge is rooted in the same as the challenge with the extent of the grassroots group, that the building industry can be assumed, to be cost-efficiency focused, based on a linear processes, with very few user involvement, and innovation. So, it is probably about a less cost-efficiency focus, and more focus on facilitating a community, in these processes.

But if you look at the other three challenges of organizing yourself, the municipality and the local plans and financing, then they can seem to lie primarily with the grassroots groups / the private citizens. These challenges stem mainly from lock-ins in the housing regime.

The financial challenges, as described earlier, are probably due to the financial risk of co-housing, which is probably due to a lack of knowledge of the housing form. The challenges with the municipal and local plans, as previously described, probably stem from the fact that the plans are adapted to the dominant technology which is single-family housing. In addition, it may seem that the processes are adapted to the more developer-dominated construction industry, where it is the professional who in most cases builds.

Based on SNM, a way to promote co-housing communities and solve some of these barriers can be through experiments such as example buildings. Like The Lochiel Park project (Berry, et al., 2013), described in the literature review, example buildings are meant to challenge the industry, and at the same time allow many individuals as organizations to gain a more detailed and practical understanding

of this type of housing. In addition, it can be assumed to give organizations the courage to change existing practices.

Another thing could be more focus on learning processes beyond the practical knowledge, like a greater focus on reflection on collected experiences. This could be assumed to provide a second-order knowledge, which in the SNM literature is stressed as an important element. In connection with more focus on reflection on collected experiences, it could be assumed, based on knowledge from the theory, that another important element could be establishing networks across the sector and facilitating knowledge sharing.

In addition, more knowledge sharing across the various professions in the industry might contribute to creating more knowledge in the field, which can be assumed to contribute to promoting the form of housing. It could be assumed that the challenge at present is, among other things, that no money is set aside for processes of reflection, after the end of the project, and it can therefore be assumed that not much second-order learning takes place, as mentioned earlier.

In addition, building a network could be beneficial, to facilitate the interaction between relevant stakeholders, and creating a constituency behind the overall technology, as well as facilitate the second-order learning

The other challenges are related to the self-grown co-housing groups. Firstly, it can be difficult to establish a group / find other families you can create a co-housing community with, as there is no place to go. Secondly, it seems that organizing, agreeing and being patient is a bigger challenge. In addition, it may seem that a lack of knowledge about the construction processes and industry in general can create challenges for such a self-grown group.

It could thus be about creating a platform where it is possible for families who want to move together to meet. In addition, it is conceivable that a platform with access to information, precisely about the challenges, and the construction processes in general, and how to handle them, could help self-grown groups.

In addition, it is conceivable that a platform where it is possible for the groups to share knowledge could help the individual groups in the establishment of a co-housing community, and hopefully promote the form of housing.

So, there are several things to tackle, to make co-housing more widespread. In Chapter 8, based on the above considerations, I will suggest on how I, as a sustainable design engineering student, can help promote the spread of the housing community.

Discussion of methods used

For my collection of empirical data, I have made use of a qualitative approach, inspired by Steinar Kvale and Svend Brinkman. This is because I, in this thesis, have tried to uncover problems which there is very little information about, I have had a desire to gain a deeper understanding of the subject, where I have seen a qualitative approach as more appropriate.

Of qualitative methods, I have made use of semi-structured interviews. This is because, I regarded this method as an opportunity for the informants to freely answer the questions, and deepen their own thoughts and experiences, however, still with a structure from the interview guide. The interview guide was prepared based on my theoretical framework tool MLP and SNM, and was used to ensure that, all the key topics were touched upon.

The challenge has been that the method is very time consuming and the results more difficult to generalize. However, I have tried to strengthen the findings, by comparing the knowledge gathered through interviews, with theory and existing literature.

In addition, I have tried to obtain a saturated data. In establishing a co-housing community, there can be an incredible number of challenges, and they can vary depending on the profession and user group. However, I assume that in my data collection I achieved some data saturation, as after the first interviews no more new challenges emerged, which was considered to be among the largest.

To analyze my collected empirical data, I used theory-driven analysis, which is a deductive coding based on theories, in this case MLP and SNM, to process the analysis results. I used this method for a more systematic and structured analysis, which hopefully at the same time has made the analysis more transparent. However, the deductive analysis, based on the theoretical frame of reference, can be assumed to result in relevant elements being overlooked. My semi-structured interviews, and transcription of the entire interview can hopefully result in a lesser likelihood of other relevant knowledge being overlooked, however, this cannot be excluded.

As a frame of reference for my theory-driven analysis, I have used multi-level perspective and strategic niche management. I have chosen the MLP framework as it helps to understand the mechanisms and

dynamics of a socio-technical system, and to identify barriers that hinder the development and implementation of innovations. However, as previously described, MLP has been criticized, among other things, for seeing the transition process from above, and not within. By making use of Geel's (2002) definition of the regime, I have just tried to also analyze the regime from within. However, MLP is complex and it can be difficult to explain all the movements within the transition.

In addition to MLP, I have used SNM in my analysis. I have made use of SNM as I consider it to be a good analytical tool for understanding and examining system transformation through innovations, as well as to understand how to manage innovation from niche to regime. But in the same way as MLP, the theory has received some criticism. In the literature, SNM is criticized for having too little focus on the diversity of the origins of the niches. This is also something I try to consider throughout my analysis, by precisely examining the different ways in which niches can arise.

8. The concept

In this section, I will, based on my collected empirical data, and theoretical understanding, present my idea of how to make co-housing more common.

As previously described, it may seem that the developers are very interested in co-housing at present. However, I choose, based on an assumption that the developer is typically driven by market trends which would mean that the interest can quickly disappear again from co-housing, to focus on the self-grown groups. My choice also stems from the fact that one of the developers states that the self-grown groups typically have a stronger social capital and are more robust than the developer-driven co-housing communities. In addition, it may also seem that most of the challenges lie precisely with these groups.

In the previous section chapter 7, I suggested as a way to promote co-housing communities, to create a platform that 1) Made it easier for families / individuals who want to create a co-housing community to meet with others, 2) Provides access to general information about how to establish a co-housing communities, various processes etc. 3) Provides access to information about various challenges that you will typically encounter in various processes and how you can handle them, 4) Provides access to a forum where the groups can share their knowledge, and in that way may facilitate something of a second order knowledge. In this chapter I will come up with a design proposal for such a platform.

8.1 The user group

In order to form a picture of the user group, I have, based on knowledge from the interviews, and research of the groups on various co-housing community sites, prepared three different personas, that fit the personality of people who would show a particular interest in moving into a co-housing community.



Ida, 31 Sune, 33 Storm 1½

Profession:

Ida, master in sociology
Sune, project manager, master in Public Health

Place and type of residence:

Living in a cooperative residence on Nørrebro

Why do you want to move in a co-housing community?

We want to get outside the city, get more space and be closer to nature where Storm can romp around.

We want to live in a co-housing community with other families because we realize that it can be a nicer and easier everyday life, especially as a toddler family where you can get help with the practical aspects.

We want to live somewhere that is safe for our child and where there are a lot of playmates.

We want a more social life that extends beyond the core family.



Ellen, 64

Profession:

Retired but has previously worked as a nurse

Place and type of residence:

Lives in a townhouse in Albertslund

Additional notes:

Is divorced, has three children

Why do you want to move in a co-housing community?

I have a passion for community and nature

I have always felt it has been crazy that each family has their own hedge trimmer that they use once a year, and therefore thinks that it makes much more sense with a sharing economy.

I can see the practical benefits of sharing the everyday tasks



Helle, 55 Michael, 60

Profession:

Helle, associate professor of communication
Michael, upper secondary school teacher

Place and type of residence:

Are living in a single-family house in Virum

Additional notes:

Have two children and one granddaughter

Why do you want to move in a co-housing community?

We want more community in our everyday life, as we have the presumption that it gives quality of life and life satisfaction to be actively involved in a community with other people.

We are interested in ecology and sustainability, and can see the benefits of sharing economy in such a housing form.

8.2 Opportunities today

Before preparing my design proposal, I have first chosen to investigate whether similar platforms already exist and how they have chosen to build theirs. At present, there appear to be two different non-commercial platforms where citizens who wish to relocate can find knowledge. These are "Bofællesskab.dk" and "Bosammen.dk". Bosammen.dk is run by Marie Chimwemwe Degnbol, who in addition to running the website holds lectures and workshops for co-housing associations, furthermore, works as a consultant in the company "Bærebo". "Bofællesskab.dk" is an association that tries to promote co-housing associations in Denmark. They describe themselves as more than just a website, but as a digital platform and meeting place for all co-housing communities in Denmark. In January 2018, Bofællesskab.dk was made into an association which, in addition to the operation of the website, also organizes various activities. The association is led by a board of five people, all of whom in one way or another have a knowledge of co-housing associations and collectives. The association is just over 2 years old and has been run by volunteers.

In general, it is my impression that the platform works well, and that there are many good features. However, based on my accumulated empirical data and theoretical knowledge, I see opportunities for optimization and expansion of several functions.

8.3 Storytelling

To convey and illustrate the possibilities that exist today, to digitally find families to form a group with, and generally find information on how to create a housing association, I have used the storytelling technique. The storytelling is based on one of my personas.

Storytelling

Sune and Ida have long thought about moving from their three-bedroom apartment on Nørrebro to a co-housing community, scenic surroundings, social community and several playmates for Storm. Now they have finally made the decision to sell their apartment and have begun to explore the possibility of establishing or moving into a co-housing community. They have introduced the idea to several of their friends, but in general, the different friends indicate that they are not interested in moving into a co-housing community.

Sune and Ida, therefore, decide to make an effort to find some other families, who might be interested in establishing a community with them. But where do you find them? Ida and Sune do a google search on the word "Bofællesskaber". The first pages that appear are "Bofællesskab.dk" and "Bosammen.nu".

At "Bofællesskab.dk" they can see an overview of existing co-housing communities and vacant housing in existing co-housing communities. But there is not a feature where you can find other families, who are also looking for other families to establish a co-housing community. So instead they open the webpage "Bosammen.nu". The website provides an overview of facebook groups for co-housing communities and communes, but the website states that the facebook pages are for already established communities, where you either can search for a new roomie in the co-housing community or search for an available apartment in a co-housing community. But Ida and Sune decide nevertheless to make a facebook post in the groups where they seek families to establish a new co-housing community together with.

While Ida and Sune are waiting for some interested families to respond to their Facebook post, they decide to investigate how to establish a co-housing community, both the practical and legal elements. Neither Ida or Sune have any prior knowledge of the construction industry. They start by doing a google search on how to establish a co-housing community, again "Bofællesskab.dk" and "Bosammen.nu" appear as search results.

At "Bosammen.nu" they find 4 tips on how to get to know each other better and get closer to whether you want to start a co-housing community with each other. On "Bofællesskab.dk" they find a post that describes 10 steps to create a co-housing community. Ida and Sune think the 10 steps provide a good overview of the process, but they are left with some questions. How do you find a building site large enough to build a co-housing community, and how do they make an offer for the area as a group? If the local plans need to be changed, how long will it approximately take, and must the floor plans and m2 be defined before the local plans can be changed?

8.4 The prototype

To concretize my ideas for optimizing the website “Bofællesskab.dk”, I have developed a prototype of a new website. The website should not be seen as a competitor to “Bofællesskab.dk”, but more as a prototype with suggestions for optimizations.

The way I think the platform could be optimized is, among other things, by adding more functions that facilitate social networking, and knowledge sharing. Below, the various functions will be described. In addition, during each function, I will try to argue the background for choosing this function.



Figure 6 Screenshot of the webpage

Why?

“Bofællesskab.dk” currently appeals a lot to people who have already made a decision to move into a co-housing community, there is very little information about living in a co-housing community, which I assume citizens who have not yet made the choice, could benefit greatly from being exposed to. In my prototype I have added a tab where it is possible to gain information about co-housing in general, including the advantages (and disadvantages) of living in a co-housing community, based on the residents' own experiences. To this section, the idea is to add videos and quotes from people living in a co-housing community, explaining why they have moved in together, their considerations, as well as some of the challenges of living in a co-housing community, and how to deal with them. I have included videos and quotes as I assume that the interested people easier can relate to this families, rather than reading cold facts.

How?

At present, "Bofællesskab.dk" offers the opportunity to read some articles about co-housing under their tab "knowledge bank". Below are currently seven articles, two of which describe 10 steps for creating a co-housing community and a senior co-housing community. The articles give a really nice overall overview, however, based on my collected empirical data, I believe that the "Knowledge Bank" can be optimized in several areas.

First and foremost, there is a lack of a more elaborated approach to establishing a co-housing community, as well as the challenges one must be aware of, when establishing a co-housing community. For example, in the interview with architect no.3, the interviewee describes that in order to bid on a large plot, one must have established a legal entity. In addition, an architect describes that in connection with the establishment of a co-housing community, the local plans usually have to be changed, and this can take up to a year and a half. As previously described, it can be really difficult to borrow money from financial institutions. This information I suppose is essential to the process and may come as a surprise to people with no knowledge of the industry. That is why I have created a tab on my website that outlines this important information.

Events

On "Bofællesskab.dk" there is a tab called "activities". The tab itself I think is very relevant, but at the same time, I think that the number of events could be optimized, although of course it is limited by the volunteers' time. I think several events with actors from the construction industry would be preferable. In my prototype, I have, for example, added an event where Mercur bank, holds an event where they share knowledge on the opportunities there are when a whole group has to finance such a project, and how to do it effectively (see figure 7). In addition, I have added a lecture on how to preserve community and handle conflict, before, during and after establishing co-housing communities.

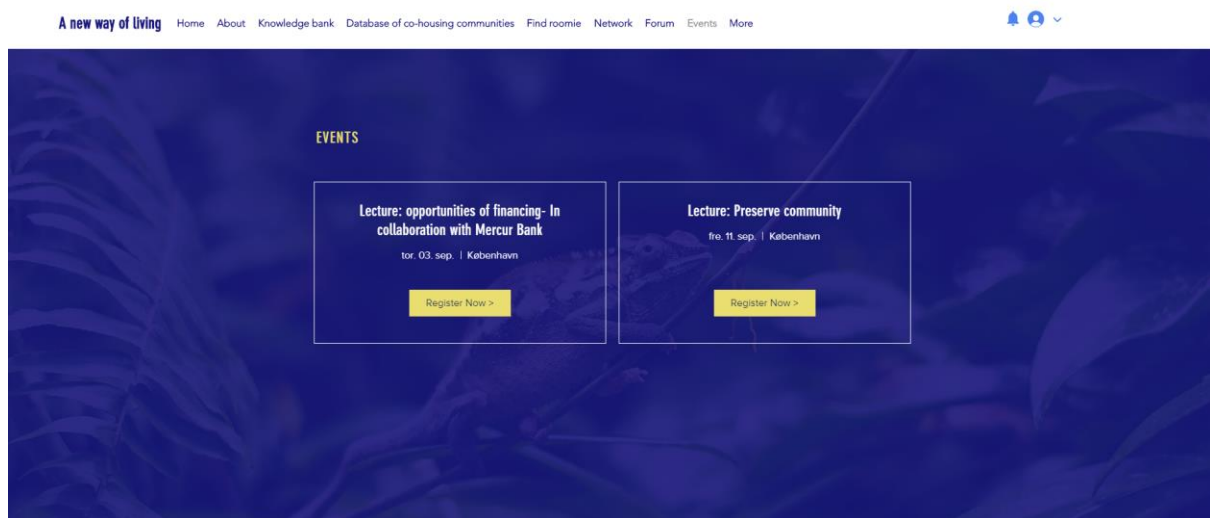


Figure 7 Screenshot of the webpage, The Event section

Find roomies

In addition, in my prototype, I added a tab called "Find roomies". In this tab, the idea is that you can register as a user who is looking for other families / persons to establish a co-housing community. In the database, the idea is that you create a user by first adding a picture of yourself / family, below the picture you write a little text about yourself or your family, information's such as age, employment and personal interests. Next, you define wishes for the geographical location of the co-housing association, as well as more specific wishes such as wishes for the number of times a week you want communal dining per week. Contact information is added to the user / profile. In my prototype the idea is that there should be a button that allows you to send emails or messages to the person/families directly. The idea is that in this way it is easier to find people who have the same interest as oneself. A filter can possibly separate the users, based on their desired geographical location.

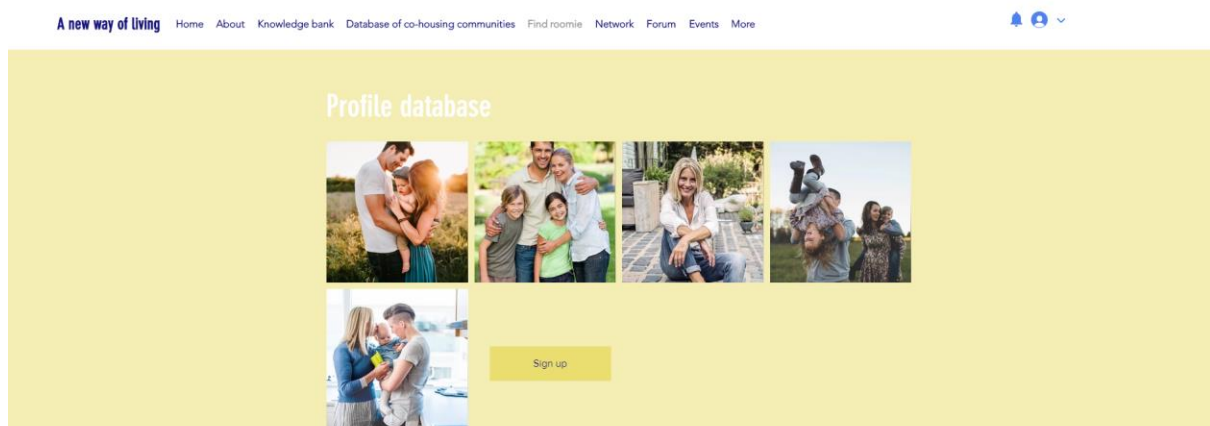


Figure 8 Screenshot of the webpage, Find roomie section

Forum

At present, as previously described, they have a tab called "Knowledge Bank", which consists of articles that convey some information. In my prototype, I have optimized the website by adding a new tab called "Forum". At "Bofællesskab.dk" there is very little opportunity for interaction between the users. Several people will likely have the same questions. The idea of the forum is that the users, the volunteers who run the site, as well as the professionals, etc., can interact. Here it is possible to ask questions and get answers. At the same time, there is a feature that allows you to see the most frequently asked questions, and the answers. For example, the forum could be managed by joining the association and paying an annual or monthly amount, which goes to the volunteers who run the site, or possibly an employee.

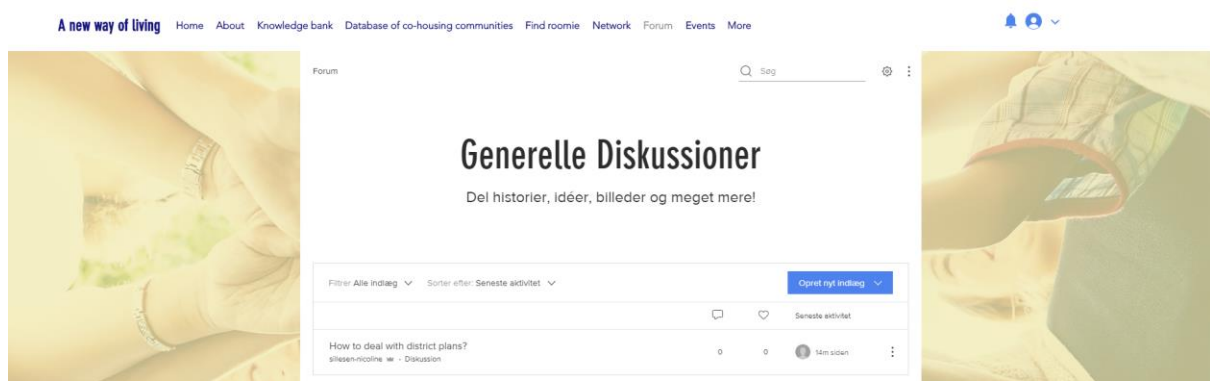


Figure 9 Screenshot of the webpage, The Forum section

Database of co-housing professionals

On the website it is possible to create a profile for relevant professionals such as architects, engineers and co-housing consultants. These can be contacted to gain information and used as advisors, lecturers, workshop settlers, consultants etc. In my prototype, I have expanded this tab. The tab is instead called “Network” and now contains not only consultants, but also architects, construction companies, contractors and more who all have an interest in and / or experience in co-housing communities. The idea is that for example an architecture company, can create a profile in the database, where co-housing projects, they have participated in can be mentioned, possibly with a link to the projects. In addition, contact information can be given to a person from the company you can contact for more information. This directory gives professional players in the industry interested in co-housing communities the opportunity to make themselves visible. At the same time, it provides the opportunity for private individuals who want to establish a co-housing community to get a quick overview of players in the industry who have experience with co-housing communities that you can contact. At the same time, the function could hopefully create more networks, and push to the building industry to arrange itself in the field.



Figure 10 Screenshot of webpage, Database of co-housing professionals section

The web page is a suggestion for how to optimize the existing platform “Bofællesskab.dk”. The added features can hopefully help facilitate networking and more knowledge sharing, which is mentioned as important processes in SNM literature. Based on knowledge acquired from the theories, this web page is likely not enough to make co-housing common by itself. But hopefully it can help create momentum to help co-housing become more widespread in Denmark.

9. Conclusion

In this master thesis, it has been investigated how to make co-housing in Denmark, more common. It can be concluded that changes at the landscape and regime levels have affected the prevalence of co-housing. In the 1960s, the formation and rise of the alternative form of housing was due to, among other things, tensions in the housing regime, which was accompanied by an educational and economic boom, at the landscape level. The changes opened up for the younger generations being able to take a critical approach to the design of society and the lifestyle of their parents. Today's revival can be assumed to be a result of changes at the landscape level such as the increasing number of elderly people and singles, as well as changed family patterns, and a greater focus on sustainability. These are believed to have resulted in tensions and challenges at the regime level.

Based on MLP, it may seem that socio-technical configurations of interconnected elements in the regime have created lock-ins and path-dependencies that create challenges in the proliferation of co-housing communities. Some of the challenges that self-grown groups face when establishing a co-housing association include challenges with; a lack of flexibility in district and municipal plans, liberalized tendering processes, a lack of loaning opportunities, a profit-driven building industry, and challenges in organizing and keeping together.

It may seem that some of these challenges are a result of the industrialization of the construction industry, which among other things, has led to a cost-efficiency mindset and linear thinking.

Based on SNM it can be further concluded that the following are important processes for a successful introduction of innovations; 1) expression and shaping of expectations in the form of promises of innovations, 2) creation of networks involving different kinds of actors, 3) formation of first and second order learning. Based on the collected empirical data, the qualitative interview, it appears that there is a lack of 2nd order learning and networking. In addition, it appears that there is a lack of structured knowledge sharing and information about the form of housing etc.

It can be assumed that my proposals for optimizing the existing platform (Bofælleskab.dk) can facilitate network formation and knowledge sharing to help promote co-housing.

In addition, it can be concluded that several niche events and connections with ongoing processes at the regime and / or landscape level play an important role in restructuring the building industry.

Lastly, based on MLP and SNM it can be concluded that the timing of the intervention is crucial. The nearer the critical point in the system, the more effective the intervention. Hence, the question is whether the right timing is now.

References

1. Abell, Y., 2016. The re-emergence of cohousing in Europe. *International Journal of Housing Policy*, 06 October, pp. 561-564.
2. Andelsportalen, 2020. *Overblik: Moderniseringsreglernes indvirkning på prissætningen af andelsboliger anno 2020*. [Online]
Available at: <https://www.andelsportal.dk/nyheder/moderniseringsregler-prissaetningen-andelsbolig-2020/>
[Accessed 20 July 2020].
3. Andersen, L. L. & Jensen, M., 2019. *Videnscentret Bolius*. [Online]
Available at: <https://www.bolius.dk/parcelhusets-arkitektur-og-historie-17537>
[Accessed 15 April 2020].
4. Arbell, Y., 2016. Review Re-Emergence of Cohousing in Europe. *International Journal of Housing Policy*, 06 October, pp. 561-564.
5. Arentshorst, M. E. & Peine, A., 2018. From niche level innovations to age-friendly homes and neighbourhoods: a multi-level analysis of challenges, barriers and solutions. *Technology Analysis & Strategic Management*, 09 April, pp. 1325-1337.
6. Beck, A. F., 2019. *Invitér bofællesskaberne indenfor*, København: Dansk Byplanlaboratorium og Kuben Management.
7. Beck, A. F., 2020. What Is Co-Housing? Developing a Conceptual Framework from the Studies of Danish Intergenerational Co-Housing. *Housing, Theory and Society*, 37:1, pp. 40-64.
8. Berry, S., Davidson, K. & Saman, W., 2013. The impact of niche green developments in transforming the building sector: The case study of Lochiel Park. *Energy Policy*, 05 August, pp. 646-655.
9. Bilali, H. E., 2019. The Multi-Level Perspective in Research on Sustainability Transitions in Agriculture and Food Systems: A Systematic Review. *MDPI*, April, pp. 1-24.
10. Blomkvist, S., 2002. Persona - an overview. *Extract from the paper The User as a personality. Using Personas as a tool for design. Position paper for the course workshop "Theoretical perspectives in Human-Computer Interaction" at IPLab, KTH, September 3, 2002*, 03 September, pp. 1-8.
11. Blomkvist, S., 2002. *Persona – an overview*, Uppasala: s.n.
12. Bofællesskab.dk, 2019. *Flersomhed, fællesskab og forskellighed*. [Online]
Available at: <https://bofaellesskab.dk/blog/flersomhed-faellesskab-og-forskellighed>
[Accessed 19 July 2020].
13. Bofællesskab.dk, 2020. *Bofællesskab.dk*. [Online]
Available at: <https://bofaellesskab.dk/bofaellesskaber/se-bofaellesskaber>
[Accessed 19 April 2020].
14. Bourdieu, P., 1999. *The Weight of the World: Social Suffering in Contemporary Society*. s.l.:Stanford University Press.
15. Brejnrod, K. N., Kalbar, P., Petersen, S. & Birkved, M., 2017. The absolute environmental performance of buildings. *Building an Environment*, 7 April, pp. 87-98.
16. Brinkmann, S. & Kvale, S., 2015. 6. Tematisering og design af en interviewundersøgelse, 7. Udførelse af et interview. In: *Interview-det kvalitative forskningsinterview som håndværk*. s.l.:Hans Reitzel, 2015, (3. udgave), pp. 151-196.

17. Brinkmann, S. & Tanggaard, L., 2015. 1. INTERVIEWET: SAMTALEN SOM FORSKNINGSMETODE. In: M. Schilling, ed. *Kvalitative metoder*. s.l.:Hans Reitzel, 2015, (2. udgave), pp. 38-41.
18. Brugge, R., Rotmans, J. & Loorbach, D., 2005. The transition in Dutch water management. *Regional Environmental Change*, 10 May, pp. 164-176.
19. Bygningskultur2015, 2015. *Bygningskultur2015*. [Online]
Available at: http://bygningskultur2015.dk/typeblade/forstad/storskala_montageplan/
[Accessed 15 April 2020].
20. Bygningskultur2015, 2015. *Bygningskultur2015*. [Online]
Available at: http://bygningskultur2015.dk/typeblade/forstad/taet_lav_boligby/
[Accessed 15 April 2020].
21. Caniëls, M. & Romijn, H. A., 2008. Strategic niche management: Towards a policy tool for sustainable development. *Technology Analysis and Strategic Management*, March, pp. 245-266.
22. Collins, 2020. *Definition of 'technology'*. [Online]
Available at: <https://www.collinsdictionary.com/dictionary/english/technology>
[Accessed 30 July 2020].
23. Cooper, A., 1999. *The Inmates are Running the Asylum*. Indianapolis: SAMS.
24. Cross, N., 2008. Identifying Opportunities. In: *Engineering Design Methods-Strategies for product design*. s.l.:John Wiley & Son , pp. 64-72.
25. Dahl, H., 2020. De vil have bofællesskabet tilbage: »I dag har den almindelige borger ikke den magt, som han havde i gamle dage«. *Berlingske*, 10 Marts.
26. Dahl, H., 2020. Vi køber standardboliger til en kernefamilie, men vores familieliv er ændret: »Har vi rent faktisk en boligmasse, der afspejler samfundet?«. *Berlingske*, 28 February.
27. Dansk Statestik, 2020. *HER ER FAMILIEN DANMARK*, s.l.: Dansk Statestik.
28. Dansk Statistik, 2015. *Her er familien Danmark*, København: Dansk Statistik.
29. Dansk Statistik, 2016. *Antal enlige voksne har rundet 1,6 mio. personer*. [Online]
Available at: <https://www.dst.dk/da/Statistik/nyt/NytHtml?cid=20988>
[Accessed 19 July 2020].
30. Dansk Statistik, 2016. *Dansk Statistik*. [Online]
Available at: <https://www.dst.dk/da/Statistik/nyt/NytHtml?cid=20988>
[Accessed 15 April 2020].
31. Dansk Statistik, 2017. *Danmark i tal 2017*, København: Dansk Statistik.
32. Dansk Statistik, 2018. *Dansk Statistik*. [Online]
Available at: <https://www.dst.dk/da/Statistik/nyt/NytHtml?cid=26827>
[Accessed 15 April 2020].
33. Dansk Statistik, 2020. *Boliger*. [Online]
Available at: <https://www.dst.dk/da/Statistik/emner/levevilkkaar/boligforhold/boliger>
[Accessed 19 July 2020].
34. Dansk Statistik, 2020. *Familier*. [Online]
Available at: <https://www.dst.dk/da/Statistik/emner/befolkning-og-valg/husstande-familier-boern/familier>
[Accessed 29 July 2020].
35. Danske Bank, 2018. *NYT fra Danmarks Statistik*, København: Dansk Statistik.
36. Danske Bank, 2019. *Danskernes økonomiske tryghed 2019*, København: Danske Bank.

37. EDC, 2019. *EDC*. [Online]
Available at: <https://www.edc.dk/om-edc/nyt-fra-edc/nyheder/tre-ud-af-ti-boligkoebere-oensker-bofaellesskab/>
[Accessed 15 April 2020].
38. Elmer, H., 2020. *Bofaellesskab.dk*. [Online]
Available at: <https://bofaellesskab.dk/18-artikler/52-jagten-pa-et-tal>
[Accessed 19 April 2020].
39. European Commission, 2018. *Loneliness: an unequally shared burden in Europe*, s.l.: European Commission.
40. European Commission, 2019. *European Commission*. [Online]
Available at: <https://ec.europa.eu/jrc/en/news/how-lonely-are-europeans>
[Accessed 19 April 2020].
41. Feldbæk, O., 2010. Folkestyret. In: *Danmarks historie*. København: Gyldendals Fagbogsredaktion, pp. 187-294.
42. Folkebevægelsen mod ensomhed, 2020. *Folkebevægelsen mod ensomhed*. [Online]
Available at: <https://modensomhed.dk/#sektion5>
[Accessed 15 April 2020].
43. Geels, F. W., 2002. Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. *Research Policy*, December, pp. 1257-1274.
44. Geels, F. W., 2005. Processes and patterns in transitions and system innovations: Refining the co-evolutionary multi-level perspective. *Technological Forecasting & Social Change*, July, pp. 681-696.
45. Geels, F. W., 2005. The dynamics of transitions in socio-technical systems: A multi-level analysis of the transition pathway from horse-drawn carriages to automobiles (1860–1930). *Technology Analysis & Strategic Management*, pp. 445-476.
46. Geels, F. W., 2005. The Dynamics of Transitions in Socio-technical Systems: A Multi-level Analysis of the Transition Pathway from Horse-drawn Carriages to Automobiles (1860–1930). *Technology Analysis & Strategic Management*, December, pp. 445-476.
47. Geels, F. W., 2010. Ontologies, socio-technical transitions (to sustainability), and the multi-level perspective. *Research Policy*, 21 February, pp. 495-510.
48. Geels, F. W., 2014. Regime Resistance against Low-Carbon Transitions: Introducing Politics and Power into the Multi-Level. *Theory, Culture & Society*, 27 June, pp. 21-40.
49. Geels, F. W., 2019. Socio-technical transitions to sustainability: a review of criticisms and elaborations of the Multi-Level Perspective. *Current Opinion in Environmental Sustainability*, 29 July, pp. 187-201.
50. Geels, F. W. & Schot, J., 2007. Typology of sociotechnical transition pathways. *Research Policy*, 20 February, pp. 399-417.
51. Geels, F. W. & Scot, J., 2008. Strategic niche management and sustainable innovation journeys: theory, findings, research agenda, and policy. *Technology Analysis Strategic Management*, 27 October, pp. 537-554.
52. Geerlings, H., Lohuis, J., Wiegman, B. & Willemsen, A., 2009. A renaissance in understanding technology dynamics? The emerging concept of transition management in transportation. *Transportation Planning and Technology*, October, pp. 401-422.
53. Glass, A. P., 2019. Sense of community, loneliness, and satisfaction in five elder cohousing neighborhoods. *Journal of Women & Aging*, 30 October, pp. 3-27.
54. Hagbert, P., Larsen, H. G., Thörn, H. & Wasshede, C., 2020. *Contemporary co-housing in Europe: Towards Sustainable Cities?*. Abingdon: Routledge.
55. Hansen, A. K., 2020. Rekordmange vælger at bo sammen flere familier og generationer. *Børsen*, 11 April.

56. Hoogma, R., 2000. Exploiting technological niches. *Twente University*.
57. IRIS group, 2009. *INNOVATION AF BÆREDYGTIGE LØSNINGER I BYGGERIET- hvordan forbedrer vi rammerne?*, s.l.: IRIS group.
58. Jakobsen, P. & Larsen, H. G., 2018. An alternative for whom? The evolution and socio-economy of Danish cohousing. *Urban Research & Practice*, 22 April, pp. 414-430.
59. Jensen, J. O., Gram-Hanssen, K. & Mechlenborg, M., 2020. Hjælp de ældre ud af deres tomme parcelhuse og ind i ældreboligerne – for klimaets skyld. *Information*, 13 February.
60. Jensen, J. O. & Stengaard, A. G., 2017. Affordable housing as a niche product: The case of the Danish “SocialHousing Plus”. *Paper præsenteret ved ENHR Conference 2017 Tirana*.
61. Kastberg, L., 2018. Dit, mit og vores: Moderne bofællesskaber hitter i hovedstadsområdet. *Berlingske*, 31 Marts.
62. Kastberg, L., 2019. Atypisk boligform vinder frem – særligt i hovedstadsområdet. *Berlingske*, 14 August.
63. Kemp, R., Schot, J. & Hoogma, R., 1998. Regime Shifts to Sustainability Through Processes of. *Technology Analysis & Strategic Management*, pp. 175-195.
64. Kemp, R. & Scot, J., 2007. Experimenting for Sustainable Transport. The Approach of Strategic Niche Management. *Technology Analysis & Strategic Management*, 26 June, pp. 175-198.
65. Killip, G., 2013. Transition Management Using a Market Transformation Approach: Lessons for Theory, Research, and Practice from the Case of Low-Carbon Housing Refurbishment in the UK. *Environment and Planning C: Government and Policy*, 01 January , pp. 876-892.
66. Kommunalbestyrelse Skanderborg, 2007. *Politik for fastsættelse af salgspriser for kommunale grunde..* [Online] Available at: <https://www.skanderborg.dk/Admin/Public/Download.aspx?file=Files%2FFiles%2Fpolitik%2Fpolitikker%2FPolitik-for-prisfastsaettelse-af-kommunale-grunde.pdf> [Accessed 22 July 2020].
67. Kristensen, H. & Andersen, H. S., 2009. *Befolkningens boligønsker*, København: Center for Bolig og Velfærd – Realdania Forskning.
68. Kulturstyrelsen, Realdania, 2015. *Bygningskultur2015*. [Online] Available at: http://bygningskultur2015.dk/typeblade/forstad/taet_lav_boligby/ [Accessed 15 April 2020].
69. Kulturstyrelsen, Realdania, 2015. *Bygningskultur2015*. [Online] Available at: http://bygningskultur2015.dk/typeblade/forstad/storskala_montageplan/ [Accessed 15 April 2020].
70. Lang, R., Chatterton, P. & Mullins, D., 2019. Grassroots innovations in community-led housing in England: the role and evolution of intermediaries. *International Journal of Urban Sustainable Development*, 22 September, pp. 52-72.
71. Larsen, H. G., 2019. Three phases of Danish cohousing: tenure and the development of an alternative housing form. *Housing Studies*, 08 April, pp. 1349-1371.
72. Loorbach, D. & Raak, R., 2006. *Strategic Niche Management and Transition Management: different but complementary approaches*, s.l.: Erasmus University Rotterdam.
73. Lovell, H., 2007. The governance of innovation in socio-technical systems: The difficulties of strategic niche management in practice. *Science and Public Policy*, February, pp. 35-44.
74. Manley, K. & Blayse, A. M., 2004. Key influences on construction innovation. *Construction Innovation*, September, pp. 143-154.

75. McCamant, K. & Durrett, C., 2011. *Creating Cohousing: Building Sustainable Communities*. s.l.:New Society Publishers.
76. Mourik, R. & Raven, R., 2006. *A practioner's view on Strategic Niche Management: Towards a future research outline*, Amsterdam: Eindhoven University of Technology.
77. Møller, V. A., 2019. *Videnskab.dk*. [Online]
Available at: <https://videnskab.dk/kultur-samfund/1960ernes-arkitektur-var-fuld-af-kreativitet-nyskabelse-og-gode-hensigter>
[Accessed 15 April 2020].
78. Nelson, A., 2018. *Small is necessary: Shared living on a shared planet*. London: Pluto Press.
79. Nielsen, K. T. & Pedersen, M., 2017. *Livskvalitet i seniorbofællesskaber*, s.l.: METHODS.
80. Nielsen, L., 2004. *Engaging Personas and Narrative Scenarios*. Copenhagen: Department of informatics copenhagen business school.
81. Odense Kommune, 2020. *Kommuneplan 2020-2032*. [Online]
Available at: <https://www.odense.dk/politik/politikker-og-visioner/byudviklingsplaner/kommuneplan/kommuneplan-2020-2032>
[Accessed 22 July 2020].
82. OECD, 2012. *The Future of Families to 2030*, s.l.: OECD publishing.
83. Osterwalder, A. & Pigneur, Y., 2013. *Business Model Generation*. 1.edition ed. Copenhagen: Gyldendal Business.
84. Rambøll, 2019. *SÅDAN SKABER VI MERE BÆREDYGTIGE BYER: BORGERUNDERSØGELSE –RESULTATER OG ANBEFALINGER*, København: Ramboll Group.
85. Rasmussen, S. H. & Brunbech, P. Y., 2009. *danmarkshistorien.dk*. [Online]
Available at: <https://danmarkshistorien.dk/perioder/kold-krig-og-velfaerdsstat-1945-1973/>
[Accessed 15 April 2020].
86. Rasmussen, S. H. & Brunbech, P. Y., 2009. *danmarkshistorien.dk*. [Online]
Available at: <https://danmarkshistorien.dk/perioder/kold-krig-og-velfaerdsstat-1945-1973/ungdomsoproer-og-kulturliv-i-1960erne/>
[Accessed 15 April 2020].
87. Raven, R., 2005. *Strategic niche management for biomass: a comparative study on the experimental introduction of bioenergy technologies in the Netherlands and Denmark*, s.l.: Eindhoven University Press.
88. Realdania By & Byg, 2019. *Byggefællesskaber: Beboerdevet boligbyggeri i byudvikling*, s.l.: Realdania By & Byg.
89. Realdania, 2019. *Ældres livskvalitet i seniorbofællesskaber- Hvad ved vi?*, København: Realdania.
90. Realdania, 2020. *Antallet af seniorbofællesskaber stiger markant*. [Online]
Available at: <https://realdania.dk/nyheder/2020/03/antallet-af-seniorbofaellesskaber-stiger-markant>
[Accessed 30 July 2020].
91. Realdania, 2020. *Realdania*. [Online]
Available at: <https://realdania.dk/tema/seniorbofaellesskaber>
[Accessed 15 April 2020].
92. Realdania, 2020. *Realdania*. [Online]
Available at: <https://realdania.dk/projekter/rum-og-faellesskaber-for-aeldre>
[Accessed 15 April 2020].
93. Realdania, 2020. *Seniorbofællesskaber*. [Online]
Available at:

- https://realdania.dk/tema/seniorbofaellesskaber?gclid=Cj0KCQjwu8r4BRCzARIsAA21i_A3cL8FRNf2j3b0NMLjkgkLcSZagwc7j353F4TLMmDuPmbcFsG_to4aAli8EALw_wcB
[Accessed 19 July 2020].
94. Realdania, 2020. *Seniorbofaellesskaber*. [Online]
Available at: <https://realdania.dk/tema/seniorbofaellesskaber>
[Accessed 15 April 2020].
95. Rebensdorff, J., 2020. Antallet af seniorbofaellesskaber slår rekord. *Berlingske*, 21 March.
96. Retsinformation, 2017. *Bekendtgørelse af lov om kommunernes styrelse*. [Online]
Available at: <https://www.retsinformation.dk/eli/lta/2017/318>
[Accessed 20 July 2020].
97. Riedy, C., Wynne, L., McKenna, K. & Daly, M., 2018. "It's a Great Idea for Other People": Cohousing as a Housing Option for Older Australians. *Urban Policy and Research*, 04 November, p. 227–242.
98. Roskilde Kommune, 2020. *Bofaellesskaber*. [Online]
Available at: <https://roskilde.dk/bof%C3%A6llesskaber>
[Accessed 19 July 2020].
99. Sanders, E. B.-N., Brandt, E. & Binder, T., 2010. *A Framework for Organizing the Tools and Techniques of Participatory Design*, Sydney: Proceedings of the 11th biennial participatory design conference.
100. Simonsen, J. & Robertson, T., 2012. Participatory Design-An introduction. In: *Handbook of Participatory Design*. s.l.:Routledge International, pp. 1-9.
101. Smedley, T., 2012. *The Guardian*. [Online]
Available at: <https://www.theguardian.com/sustainable-business/blog/urban-environments-ageing-population-design>
[Accessed 19 April 2020].
102. Smith, A., Stirling, A. & Berkhout, F., 2005. The governance of sustainable socio-technical transitions. *Research policy*, 19 October, pp. 1491-1510.
103. Social- og Indenrigsministeriet, 2011. *Bekendtgørelse om offentligt udbud ved salg af kommunens henholdsvis regionens faste ejendomme*. [Online]
Available at: <http://www.glostrup.dk/~media/borger/bolig-og-byggeri/find-bolig/salg-af-ejendomme/kirkebjerg-alle-4-og-6/Bilag%206%20-%20Udbudsreglerne.ashx?la=da>
[Accessed 22 July 2020].
104. Stappers, P. J. & Sanders, E. B.-N., 2008. Co-creation and the new landscape of design. *Taylor & Francis Group*, 24 June , pp. 5-18.
105. Statens Institut for Folkesundhed, 2017. *Ensomhed og svage sociale relationer blandt ældre: Tal fra Den Nationale Sundhedsprofil 2017*, København: Statens Institut for Folkesundhed, SDU.
106. Strasser, H. et al., 2018. IEA EBC annex 63—implementation of energy strategies in communities. *Energy and Buildings*, 01 January, pp. 123-134.
107. Sundheds- og ældreministeriet, 2019. *Seniorer ønsker at bo midt i fællesskabet*, København: Sundheds- og ældreministeriet.
108. Sundhedsstyrelsen, 2020. *Sundhedsstyrelsen*. [Online]
Available at: <https://www.sst.dk/da/viden/aeldre/forebyggelse-blandt-aeldre/ensomhed>
[Accessed 15 April 2020].

109. Sørensen, A. E., 2018. *Ungdomsoprøret 1968*. [Online]
Available at: <https://faktalink.dk/ungdomsoprøret-1968>
[Accessed 29 July 2020].
110. Thisted, J., 2018. *Forsknings metode i praksis-Projektorienteret videnskabsteori og forskningsmetodik*. 2.udgave
ed. s.l.:Munkgaard.
111. Thorsen, S., 2019. SHARED LIVING. *Scenario 05:2018*, 29 July.
112. Toppinen, A. et al., 2018. Internal and external factors of competitiveness shaping the future of wooden
multistory construction in Finland and Sweden. *Construction Management and Economics*, October, pp. 201-216.
113. Tummers, L., 2015. Understanding co-housing from a planning perspective: why and how?. *Urban Research &
Practice*, 25 February, pp. 64-78.
114. Tummers, L., 2016. The re-emergence of self-managed co-housing in Europe: A critical review of co-housing
research. *Urban Studies*, p. 2023–2040.
115. Udlændinge-, Integrations- og Boligministeriet, 2016. *Fremtidens bofællesskaber: I funktionstømte bygninger i
storbyen, provinsbyen og på landet*, s.l.: Dansk Bygningsarv.
116. United Nation, 2018. *68% of the world population projected to live in urban areas by 2050, says UN*. [Online]
Available at: <https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html>
[Accessed 19 July 2020].
117. United Nation, 2020. *Ageing*. [Online]
Available at: <https://www.un.org/en/sections/issues-depth/ageing/>
[Accessed 19 July 2020].
118. United Nations, 2019. *World Urbanization Prospects: The 2018 Revision*, New York: United Nations.
119. Unruh, G. C., 2000. Understanding Carbon Lock In. *Energy Policy*, October, pp. 817-830.
120. Videncenteret Bolius, 2015. *Lokalplaner*. [Online]
Available at: <https://www.bolius.dk/lokalplaner-18113>
[Accessed 22 July 2020].
121. Videncentret Bolius, 2004. *Videncentret Bolius*. [Online]
Available at: <https://www.bolius.dk/parcelhusets-historie-1980erne-og-1990erne-17123>
[Accessed 15 April 2020].
122. Weber, M., Hoogma, R., Lane, B. & Scot, J., 1999. *Experimenting with sustainable transport innovations : a
workbook for strategic niche management*, s.l.: Universiteit Twente.
123. WWF, 2014. *Living Planet Report 2014: Species and spaces, people and places*, Glad: WWF International.