
# The University of Sheffield
# School of Architecture

## Title: A development framework for sustainable lifetime cohousing communities

## Doctor of Philosophy Thesis

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## Acknowledgement

I would like to express my sincere gratitude to the University of Sheffield for letting me fulfil my dream of being a student here. I would like to acknowledge and give my warmest thanks to my supervisors, Karim Hadjri and Jenny Pickerill, who made this work possible. their guidance and advice carried me through all the stages of my study. I would also like to thank all cohousing members and architects who participated in this research. Thank you for all your support, your brilliant comments and suggestions, which make this research meaningful and valuable. I would also like to give special thanks to my family as a whole for their continuous support and understanding during all of my study, especially, in the pandemic period. Their understanding means a lot to me and helps me to complete my entire research in the last 5 years.

## Glossary

**AECB:** Association for Environment Conscious Building. It is a network of individuals and companies with a common aim of promoting sustainable building.

**CSH**: Code for Sustainable Homes. It is a method for assessing and certifying the sustainable design and construction of new homes.

**Co-design:** Collaborative Design. It represents the collaborations between architects and residents in the design and planning stage.

**DDA:** Disability Discrimination Act 1995. The Disability Discrimination Act (DDA) works to protect people with disabilities – including blind and partially sighted people – from discrimination.

**LH:** Lifetime Home standards. The Lifetime Homes Standard is a series of sixteen design criteria intended to make homes more easily adaptable for lifetime use at minimal cost.

**LILAC:** Low Impact Living Affordable Community (Cohousing community in Leeds)

**MVHR:** Mechanical Ventilation with Heat Recovery System. A Mechanical Heat Recovery Ventilation (MVHR) system offers a solution by bringing fresh air into all habitable areas without letting the heat escape.

**PH:** Passivhaus (Passive House) Standard. Passive House is a building standard that is truly energy efficient, comfortable and affordable at the same time.

**POE:** Post-occupancy Evaluation. Post-Occupancy Evaluation (POE) is the process of obtaining feedback on a building's performance in use.

**SBD:** Secured by Design Standard. Secured by Design (SBD) is the official police security initiative that works to improve the security of buildings and their immediate surroundings to provide safe places to live, work, shop and visit.

**SOC:** Sense of Community Theory proposed by David McMillan and David Chavis in 1986.

**Solar PV:** Solar Photovoltaic Technology

**5R:** Five Rivers cohousing project in Sheffield

## ABSTRACT

The UK housing market has faced significant challenges since the 2008 Global financial crisis, which resulted in negative financial and social impacts such as repossessions, growing social housing waiting lists, mass unemployment in the construction industries, and soaring housing costs. Many people in the UK are mis-housed, ill-housed, or unhoused due to the lack of adequate housing options and ongoing lack of supply and affordability. To this end, the concept of cohousing is designed as an answer to this long-running crisis, seeking to foster meaningful relationships, social interaction, and energy efficient concepts. The terms 'cohousing' and 'collaborative housing' refer to a shared housing model or community. Through cohousing, residents are committed to living healthy lifestyle.

As a contribution to this effort, this study explores the contemporary insights of UK cohousing with the aim of developing a cohousing design and developmental framework for its residents, architects and other related stakeholders. This is to investigate how can cohousing design provide a lifelong housing option and create an intergenerational community, which would lead to social engagement and low environmental impact. This study is guided by environmental psychology theory and used an inductive approach with a qualitative strategy. The research data was collected through semi-structured interviews, site observation and secondary data documents provided by the selected cohousing communities. Architects and cohousing residents are the core research participants. In total 22 participants from seven cohousing communities were interviewed in this study. Meanwhile, in-depth observations were used at two communities to understand the cohousing design, environmentally sustainable features, and residents' social interactions. The secondary data was used to supplement and validate primary data sets. The data was analysed using qualitative content analysis and ethnographic descriptive analysis to identify the core themes, and the fundamental design elements and their

interrelationships. On this basis, the cohousing framework was developed using the research findings.

The main findings include five sections: group motivation, sustainability, social proximity, thinking and behavioural changes, and neighbourhood design. In terms of group motivation, the study found that that the motivation for entering cohousing represents a complex decision-making process. It was identified that the social, environmental sustainability, and financial aspects were the three top priorities for people considering joining a cohousing community. Referring to the sustainability of the cohousing community, 18 categories were identified under environmental, social and economic sustainability dimensions. The categories related to ‘Energy’, ‘Sharing’, and ‘Heating’ were identified as influential categories with a significant impact on the community’s sustainable living. Additionally, the study explored two aspects of the social environment in cohousing communities - social proximity and behavioural changes. The results show that social proximity and residents’ practices are strongly associated with the community build environment and neighbourhood planning. The physical and social environments simultaneously influence each other.

Finally, the cohousing framework encompassed the overall research findings and is a guiding tool that fills the knowledge gap on cohousing research. The findings of the study provided not only the comprehensive understanding of UK cohousing model, but also offered the practical design, sustainable and management guidance for wider collaborative communities in the UK and beyond. Meanwhile, the design recommendations for various stakeholders are highlighted for the future housing practice. The study results are transferable to other contexts with other stakeholders.

# Chapter 1 : INTRODUCTION

## 1.1 Preface

Traditional forms of housing in the United Kingdom (UK) no longer address the needs of some sections of the population because of a lack of supply, increased housing prices, and inconsistent construction quality. This is further complicated by the lack of adequate housing options, which has led to people being mis-housed, ill-housed, or unhoused since the 2008 UK housing crisis (BBC, 2019a; McCamant & Durrett, 1994). Meanwhile, under the Climate Change Act 2008, the UK adopted the legally binding target of reducing $CO_2$ emissions by 2050 (GOV.UK, 2019; DECC, 2008). To reach this target, new and existing homes must be more sustainable (Hacker et al., 2005; Seyfang, 2009). Therefore, cohousing has started to attract public interest as a new collaborative housing model, offering an alternative accommodation option that responds to the housing crisis, delivers low-carbon lifestyles (Jarvis et al., 2016), and provides another scale of social organisation – an intermediate layer between the single family and town – for different groups in the UK (Lorion & Newbrough, 1996).

The aim of this thesis is to investigate the ways in which cohousing can provide a lifelong housing option and intergenerational community, one that leads to balanced social engagement and low environmental impact. To achieve this, the research will examine the contribution of the UK cohousing model in creating sustainable communities and meaningful social interactions. This will be done through an in-depth study of the following themes: a) the motivation of cohousing groups and older people; b) the sustainable features, design, and benefits of cohousing; c) social proximity, attitude and practice change of living in a cohousing development; and d) the main principles and elements of cohousing design. For each theme, this study will further reflect on cost efficiency concepts and considerations raised from both the projects planning and post-occupancy stages. The principal outcome of this study will be a cohousing development framework to support the design and management of future cohousing for multiple stakeholders.

This chapter is divided into four parts. First, the background of the study and the research problem statement are introduced. Second, the research questions, aims, objectives and limitation of the study are identified. Third, the research methodology, data collection and analysis methods are discussed. Finally, the overall structure of the PhD thesis is outlined at the end of the chapter.

## 1.2 Background of the Study

The background of this study is structured into five sub-sections, which are, UK housing demand, object of the research, neighbourhood design and sustainability (environmental and social features), cohousing with older people, and foundation theories. The first four sub-sections outline the current developmental status, sustainable contributions of cohousing communities, and explain how community spaces are designed and used in the UK cohousing model. The last sub-section summarises the leading theories and lays the theoretical foundation of the research.

### 1.2.1 UK Housing Demand

The UK housing market has faced significant challenges since the 2008 Global Financial Crisis, which resulted in negative financial and social impacts including mortgage repossessions, growing social housing waiting lists, massive unemployment in the construction industries, and soaring housing costs leading to the collapse of home ownership in the country (Parvin et al., 2011; Perry et al., 2019; The UK Collaborative Centre for Housing Evidence [CaCHE], 2019). According to the National Housing Federation, an estimated 8.4 million people in England are living in an unaffordable, insecure or unsuitable home. Compounding this situation, the UK needs 340,000 new homes every year, including 145,000 social homes, to meet the housing demand (BBC, 2019). Therefore, providing suitable, affordable and adequate homes and housing options has become an urgent issue. In recent years, there has been debate focusing on housing highlighting the role of cohousing as a new collaborative living style with communal living arrangements for individuals and families (UK

Cohousing Network Website, n.d.; Wang et al., 2020; Hopwood & Mann, 2018; Livingston, n.d.). Many scholars have also highlighted that cohousing can be an effective approach to alleviating the housing crisis by providing suitable community financial schemes, shared ownership models and supportive community living, thus helping to address the financial concerns of lower-income families and the aging population and their social needs (Housing LIN, 2013; 2019; Jarvis et al., 2016; The Social Market Foundation, 2019).

### 1.2.2 Object of the Research

This research is primarily concerned with a type of community-led housing model in the UK known as cohousing. The term cohousing was originally used as a generic European term for "collaboratively designed and built housing spaces for multiple households that develop 'self-managed social architectures' to share activities and experience" (Nelson, 2018, p.xii). As an essential part of the community-led housing in the UK, it nevertheless remains a niche and unfamiliar concept to the general public (Moore & Mullins, 2013). A cohousing community is a group of between 15 and 40 households (15-35 families, about 50-100 people) who come together and share facilities and belongings (Lietaert, 2009; Hagbert et al., 2020). As stated by the UK Cohousing Network website (2020), cohousing communities have a common house, with shared facilities such as cooking and dining spaces, meeting and playing areas, laundries and guest rooms. Sargisson (2010) highlights that cohousing and its communities are based on a concept of sharing, not only spaces and facilities, but also group participation, decision-making processes and life experiences. In recent years, the demand for cohousing has been increasing (Jarvis et al., 2016). With the development of the cohousing market over the past two decades (2000 to 2020), there are now 31 built communities geographically dispersed all over the country, 58 groups are developing their cohousing projects and 30 cohousing groups are forming their membership (UK Cohousing Network website, 2020).

### 1.2.3 Sustainability and Design

The sustainable features of the cohousing model will be introduced below through a discussion of the two key dimensions of neighbourhood design: environmentally sustainable features; and social features. In the UK, housing contributes around 15% of total Greenhouse Gas (GHG) emissions (Department for Business, Energy & Industrial, Strategy, 2020). Therefore, reducing GHG emissions from the residential sector is imperative. In 2019, the UK government reaffirmed the '2050' target, stating that "no houses built after 2025 will be connected to the gas grid. The owners of older buildings will need to switch their heating system to a low carbon one by around 2035" (The Guardian, 2019; Institute for Government, 2020). This government strategy above seeks to reshape the British housing market with a focus on sustainability. Under the guidance of this governmental policy, many kinds of sustainable housing models are being developed in the UK, including PassivHaus (PH), affordable zero-carbon homes and sustainable farmhouses (Hobbs, 2020). Cohousing, as a new collaborative housing model, has attracted the public attention because it not only offers an alternative accommodation option that responds to the existing housing crisis, it also delivers a low-carbon lifestyle for people in the UK (Jarvis et al., 2016). Additionally, according to Meltzer (2005), a more compact housing form with higher residential density is found in cohousing communities, which can reduce the environmental impact of such developments such as heating demand.

Due to the special social setting of a cohousing community, density becomes a significant factor which could largely affect residents' community living and quality of life. Further, cohousing groups have the flexibility of applying advanced environmental technologies and building standards (e.g., PassivHaus Standard (PH), solar Photovoltaic (PV), and biomass) to core building structures. This will enable significant reductions in energy and consumption demands by supporting sustainable practices (Jarvis et al., 2016; Chatterton, 2014; Sanguinetti, 2014). Thus, a growing number of housing practitioners, funders and policymakers have started to consider using

cohousing as an ideal and realistic model for sustainable housing development (Garciano, 2011).

According to Barr (2018), approximately nine million people in the UK suffer from loneliness, with many struggling to make lasting social connections with others. According to Landeiro et al. (2017), social isolation and loneliness have detrimental effects on physical and mental health for all age groups. At the same time, the impacts of loneliness and social isolation were found to be more pronounced in older people (Davidson & Rossall, 2015). Therefore, a major concern to society is how to create more opportunities for people to build closer and stronger social connections and a sense of belonging. Many scholars have found that the cohousing model offers a possible answer to loneliness and social isolation, particularly in the intergenerational cohousing model (Torres-Antonini, 2001; Jarvis, 2011, 2015; Williams, 2005). Additionally, cohousing provides a valuable platform for social connection because its design principles for the physical settings and community management could encourage neighbourhood social interactions and promote a sense of community. Thus, it offers a unique answer to the issue of social sustainability and provides safe outdoor spaces for families with children while simultaneously protecting the privacy of individual households (Meltzer, 2005). Meanwhile, the senses of community and belonging are promoted through residents' daily interactions (Hill, 1996). Therefore, social benefits, namely a strong sense of community and mutual support, are one of the primary aims in developing cohousing communities (Garciano, 2011; Sanguinetti, 2014).

### 1.2.4 Cohousing and Older People

A review of all cohousing communities in the UK reveals that older people constitute the largest 'customer' and 'investor' group compared to all other age groups. Irrespective of whether older people are seeking companionship, a low-carbon lifestyle or affordable housing within a cohousing community, or they are in intergenerational or senior cohousing groups, cohousing has certain advantages for older people. Co-

care is the strongest reason to attract new members and raise awareness of ageing options among many residential models. Even though cohousing is not seen as primarily for social or mutual care, however, it can be interpreted as an active-ageing residential model to prevent the need for social care, albeit with a carefully balanced age-structure (Brenton, 2013). The cohousing advantages can be also identified through intergenerational living. In a cohousing community, the implication of intergenerational living is that all community members will live closely as an extended family. Group members provide mutual support to each other, whilst retaining their own privacy. Therefore, it can be interpreted that better health conditions and reduced care requirements can be expected in cohousing communities. It will also help older people to build resilience and promote a positive ageing attitude to cope with life's changes (Wealleans, 2015).

### 1.2.5 Theories underpinning the Study

This research was influenced by multiple theories. Based on the research aims, the main themes and the nature of the cohousing model, the selected leading theories cover three strands: (a) human-environment relationship and cohousing design through environmental psychology (Steg and de Groot, 2019; Bell, et al.,1984), (b) the social norm of cohousing model through ethnography (Bell et, al. 1984; Brewer, 2000; Van Maanen, 1988) and Sense of Community theory (SOC), and (c) public space and common activities through relevant urban theories such as 'Human Aspects of Urban Form' (Rapoport, 1977), and 'Life between buildings'(Gehl, 2010).

Exploring the human-environment relationship is the motivation for selecting relevant theories because it is a direct approach to explaining how people 'shape' their living environment, and how and to what extent the physical environment affects people's daily lives. Cohousing is a very interesting example which links people and their environment (e.g., cohousing members are both designers and users) in the two-way interaction. Environmental psychology theory from Paul Bell and Jeffrey Fisher (1984) and the urban planning theory – Human Aspects of Urban Form (Rapoport, 1977) –

are vital to understanding a 'human-environment approach' to explain the social phenomena, space and environmental cognition of a community setting. Several concepts or aspects in these theories are fundamental to this study, for example, through dividing environmental quality components into material and socio-cultural domains, the measurable characteristics of an area, how people cognitively define places and what criteria they use, public and private domains of a housing settlement, and the social meaning of neighbourhood (Rapoport, 1977). At the same time, environmental psychology also highlighted that "The design of the buildings, once primarily concerned with how they looked, now includes considerations of how they affect people who use them". (Bell. et, al 1984, p.4).

Research on the social norms and interactions of group members were also essential in this study. Based on the research sub-questions (question 3), the study is guided by Ethnography. Ethnography is one of the oldest qualitative research methods, originating in the field of anthropology. Yet, researchers from various disciplines are now using and adapting ethnography beyond its origins as a result of philosophical reflections on the processes and purposes of the method (Wall, 2014). Put simply, ethnography is the art and science of describing a group of culture (Fetterman, 2010). It is characterised by a written culture of a group of people that focused on their daily routine, religion, group identities, ritual lives with their environment and explored their common sense about their world (Muecke, 1994). At the same time, this study also strongly acknowledges Bourdieu's concept of habitus from His theoretical framework. His concept explains that "the regularities of behaviour that are associated with social structures, such as class, gender, and ethnicity, without making social structures deterministic of behaviour, or losing sight of the individual's own agency." (Power, 2015, p.48). This highlighted that the behaviour is a complex system influenced by multiple factors. The unique social structure formed by cohousing communities is one of the key factors. The purpose of applied ethnographic research is concerned with "understanding sociocultural problems in communities or institutions

and using these understanding to bring about positive change in communities, institutions or groups." (LeCompte et al. 1999, p6). Additionally, ethnography generates theories of cultures, provides explanations of how people think, believe and behave in the local time and space (LeCompte et al. 1999). One of the strengths of ethnography is that the methods used produce a picture of cultures and social groups from the perspectives of their members. Ethnographies tell the story of a group from the group's perspectives as much as from the ethnographer's point of view. (LeCompte et al. 1999)

This study argues that a cohousing community can be viewed as a simplified version of a city with private areas, communal areas, paths, landscapes and basic infrastructure. This is why Gehl's (2010) urban theory is suitable for this study. In this theory, the detailed explanation of human activities, activity types (necessary, optional, social) and preferences (e.g. sitting points and orientations) in a given context become the important criteria of analysing a community setting. In other words, this theory analyses the relationships between public special design and human activities in many layers, such as human senses, and private and public domains. Gehl (2010) identified that human activities in the public area are shaped and limited by the physical environment, and that the design of urban public areas should take human preference and social needs into account. Therefore, this concept will become the essential foundation towards understanding and analysing the activities that take place in the communal areas of a cohousing community.

## 1.3 Problem Statement

Identification of the research problem was established by carrying out an examination of the current situation of the UK cohousing model, a review of the extant literature and the need for cohousing research. The research problem can be demonstrated in three domains: environmental sustainability requirements; social needs and housing demand; and neighbourhood design requirements. As mentioned above, building

environmentally sustainable housing and communities is an urgent task for the UK Government in response to addressing global climate change. However, very limited resources and academic research exist to evaluate the contribution of environmental sustainability for cohousing groups and other stakeholders (e.g. policymakers, developers, and architects). What is more, no practical sustainable recommendations have been proposed or tailored to cohousing communities and groups' sustainable development. Cohousing group members have difficulties in understanding environmentally sustainable practice and meeting environmental requirement through neighbourhood design. The selection and application of environmental design standards (e.g., PassivHaus) also vary for each cohousing group.

Further, the demand for cohousing and other types of community-led housing is increasing in the UK. A growing number of people, especially older people, are seeking a supportive and engaging neighbourhood to live. Cohousing can be a possible living option. However, the UK cohousing model is not standardised in the housing market and it has certain social limitations and disadvantages, including privacy concerns, community management pressures and unbalanced distribution of responsibility. Additionally, there is a lack of information regarding the social environment, leading people to face difficulties making housing decisions to join or create a cohousing development in the UK. Therefore, a comprehensive analysis of the social environment and group dynamics is necessary to underpin the social organisations, community living, daily activities, and to identify the social benefits and barriers to cohousing in the UK.

## 1.4 Research Questions, Aims and Objectives

This study was motivated by the fact that there exists very limited literature describing the role and contribution of cohousing to sustainable living. Indeed, as discussed above, there is a dearth of literature on design guidance for neighbourhood design and community management, and how to embed greater levels of sustainability in

cohousing practice in the UK. The aim of this study is to investigate how UK cohousing design and its built environment can provide a feasible lifelong housing option for better intergenerational community living, leading to better social engagement and low environmental impact. Using an extensive literature and desktop review of UK cohousing models, this study aims to develop a framework for the environmental, social and design provision of cohousing in the UK. The framework will be developed through engaging cohousing architects and residents to support future sustainable development and neighbourhood design. The proposed framework can then be used as a tool to guide future cohousing design and provide possible solutions to the problems identified above. To respond to the three domains described in the problem statement, the research questions were developed as follows:

**Environment sustainability requirements：**

- Are cohousing communities feasible and can they lead to sustainable and low carbon lifestyles?

**Social needs and housing demand：**

- What are cohousing communities and why are they important?
- Why people chose to live in a cohousing?
- How do cohousing residents interact with each other and how does cohousing design affect their daily lives?

**Cohousing design requirements**

- What are the drivers and barriers of cohousing design in the UK?
- What are the ways to maximise cost efficiency in a cohousing community?

The corresponding objectives of this study are as follows:

1. To establish how cohousing can contribute to an environmentally friendly sustainable living environment.
2. To identify the main attributes, characteristics, and manifestations of cohousing in the UK.

3. To explore the motivations of cohousing members to entre or create a cohousing group.
4. To establish how cohousing design contributes to a sense of community and may lead to social cohesion and behavioural change.
5. To explore the principles, considerations, and elements of cohousing design.
6. To establish how to support economic sustainability in a cohousing environment.

In order to demonstrate the relationship between objectives and chapters, and also highlight the focuses for each chapter, the cohousing design has been explained through two approaches: social design and physical design. The links between objectives and chapters are shown below (see Figure 1-1).

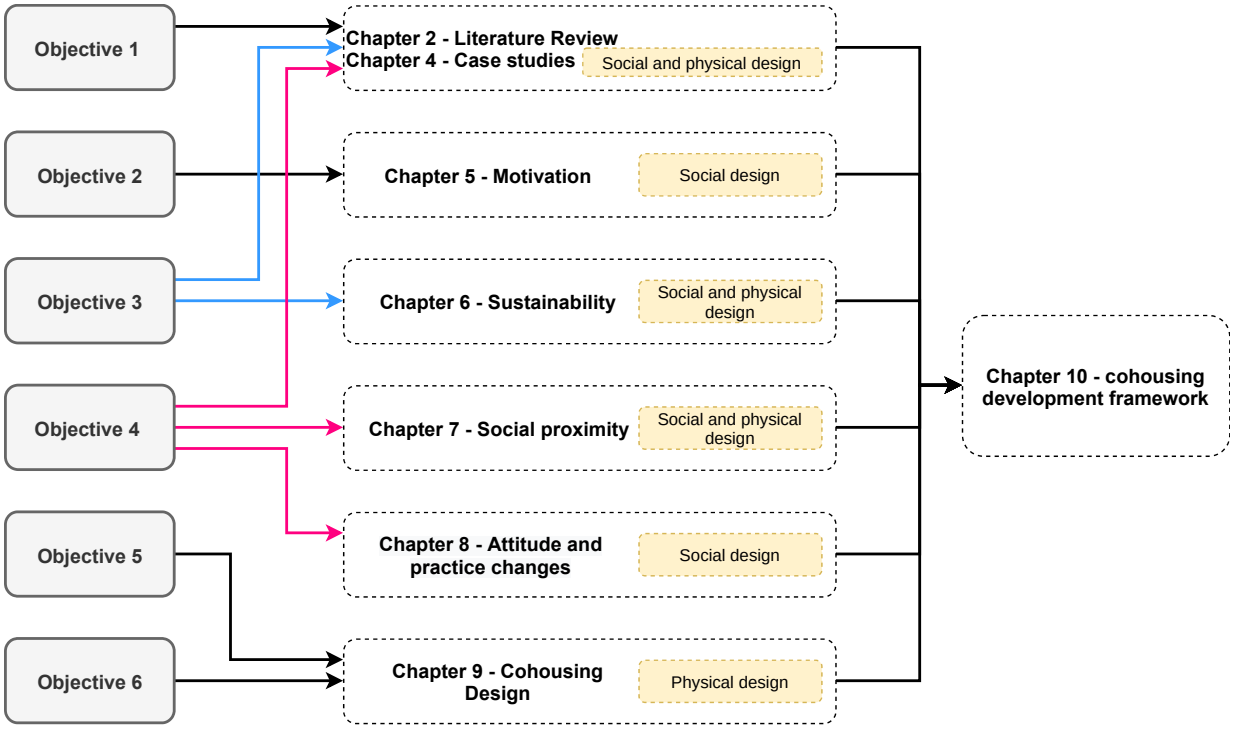



Figure 1-1.Thesis structure guide

## 1.5 Study Methodology

This research is adopting the stance that the world is socially constructed; and that science is driven by human interests (Easterby-Smith, 2012). Additionally, the study

supports the views of constructivists and acknowledges the interactions and relationships between subjects. According to the research questions and objectives, the position of this study falls firmly within the interpretivist paradigm. As such, it was decided that the inductive approach should be applied in this study through the use of case studies. The methods of this research were divided into data collection and data analysis categories by using multiple qualitative methods.

Case study is selected as the research methodology for this study. The methods applied are influenced by environmental psychology behaviour-setting theories, SOC and ethnography. The participant groups for this research involve both architects and cohousing group members. In total 22 participants took part in this study. The data collection procedure consisted of two phases: exploratory studies; and in-depth case studies. Specifically, two cases have been chosen at phase one to provide a foundation for the UK cohousing model: Lancaster Cohousing and LILAC project in Leeds. Next, the aim of phase two is to develop a framework that could fill the knowledge gap by indicating the contemporary tendency of cohousing communities and offer lessons to future cohousing initiatives. This is achieved through in-depth case studies and framework development. Seven cases were examined (including two cases from phase one) during this stage. The data collection methods applied in this phase were interviews, secondary data documentary work and site observations. More details see Chapter 3 section 3.3.

In this study, the data were analysed through ethnographic descriptive analysis and a process of Qualitative Content Analysis (QCA) using thematic coding techniques. Ethnographic descriptive analysis was applied to analyse the observation date set (Marvasti, 2013). QCA was used to analyse the interviews and secondary data (Mayring, 2014). The purpose of using descriptive analysis for cohousing setting was to develop deeper meanings for the community design and spatial divisions, examine the quality of outdoor common spaces, and provide a comprehensive overview of

social connections from the researcher's perspective. QCA was carried out through various types of coding techniques, such as open, selective, structural, and axial coding (Saldaña, 2015). These coding techniques were used to define the main themes and to identify the relationships between themes.

Finally, the cohousing development framework will be provided to combine all stages of the research findings. The central purpose of this framework is to establish a clear structure of the interrelations between the cohousing knowledge base and future practice. This will provide a rationale for the methodological choices and implementation of cohousing development. The core themes of the framework will be developed to respond to environmental sustainability and neighbourhood design requirements, housing demand and social needs, and offer recommendations for cohousing future design and community engagement. Additionally, the framework is designed to support various stakeholder groups with different priorities, including the practice group (architects and planners), policy makers, residents, and housing providers. The methodology and methods of this study are illustrated in Figure 1-2 below. More

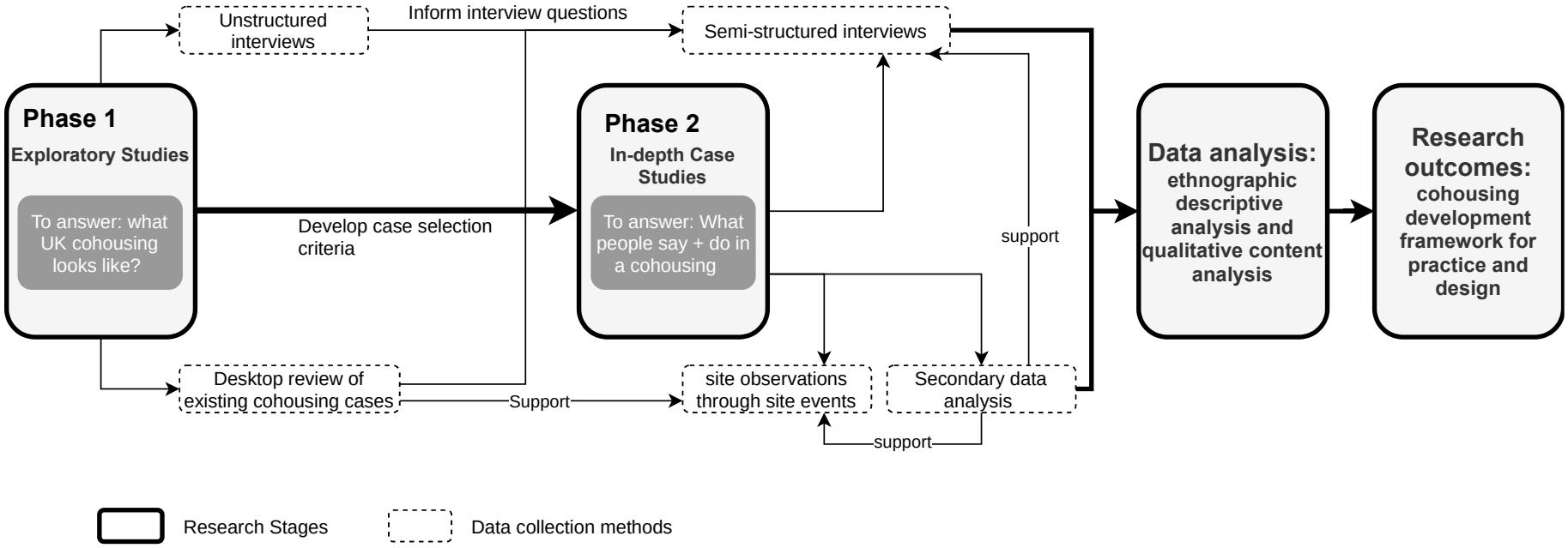



Figure 1-2. Research stages and selected methods

## 1.6 Thesis Structure

The thesis is comprised of 11 chapters, of which this Chapter (**Chapter 1**) forms an introduction to the study. First of all, this chapter provides the background context and justification of the research. It also highlights the environmental and social needs underlying cohousing communities in the UK. In addition, it summarises the research problems, research questions, and research aims and objectives, and briefly explains the study methodology and expected outcomes.

**Chapter 2** reviews cohousing-related literature and several foundation theories. The Chapter outlines the history of collaborative living and highlights the sustainable contributions and limitations of the cohousing model regarding the environmental, social, and economic dimensions. This Chapter also introduces the neighbourhood design of existing cohousing communities and identifies whether or not cohousing can be a viable living option for older people. Chapter 2 further sets out the theoretical foundation for this research and explains how these theories influence the data collection and analysis process.

**Chapter 3** presents the methodology and methods selected in conducting this study. This Chapter starts by stating the philosophical position and theoretical perspectives of the researcher and also identifies that the nature of study fits well in 'social research' realm. Subsequently, the Chapter introduces the data collection and analysis methods used in the exploratory and in-depth case studies. Finally, the methods of developing the cohousing framework are clarified, including colour coding, layout design and hierarchical data grouping.

**Chapter 4** interprets the site-observation findings of all the selected cases. The purpose of this Chapter is to evaluate the residents' daily practices (environmental and social practices) and their physical living environment in a micro scale. The information presented in this Chapter provides detailed examples of how the physical environment

and group dynamics influence residents' daily lives. It also explains the boundary between private and public spaces and the principles of measuring social proximity in a community setting.

**Chapter 5** presents the motivation(s) of cohousing group members to create or enter a cohousing community. Group motivation represents the complicated housing-decision process which is simultaneously influenced by multiple factors. Additionally, this Chapter identifies the dominant aspects of entering a cohousing development and sets out the differences between the architects and residents.

**Chapter 6** explores how cohousing contributes to sustainable living in the UK. This Chapter identifies the features and potentials of cohousing communities in terms of ecological, economic, and social sustainability and explores practical pathways to achieving sustainability through community living. Furthermore, this Chapter highlights various insights summarised from the architects and residents towards sustainable practice.

**Chapter 7** and **Chapter 8** jointly demonstrate the 'social environment' aspect in a cohousing development. **Chapter 7** discusses the various social factors in cohousing communities towards social proximity and discovers how these factors can influence residents' community life. This Chapter also explores how community physical environments can shape residents' social activities and proximity. **Chapter 8** explains residents' thinking and behavioural changes after joining a cohousing group. The correlations between group members' attitudes and daily practices (e.g. environmental and social practices) are also analysed in this Chapter.

**Chapter 9** is concerned with the collaborative design process, fundamental design principles and detailed design elements of a cohousing community. This Chapter

combines the ideas from both architects and residents towards cohousing design and evaluates the related design standards and advanced environmental technologies.

**Chapter 10** presents the cohousing developmental framework by demonstrating the formulation process, framework applications and stakeholders, recommendations for policy and practice, and transferability based on the overall findings of the study. This Chapter visually presents the cohousing framework and explains the expected actions of various stakeholders and their respective priorities.

**Chapter 11** concludes the study by restating the study objectives, summarising all of the research findings, and highlighting future areas of investigation. This Chapter also includes the discussions of cohousing model in the UK and indicates their potentials, limitations, and barriers. Finally, it highlights the trends of the collaborative community-led housing model in the UK and beyond.

# Chapter 2 : LITERATURE REVIEW

## 2.1 Introduction

The Literature Review chapter aims to examine current research in UK cohousing by identifying its environmental and social features, sustainable advantages and limitations, and how cohousing design could impact on residents' lives. Additionally, the literature review aims to establish the gap in extant knowledge and identify the relevant methodologies and research techniques (Hart, 1998). The literature review of this research has two parts: a reflection of cohousing-related literature; and the analysis of relevant theories on community practices and design. A conceptual framework is produced at the end of this chapter that will guide the study.

## 2.2 Definition and Background

When discussing cohousing communities, it is fundamental to understand the definitions of cohousing, what they look like, and how they developed historically. This section starts with the various terminologies, definitions, and development features of the cohousing model, followed by a history of cohousing ideas. Subsequently, the current developmental status of British cohousing model is presented.

### 2.2.1 Definition of Cohousing

The term 'cohousing' (also synonymous with 'Cohousing' or 'Co-housing') is a generic European term for "collaboratively designed and built housing spaces for multiple households that develop 'self-managed social architectures' to share activities and experience" (Nelson, 2018, p.xii). The words 'cohousing' and 'co-housing', then, capture the all-encompassing term 'collaborative housing' and they refer to a housing model which can offer a possible solution to the housing crisis (Priest, 2015). Nowadays, traditional forms of housing no longer address the needs of many people and a lot of people are mis-housed, ill-housed or unhoused due to a lack of adequate housing options (McCamant & Durrett, 1994). Therefore, cohousing emerged as a new collaborative housing concept, designed to foster meaningful relationships, social

interaction, and energy efficiency concepts. Once a cohousing community is established, it is maintained by its residents and functions as a community through shared amenities, facilities, and spaces.

Through cohousing, residents are committed to living together as a community and gain the benefits of a supportive social network (Garciano, 2011; Hagbert, et al., 2020). Typically, a cohousing community is a group of between 15 and 40 households (15-35 families, approximately 50-100 people) who have come together and share facilities and belongings (Lietaert, 2009; Hagbert, et al., 2020). As stated by UK Cohousing Network website (n.d.), cohousing communities have a common house, with shared facilities such as cooking and dining spaces, meeting and playing areas, laundries, and guest rooms. Sargisson (2010) indicated that cohousing communities are established based on a concept of sharing, not only of physical spaces and resources, but also community management, mutual support, and life experiences.

An additional aim of cohousing communities is to minimise living costs, such as rent, car ownership, and energy consumption (Thorne, 2015). Community living may enable residents to reduce living costs via shared resources, education, cars, workshops, caring for children and older people, tutoring and training (Priest, 2015; Garciano, 2011). Further, it creates a special network by encouraging social interaction resulting from close inhabitation in a community environment, whilst maintaining an element of privacy and independence (Greater Manchester Housing Action [GMHA], 2018; Ruiu, 2014; Stevens-Wood, 2018).

### 2.2.2 History of Cohousing Ideas

The modern history of cohousing (using the term ‘cohousing’ to capture earlier terms) can be traced back to 1960s Denmark (Ahn et al., 2018; Fromm, 2000), subsequently spreading to the United States and Canada in the 1980s, and then into southern Europe over the last decade. However, the cohousing model can be traced back to 200 years ago. The first cohousing model was a vegetarian commune called

Homakoeion (Meltzer, 2005). Vestbro & Horelli (2012, p.331) summarised the time periods of cohousing development as follows: 'utopists' (19th century); 'material feminists' (late 19th and early 20th centuries); 'central kitchen houses' (1904-1922); 'cohouses with employed staff' (1935-1976); 'new everyday life and the Swedish self-work model'; and 'today and the future' (Table 2-1).

'Housing solution and design' is a very useful research angle when discussing the history of cohousing. Table 2-1 shows that the identity of the cohousing model in different time periods largely depended on where and how residents had their meals and whether they had private kitchens. This is also the part of the communal living philosophy that serves to distinguish between cohousing and communes. Because the modern cohousing model advocates that the community should have both a central kitchen and private kitchens, there is no pressure on residents to join the common meal. Frazer (1994) suggested that cohousing provides arenas for a deliberative democracy that nourishes a special type of public sphere. According to Vestbro and Horelli (2012), even the design of the cohousing community often supported the sharing of domestic work and social life, but the promotion of community and cooperation among neighbours was only mentioned after 1970 (Vestbro & Horelli, 2012).

The driving forces behind the communal living model varies. However, all cohousing models have rich communal spaces and contribute to an equal distribution of responsibilities for house and community work (Vestbro & Horelli, 2012).

Table 2-1. Aspects of communal living models from the Renaissance utopians until today

| *Aspects Models* | *Driving Force* | *Models of Co-Housing and Gender* | *Housing Solutions and Design* | *Domestic Work, Impact on the Labour Market* | *Lessons for the Future; Obstacles and Stepping Stones* |
|---|---|---|---|---|---|
| *Utopists, nineteenth-century USA and Europe* | Visions of a harmonious and just society; workers to own the means of production. | Women to work in production, but the division of tasks according to gender. | Production and reproduction spatially integrated out of cities; influence on modernist ideas. | Collective organization of meals, partly for women's participation in production. | Inflexible solutions, but had positive influence on later co-housing ideas. |
| *Material feminists, late nineteenth and early twentieth century* | Economic independence for women through socialized domestic work (coop housekeeping). | Production coops in the neighbour-hood liberating women (but work not done by men)/ | Neighbourhoods with kitchen-less houses, public kitchens and laundry, dinner clubs, etc. | No demand for equal distribution of domestic work with men. Gender and class conflicts not solved. | Interesting solutions in neighbourhoods. Conflicts with patriarchal society and corporate society. |
| *Central kitchen houses, 1904–1922* | To solve the servant problem of the middle classes; collectivization of the maid. | No ideas of equality, an aid to housewives, rationalization of food production. | Bourgeois apartments without private kitchens, with food lifts and a central kitchen. | Reduction of domestic work; housewives not expected to work in production. | Possible to centralize food production, otherwise few lessons for the future. |
| *Co-houses with employed staff, 1935–1976* | The machine age transferred to housing. Well-educated women wanted to combine family with a career. | Socialization of maids allowing women to participate in labour force. Low valuation of housework. | Apartments with small kitchens, central kitchen and other services. | Enhanced female participation in the labour market. Domestic work not done by men. | Paid services became too expensive. Strong resistance from patriarchal society. |
| *New Everyday Life and the Swedish self-work model* | Integration of work and private life through shared domestic work by men and women in housing. | The model made domestic work visible and thus sharable with men. Neighbourhoods with local production, care, culture. | Combination of bungalows and apartments with the community house and other shared spaces. | Equal distribution of domestic work a prerequisite for work/life balance. | The most successful model today, has expanded the concrete utopia into the neighbourhood. |
| *Today and the future* | A need to overcome isolation, a demand for sustainable lifestyles. | Reduction of housework and care of children and elderly still issues that affect inequality in the labour market. | Models needed at the neighbourhood level, also ones that are accessible to all classes. | Equal distribution of domestic work, but educational and labour markets remain segregated by gender. | Co-housing ideas expand, but the conservative construction sector is slow to respond. Hope in the new movement. |

Source: Vestbro & Horelli (2012)

With its origins in Denmark, the cohousing model form was affected by the arrangement of traditional Danish low-density housing; their collective movement grew in both towns and cities (Formm, 1991). The motivation behind the first cohousing development in Denmark was to build a strong social connection for the nuclear family.

Between 1965 to 1976, the housing design in Denmark was promoted towards smaller and well-planned units, and more common spaces and facilities (Formm, 1991).

### 2.2.3 The UK Context of Cohousing

The initial development of UK cohousing was boosted by the first wave of the cohousing movement in Europe. The first wave emulated the original northern European urban ideal, with a view to improving the lives of working parents and their children through more efficient and egalitarian housekeeping (Vestbro and Horelli 2012). While the co-housing moniker was not consciously adopted in the UK, the United States or Australia until the 1970s, there was widespread experimentation in communal living at this time, including many small housing co-operatives in the UK. The origin of UK cohousing, then, really only started at the end of the 1990s. Nowadays, in the UK, demand for cohousing and other community-housing is increasing (Jarvis et al., 2016), and various forms of collective living have been developed, including housing co-ops and communes (Ahn et al., 2018). With the development of the housing market over the past two decades (until the end of 2020), there were 31 built communities distributed across the country, whilst 58 groups are developing their cohousing projects and 30 cohousing groups are forming their membership (Morrison, 2013; UK Cohousing Network website, 2019, 2020). Currently, diverse types of cohousing are blooming around the UK, including: low impact affordable cohousing (LILAC); intergenerational cohousing; senior cohousing (Older Women Cohousing); eco-village (Cambridge Community Land Trust); and vegetarian cohousing.

There are fewer completed projects in the UK compared with other European countries, particularly Denmark and Sweden. A lag in development corresponding with economic austerity has resulted in a mix of purpose-built and re-purposed development, including experiments with mutual home ownership models in LILAC intended to make co-housing more accessible to young people living on a low income (UKCN 2021; Chatterton 2013; Jarvis, 2015). In England, cohousing groups have been cooperating with the Department for Communities and Local Government (DCLG) towards the New

Community Housing Fund for cohousing Groups (UK Cohousing Network website, 2020). The government report 'Lifetime Homes, Lifetime Neighbourhood' highlighted the potential and great value of cohousing for an ageing population (Andrews, 2008). In Wales, cohousing has contributed to the Welsh Government Expert Group in response to an ageing population (UK Cohousing Network website). Cohousing has been recognised as playing an important role in the widening choice of housing options. Hence, financial and professional support and advice should become available to facilitate community-led housing solutions. The Scottish Government is keen to encourage the development of new and innovative models of housing that enable older people to maintain their independence in the community (The Scottish Government, 2011). Additionally, Northern Ireland has an active intergenerational cohousing group that promotes cohousing in the country (UK Cohousing Network website, 2019). In sum, the booming development of cohousing models in various regions of the UK and the promulgation of relevant governmental policies represent the public demand for cooperative living. With the support of both central and local government, cohousing will gradually become another possible living option for more and more people in the UK.

## 2.3 Sustainability

The main research trends can be attributed to the aspect and degree of community sustainability. To be socially, environmentally, and financially sustainable is one of the intrinsic motivations evidenced on lots of cohousing groups' mission statements. This section will establish the meaning of sustainability in the cohousing context through an explanation of the social, environmental, and economic domains.

### 2.3.1 Social Design in Cohousing Communities

An awareness of social sustainability is the core part of community building. Cohousing residents commit to the concept, contribute to the community, and also share resources, spaces, tools, time, ideas and skills. There are four fundamental

characteristics of a cohousing social setting: 1) weekly shared meals; 2) regular membership meetings; 3) resources sharing; and 4) diverse membership (e.g. age, religion, and household type) (Berggren, 2017; Jarvis, et al., 2016; Sargisson, 2012). In some respects, cohousing is not an entirely new concept. In the past, most people lived in a village or closely-knit neighbourhood, such as a commune. However, a cohousing community is not a commune, and it offers a contemporary approach for re-creating a sense of community and neighbourhood while responding to today's needs, such as sustainable targets and resilient neighbourhood care. (McCamant & Durrett, 1994). There are obvious practical advantages to living in a cohousing community, including a vibrant social atmosphere, sustainable living, reduced loneliness, child support and care for older people.

Cohousing residents are greatly involved in the community space planning, common facilities sharing, maintenance and management of their own neighbourhood (Garciano, 2011). In particular, as Sargisson (2010) highlighted, 'consensus' as the key to group governance in cohousing communities even if it requires time, patience, tolerance, mutual understanding, and a strong willingness to cope with the internal and external issues. The following sections introduce in detail social engagement and interaction in the cohousing community by explaining various types of sharing, depth of democracy (degree of collaboration), resident participation, and the decision-making process.

#### *2.3.1.1 Three Types of Sharing in Cohousing Communities*

The three types of sharing in a community setting identified by Ahrentzen (1996) is very helpful to both understand the myriad sharing practices and to test the socio-spatial dynamics involved in a cohousing community. Co-presence is the first type of sharing, that shared physical spaces (within common buildings and between private dwellings) offer opportunities for neighbours to share a variety of goods and knowledge to establish closer social relationships. Affiliation is the second type of sharing, evident in the way each group has a core set of values, common visions, or mission statement.

This represents a tacit if not explicit ethic of care (Jarvis, 2015). The third type of sharing is endeavour, explained as the manifestation of the way co-presence and affiliation are performed and experienced. In other words, daily tasks (e.g. food preparation for common meal, gardening and building maintenance) are transformed by the sociality of work in a way that can be interpreted as a ritual (Jarvis, 2015). In fact, these types of sharing are intertwined and interacted in a process of evolution; the physical proximity and social structure for reciprocity and exchange are subject not only to personal growth but also highly reflexive deliberations and changing group dynamics (Douglas, 2019; Jarvis, 2015).

#### *2.3.1.2 The Depth of Democracy in Cohousing Communities*

In order to identify the degree of collaboration in a cohousing community, it is necessary to consider its social capacity through the community dynamic and conscientious participatory governance (Jarvis, 2015). Jarvis (2015) noted that the depth of democracy depended on three overlapping domains of a cohousing community: 1) intentions and community 'glue'; 2) interpersonal relations (sources of support); and 3) engagement within and beyond the cohousing community.

##### *Intentions and Community 'Glue'*

The shared intentions in a cohousing scheme represents the glue which ties and gives meaning to community relations. All the shared activities, community culture, rituals and participation are associated with a core sense of purpose and meaning that depend on habituated practice (Jarvis, 2015). Generally, the group statement or brief is explored in order to build a sense of community. Further, it is a symbol of a shared vision. The statement document has always been produced at the design stage, long before the walls have been built, serving to keep group members 'orientated' towards a common vision and mission (Fromm, 1991; Jarvis, 2015). Some groups begin their common meetings by reflecting on the group vision statement, helping group members to stay focused, share values and hold each other to account (Jarvis, 2015). Sometimes, it is tough to generalise the core values of a cohousing group. According

to Jarvis (2015, p.99), the common vision is interpreted in term of “a meaningful life, to live responsibly… to be closely involved in other people’s lives and to reduce environmental footprint”.

### *Interpersonal Relations: Sources of Support*

The source of support in a cohousing community is largely associated with its physical setting and social structure; it can be summarised as caregiving and care-receiving (Douglas, 2019; Jarvis, 2015). In a cohousing community, not all members are closely connected. Meltzer (2005) noted that the types of support can be classified as social support (e.g. value someone’s company, share your personal problems and concerns), practical support (e.g. feel useful to one another, willing to water the garden or feed their pet(s) when neighbours have a holiday) and moral support (e.g. share a commitment to the common good). Jarvis (2015, p.99) also identified that these types of less tangible support flowed through circuits of learning, peer influence, and affective awareness of a wider ethic of care. Additionally, support can be found from different forms of daily conversation (Sennett, 2012). Sharing a vision in a cohousing community requires a higher level of reflections for mutual understanding and a manner of conversing (Buur & Larsen, 2010). According to Jarvis (2015), the majority of the cohousing group encouraged respectful dialogue and conscientious listening from all cohousing members. If an intentional community loses its common intentionality, people will do things differently and the community will be hard to maintain.

### *Engagement within and beyond the Cohousing Community*

There are several ways to distinguish between types of cohousing. In existing research, the cohousing community can be defined by considering the wave of development (Williams, 2005), legal structure, or by its location (urban, suburban, rural) (Jarvis, 2015). Jarvis (2015) suggested another method to distinguish cohousing, namely considering how particular cohousing groups started. This method could help to understand the engagement within and beyond the cohousing community. As Formm (1991) stated, the collaborative attitude of group members is when people switched

from an individual mode of thinking to one of an awareness and care of the group. The development process can be started from a 'self-created' format, which can be family members or a group of friends. Inspired by a social movement (e.g. previous living experience, social event, or a festival), they sought a reasonable and collaborative way to live closely. The collaborative attitude or the group can grow with the support of professionals, city council, academics and third sector organisations (Fromm, 1991; Jarvis, 2015).

The way of forming membership can be a significant factor to measure resident engagement in a cohousing community. In other words, the actual roles of founding members, and the relationship between founding members, new members, owners, and tenants largely influence social engagement (Jarvis, 2015). As Jarvis (2015, p.100) stated: "engagement is rooted in a sense of belonging, and this turn shapes the way members feel they have a voice and respect in their community". Christian (2003, p.7) agreed with this idea, noting: "a harmonious organisation based on equality of voice, transparency and effectiveness". If the founding members play a dominant role in the community governance, other members are passively engaged in the community decision-making process, strongly affecting the feeling of community attachment and belonging. Besides, a culture of openness appears to be a fundamental factor when group engagement is measured (Jarvis, 2015). This is not only about conducting regular meetings in a polite manner, but also the way group members coped with unexpected changes. This is viewed as a significant pathway for problem solving and to keep the group moving forward, particularly in the early stages of community development (Jarvis, 2015).

#### *2.3.1.3 Social Interaction and Resident Participation in Cohousing Communities*

Social interaction has been shown to be crucial to cohousing communities. Successful development of cohousing communities requires efficient communication and harmonious interactions from multiple parties, involving residents, architects, builders and local authorities. As Dempsey (2011, p.294) stated, "without social interaction,

people living in a given area can only be described as a group of individuals living separate lives with little sense of community or sense of pride or place attachment".

It is vital to understand 'consensus' because it is the primary principle of social interaction and decision-making in a cohousing community; it becomes the underlying principle when people design and manage the site together (Renz, 2006). In accordance with Hare (1980), consensus decision making has been defined as a possible solution to satisfy all members. Additionally, it can be applied to evaluate the degree of democratic contribution (Collins-Jarvis, 1997), and it is a fundamental group consideration for common activities (Collins-Jarvis, 1997). The following section provides detail regarding common activities, sense of community and the decision-making process.

*Common Activities*

In a cohousing community, cultural norms of privacy have been challenged not only by the shared community space, but also by residents' participation (Jarvis, 2011). The purpose of a cohousing neighbourhood is to create a vibrant social environment with enhanced community support and care (Sanguinetti, 2014). Residents' collaboration and participation start with group members who get to know each other through regular activities (Garciano, 2011; Ruiu, 2014). In particular, the participative process offers opportunities for residents to develop a sense of ownership and a sense of group belonging (Brenton, 2008). Based on Glass (2013), the most popular common activities in a cohousing community included residents' association meetings and attending and preparing common meals (Table 2-2). Meanwhile, outdoor and indoor maintenance and planning special events also provided evidence of effective social interaction.

Table 2-2. Participation in common activities

| **Common Activity** | **Percentage** |
|---|---|
| Residents' association meetings | 96.9 |

| | |
|---|---|
| Attend common meals regularly | 84.4 |
| Other committees | 67.7 |
| Preparing common meals | 65.6 |
| Outdoor maintenance | 56.3 |
| Planning special events | 56.3 |
| Indoor maintenance and cleaning | 50.0 |
| Common exercise activities | 46.9 |
| Common hobby activities | 31.3 |
| Steering committee/ board | 28.1 |
| Coffee meetings | 12.5 |

Source: Glass (2013, p.356)

*Sense of Community*

According to McMillan (1996), sense of community works closely with several elements: boundary; emotional safety; sense of belonging; and trust. These elements are connected and contribute to different aspects of the community; each could strongly influence community members' feelings, desire, intimacy, cohesiveness, and attachment to the community (Fromm, 1991; McMillan, 1996).

The boundary aspects are related to 'membership' within the community. Membership emphasises the boundaries defining 'us' and 'them', providing emotional safety and encourages intimacy between group members (McMillan, 1996). Further, it helped to build confidence, created a sense of entitlement, and served to build loyalty to the community (McMillan & Chavis, 1986). The task of emotional safety concerned whether the community could accept the group members to speak about how they really thought and felt within the group. This requires community empathy, support, understanding and caring (McMillan, 1996). When group members believe that they will be welcome, they can fit well in a community, and they will feel strongly attached to the community. Similarly, the responsibility of community needs to accept the resident as a member will also increase the attachment to the community (McMillan & Chavis, 1986). The last element, 'trust', is fundamental for all stages of community development. First, this enabled people to know what to expect from other members by understanding the law and the order in the community (McMillan, 1996). There is an example that can be found in a cohousing community: the older residents cannot expect other group members to take responsibility for looking after them if they need

care. There is no obligation for cohousing members to provide care to other members. Once the law is established, the development procedure of trust in a community relates to authority (McMillan, 1996). In other words, an individual or a group of individuals has to be in charge or explore the principles to make decisions. Generally, there is no dominant figure (or community manager) in cohousing, however, the authority can be described as different small groups being in charge of different issues (e.g. a design group, research event group, landscape group) and consensus decision making. Finally, cohesion can be increased if the community leaders and members can simultaneously influence each other (Miller, 1990; Steel et al., 1990).

*Consensus Decision-making*

In a cohousing community, the consensus model has offered a decision approach that promotes each group member to consider and discuss ideas openly (Renz, 2006). It also becomes a new perspective for defining group cohesion. As a resident from Brich Haven Cohousing (located in Wisconsin, America) indicated: “Some way to make a clearing where we can all step out of what we came in wanting, expecting, hoping for, etc., and stand in a place together where we can begin to see a new way or something different” (Renz, 2006, p.360).

Additionally, there have been some difficulties with the application of consensus. The difficulties began with the fact that some researchers considered consensus as a packaged solution whilst others viewed it as a process (Renz, 2006), with different opinions potentially creating barriers to the decision-making process. Meanwhile, the decision-making of the community will be strongly influenced by a resident’s age, educational level, cultural background, life experiences, income, and other social factors. Moreover, each cohousing community is unique with different foci and priorities, thus no ‘universal decision-making model’ can be applied to fit all. In other words, it is difficult to be effective: cohousing group members need to solve various issues by considering the potential rules and capacities of such community. It is also restricted

by the size of the community, and some communities have a strategy for making 'small decisions' in parallel teams without full group attention. Therefore, more social support is necessary in the community decision-making procedure, particularly for large communities.

### 2.3.2 Environmental Features in Cohousing Communities

#### *2.3.2.1 Definition of Community*

Any discussion of the environmental features in a cohousing community requires defining the term 'community'. As Beck (2001, p.455) stated: "community is a group of people who share a common territory or ecology. Communities share a common culture and set of institutions involved in the provision of daily needs". Put simply, the core and the identity of a community can be indicated by understanding the interactions among residents about certain cultural and ecological aspects (Beck, 2001). Further, personal relationships, personal health, safety, and sustenance could significantly affect human well-being (Maslow, 1954). Within a community setting, the specific physical and social features can largely influence residents' activities and social engagement, but this also depends on their activities level (Yang & Stark, 2010).

#### *2.3.2.2 Physical Design of Cohousing Communities*

In a cohousing community, each household has their own front door. Homes are grouped facing the common spaces. This offers access for everyone to the open areas and the chance to socialise with neighbours under 'casual surveillance' (Berggren, 2017; Ruiu, 2014). The common house is one of the key features of a cohousing community, which may include a shared kitchen and dining area, common laundry and guest rooms, and sometimes a workshop, children's play area, a shop, and a library (Berggren, 2017). McCamant and Durrett (1994) pointed out that extensive common facilities were an integral part of the community, with common areas designed for daily use to supplement private living areas. Both physical design and community layout aim to encourage a strong sense of home and also create a sense of belonging to the community. Additionally, the corralling of cars is usually organised at the site's edge,

which becomes a fundamental site planning strategy. This particular trend of carpooling strategy can help community members to create a safe environment, leading the general population to rethink personal transportation priorities (Meltzer, 2005). The following elements are often considered when discussing the physical design of a cohousing: site planning; density; architectural form and building materials; dwelling size; and building technologies (Meltzer, 2005).

*Site Planning*

Cohousing site plans varied, although the most common community layouts adopted either a linear (Lancaster cohousing site plan) or circular format (LILAC community site plan). In the circular format, housing is placed around a small courtyard or common house. The common adopted site plans were identified by McCamant and Durrett (1989), revealing four generic cohousing site plans that suited the special needs and aspirations of cohousing communities (see Figure 2-1). Dwellings are arranged along or around: (a) a pedestrian path; (b) a courtyard; (c) a pedestrian path with activity nodes; or (d) a glass-roofed atrium (Meltzer, 2005). These types of site plans have many advantages (Meltzer, 2005):

- They offer opportunities to use land, materials, and energy efficiently.
- They can provide safe outdoor spaces for families with children.
- The privacy of individual households can be protected; and
- They can promote social interactions in the provided open spaces and spaces between buildings.

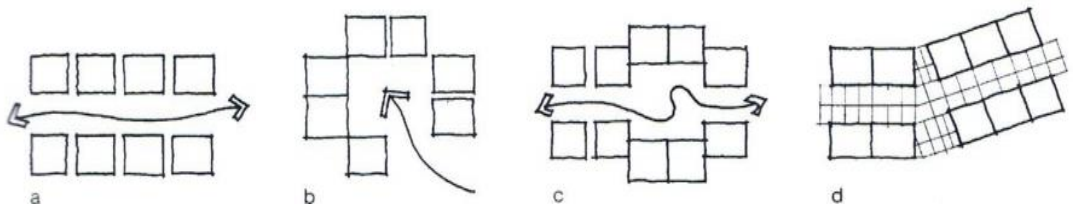



Figure 2-1. Four generic cohousing site plans
Source: McCamant & Durrett (1989); Meltzer (2005)

Each type of housing layout aims to maximise community contact without affecting private living space (Fromm, 2000). Furthermore, the common house plays the central role in the neighbourhood design. It mainly includes a sitting area, cooking and dining components, guest room(s), play area for children and a laundry. In contrast, there is a commensurate space reduction from the private dwellings. In other words, homes in cohousing communities are usually smaller in size because residents also have access to the common area and shared facilities (Fromm, 2000; Garciano, 2011).

*Residential Density*

According to Meltzer (2005), more compact housing forms and higher residential densities can contribute to protection of the environment. Due to the special social setting of a cohousing community, density becomes a significant factor which could largely affect residents' community living and quality of life. Alexander (1993, p.183) suggested a unique density measure called perceived density (or experience of density). In Alexander's perceived density model, apart from measured density, three other factors are involved:

- Qualitative physical factors;
- Individual cognitive factors; and
- Socio-cultural factors.

Qualitative physical factors encompass scale, massing, design diversity and other building details. Individual cognitive factors can affect one's perception of privacy, social distance, comfort and feelings of control, and the socio-cultural factors may contribute to collaborative norms, standards, and social interaction (Alexander, 1993; Meltzer, 2005). These factors work harmoniously to influence the level of social interaction and character of activities in a community (Alexander, 1993).

In a cohousing community, the qualitative physical factor can be illustrated by the distribution of private dwellings, location of the common house, orientation of buildings, and overlapping paths. Positively formed private units echo the with outdoor space, which can bring clarity to the site plan by considering a balance of solid and void,

openness and closure, hard and soft landscaping (Fromm, 1991; Meltzer, 2005). The use and location of the common area (e.g. common house) can lead to different layers of conversation within various subgroups in a cohousing community. Well considered massing and the juxtaposition of buildings can be employed to deliver a coherence enabling faster and easier navigation by the cohousing residents (Meltzer, 2005).

Individual cognitive factors (including perception of privacy and comfort) are used to induce the balance between the public and the private. In a well-designed cohousing community, the privacy gradient is defined whereby residents can control their proximity level and accessibility to others (Meltzer, 2005). As Alexander (1977) reported, the spaces in a building are designed in a special order which corresponds to certain degrees of privacy. The evidence can be found in a cohousing community, for example, the ways in which people use the common area, and how often, could strongly contribute to the living experience in the community. A rich and intimate public life can only be maintained if cohousing residents have complete control of their privacy (private life). The higher perceived density in a cohousing community requires similar circumstances, values, life experiences or even ages of group members. The group's intentionality, main visions, and high level of cohousing concept acceptance will allow a higher perceived density, and the tolerance, solidarity, community governance structure and problem-solving strategy of the group should not be ignored.

*Architectural Forms with Sustainable Building Materials*

Even though the architectural forms of a cohousing vary, they are reflections of a vernacular building. The architectural forms coincide with special regional styles developed in response to local culture, ideology, landscape, climate, and available building materials (Meltzer, 2005). Besides, the progressive social values and collective identity also can be expressed through the architecture (Meltzer, 2005). However, the building construction stage is one of the largest users of energy, material resources and water, and can be a polluter; so the sustainable building approach has

a high potential to make valuable contributions to sustainable development (Akadiri et al., 2012; Hagbert et al., 2020).

In a cohousing community, architectural form is strongly influenced by the site location, group willingness and group identity. Due to the potential of collaborative design processes, many groups selected the building materials (guided by their architect) through a consideration of environmental impact, sustainable standards, and future living costs (Meltzer, 2005). Architects, designers, and group members involved in the cohousing project have a special opportunity to reduce environmental impact through the design stage of a building project (Akadiri et al., 2012). According to UK Cohousing Network website (2019), the architectural building types of cohousing communities can be found as new-build (completely new-build, partly new-build), eco-build, self-build, retrofit, and refurb. However, working with big Victorian houses, old stone buildings, farmhouses, non-residential building use change and listed building retrofitting and refurbishment are ubiquitous, very challenging and expensive for UK cohousing communities because the old building structure and retrofitting difficulties of water, electricity and ventilation system . But once established, the cohousing group can largely benefit from the well-designed and performed residential building, such as super-insulation and better acoustics.

*Dwelling Size*

As mentioned previously, it is widely recognised that a private dwelling in a cohousing is smaller than conventional market houses. The average dwelling size ranges from 79 metres (m)² to 127m², with the overall average being 100m² (Meltzer, 2005, p.121). In America, cohousing dwellings are approximately half the size of typical new-build houses in the market (Meltzer, 2005). Generally, cohousing residents are willing to live in smaller dwellings because the shared spaces (e.g. common guest rooms) and facilities (e.g., common laundry) were provided in the common house (Meltzer, 2005). Moreover, smaller house were easier to heat and manage, especially for older people. As a result, cohousing residents were prepared to live in a more compact way than

they did before (Meltzer, 2005). Two examples of dwelling size in the UK are shown in Tables 2-3 and 2-4.

Table 2-3. Lancaster Cohousing dwelling size

| **Number of bedrooms** | **Type** | **Floor area** |
|---|---|---|
| 1 bed flat | upstairs flat with bed loft | 54.8m² |
| 1 bed flat | ground floor flat without bed loft | 40.4m² |
| 2 bed house | 2 storey | 65.4m² |
| 3 bed house | 2 storey | 80.8m² |
| 3 bed house | 3 storey | 98.1m² |
| | | Average 67.9m² |

Source: Adapted from: Lancaster cohousing

Table 2-4. Cambridge Cohousing (K1) dwelling size

| **Number of bedrooms** | **Type** | **Floor area** |
|---|---|---|
| The A House | 5.2m wide terrace house | 108.6m² |
| The B House | 6m wide terrace house. | 122.8m² |
| The C one bedroom flat | Ground floor apartment with garden | 51.3m² |
| The C one bedroom flat | First floor apartment. | 66.5m² |
| The D apartment - two double bedrooms | Balcony overlooking common garden. | 75.3m² |
| The F affordable flat | One bedroom apartment | 47m² |
| The E one bedroom flat | Apartments over the workshop with balcony | 51m² |
| | | Average 74.6m² |

Adapted from: K1 Cambridge cohousing

*Building Technologies*

Coldham (1993) suggested that cohousing offered another scale of social organisation between single families and the town. Expanding the palette of technologies that can be applied, he explained that different technologies operated efficiently at a particular scale (see Figure 2-2). For example, solar water heating operated well at the domestic scale. In contrast, electricity distribution operated best at the scale of towns or the district level. Cohousing communities, then, could provide a platform which may combine the household and community level to maximise the benefits of technology application.

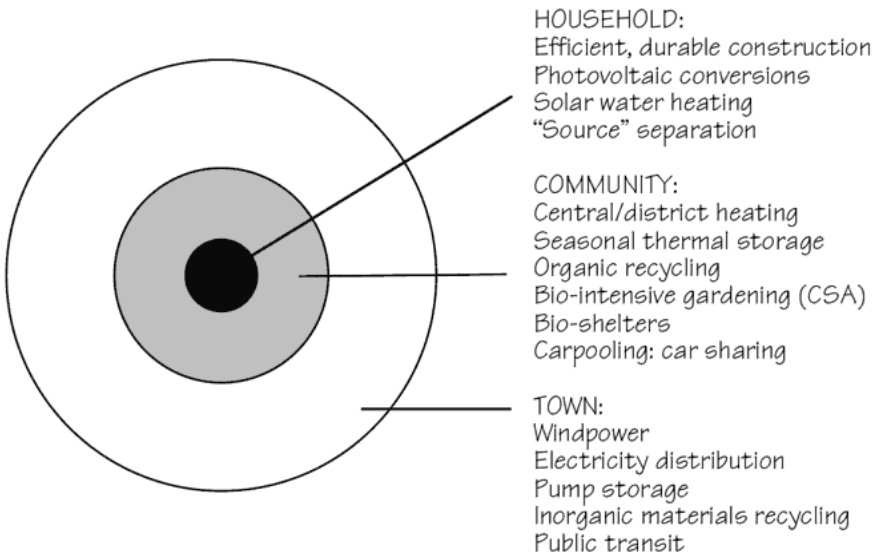



Figure 2-2. Scales of technological efficiency
Source: Coldham (1993)

Cohousing provides unique opportunities to optimise advanced technologies on site such as centralised heating, biomass, and thermal storage (Meltzer, 2005). The technologies applied in a cohousing can be divided into two types: construction technologies; and living technologies. In the UK context, advanced construction technologies include straw-bale construction (LILAC Cohousing) and modular building. Common living technologies in British cohousing are Mechanical Ventilation and Heat Recovery (MVHR), solar PV, passive solar, ground source heating systems, sustainable water system with a borehole and rainwater collection.

### 2.3.3 Affordability and Financial System

The affordability of a cohousing is affected by land prices, development finance, construction and maintenance, and community physical planning (Scanlon & Arrigoitia, 2015). Even though one of the key purposes for cohousing model was to minimise living costs (Thorne, 2015), some cohousing properties typically cost more than standard townhouses (Ruiu, 2014). The reasons are listed below:

- Cohousing neighbourhoods provide generous common facilities that are unheard of in standard housing developments; and
- The use of environmentally sustainable features and technologies are favoured in a cohousing community, such as biomass, ground heating, solar heating and rainwater harvesting systems. These homes will cost more in the short-term (Cohousing Partners, 2012).

On this occasion, low-income groups might be excluded from living in cohousing communities because some communities lack affordability (Garciano, 2011). Rodman (2013) acknowledged that affordability is highly valued but hard to achieve. Therefore, affordability is seen as a major challenge for cohousing development.

In general, income level can be one of the important criteria of categorising cohousing residents (Garciano, 2011). In addition, cohousing schemes can provide financial supports for the low- and moderate-income groups. For example, some communities assisted their tenants with a wide range of affordable housing strategies, internal and external subsidies. According to Garciano (2011), some domestic subsidies included community loans, and vouchers or gifts for low-income families to manage their payments. This strategy and financial policy enabled more possibilities to help low-income house owners to buy a smaller house within the cohousing community. Correspondingly, cohousing offers many benefits for these low-income families, for instance, the community provides residents with opportunities to gain life and working skills, therefore, they might have no need to go out and attend courses for general

skills and job training. It also benefits young adults, offering more chances for group work and leading to positive change and promoting social engagement.

LILAC (the first UK's ecological, affordable cohousing community located in Leeds) is a typical example showing financial support and affordable housing strategies (Figure 2-3). This largely reduces financial pressure and benefits every resident. According to Chatterton (2013), the LILAC scheme has a complicated ownership structure. All the LILAC members buy shares (land and building the homes) in the mutual company Mutual Home Ownership Society (MHOS) which owns the site and properties. Members pay a deposit equal to 10% of the shares, and thereafter, the households are charged the equivalent of 35% of their net monthly income to accrue more shares. Moreover, members can finance through monthly payments (Chatterton, 2013, p.1664). Clearly, the LILAC scheme is challenging the local housing market and creates the new affordable concept in perpetuity.

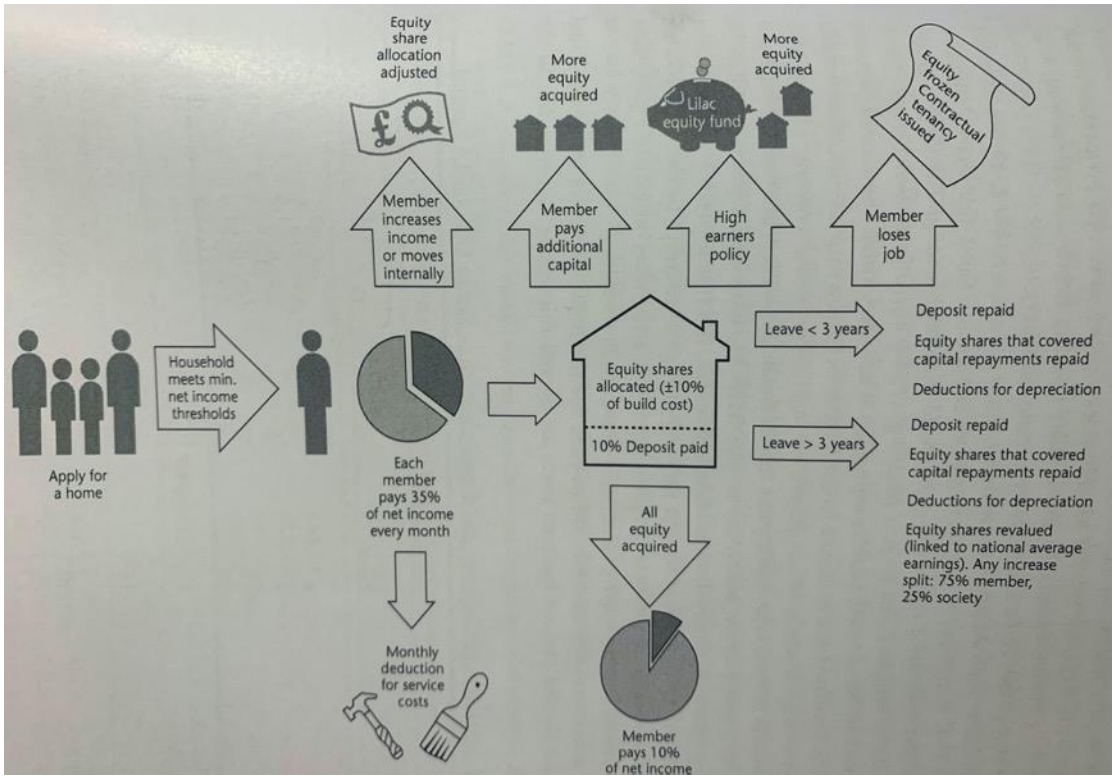



Figure 2-3. LILAC's Mutual Home Ownership Society
Source: Chatterton (2015, p.135)

## 2.4 Cohousing for Older People in the UK

Statistics concerning ageing population are widely known and represented. Nowadays, the UK's population is ageing, with 15.21% of the UK population aged over 70; by 2040, nearly one in seven people are projected to be aged over 75 (GOV.UK – Government Office for Science, 2016). At the same time, the demands of older people are receiving more attention. Additionally, for older people, their lives not only require good levels of material comfort but also self-value and a sense of belonging. As Wealleans (2015, p166) stated: "A needs focused view of ageing populations underestimates the value of older people and the contribution they make to society. Obviously, it is a good thing that we are living longer but we need to ensure that people are living stronger for longer and with purpose and a sense of belonging".

Based on this situation, UK policy-makers have become increasingly interested in the benefits of cohousing. Similarly, cohousing has appeared as a desirable alternative and a socially, environmentally friendly, self-management residential model in the UK for seniors. Thus, it is necessary to develop a broad infrastructure of support in the UK which is currently lacking. Looking at all the cohousing communities in the UK, older people are the biggest 'customer' and 'investor' group compared with other age groups. Whether older people are seeking companionship, a low-carbon lifestyle or affordable housing within a cohousing community, or whether they are in intergenerational or senior cohousing groups, the relationship between the cohousing model and older people, and how they influence each other should be explained.

### 2.4.1 Is Cohousing an Option to Age in Place: Co-care and Co-support?

Cohousing members offer mutual assistance for each other voluntarily, and this promotes social engagements and healthy ageing (Rodman, 2013). Generally, the applicants do not have to be 'old' to join a cohousing group, but they can have an 'ageing in place-friendly' vision and motivation to cooperate with the neighbourhood. However, the study challenges that cohousing is not suitable for everyone. This following questionnaire (Table 2-5) proved this claim and showed the recruitment

process of the ElderSpirit Community (ESC). This is a typical example to examine whether cohousing concepts are a 'good fit' for older people and their interests. If the person agrees with most or all of these statements shown below, the person might be a good fit for membership in this particular cohousing community.

Table 2-5. ESC Members Recruitment Questionnaire

| Agree Neutral Disagree |
|---|
| I respect other spiritual paths and do not hold mine as the only one. |
| I have or would like to have a regular spiritual practice. |
| I try to be as physically active as my health allows. |
| I am interested in learning new things. |
| I value a sense of community with others. |
| I would like to participate in some group activities. |
| I am willing to give some time to ESC work and responsibilities. |
| I have a history of volunteer work and might like to continue. |
| I would like to give and receive caring support as I age. |
| I value the environment and act accordingly (recycling, etc.). |
| I would like to further develop my gifts and talents and encourage others to develop theirs. |
| I am open to change. |
| I appreciate diversity in a community |
| I am willing to face the mysteries of ageing and death. |

Source: Glass (2009, p.291)

When discussing mutual support (co-support) in a cohousing community, Glass (2009, p.295) reported in a study that when asked, 'If you needed help with your home and personal care due to a health problem, how likely would you be to ask any cohousing community members to help you?', a pattern appeared from the answers. This indicated that, in ESC, about 80% of respondents answered they were 'very likely' to ask cohousing members for help compared to about one-third who would 'very likely' ask their children. Apparently, mutual support through daily activities and sharing was able to reduce social isolation and encourages independent and active ageing.

### 2.4.2 Intergenerational Living in Cohousing for Older People

During the last two decades, intergenerational cohousing models and community developments have been considered as possible ageing options to older generations in a number of European countries. According to Kehl and Then (2013), the

intergeneration cohousing concepts which combine housing design and older people's living with the development of sustainable community have been promoted for more than 15 years in Germany. When talking about intergenerational living, many advantages have been found. For instance, family members could build strong emotional connection and closeness across generations. Spending time with children can bring purpose and meaning to the lives of older generations while younger generations could learn from older generations. If in good health, older residents can look after young children and also become significant role models in social life for them in the community.

Intergenerational learning can be well-developed in a cohousing community. According to Mayo et al. (2013), intergenerational learning tended to focus on grandparents helping their grandchildren to read and young people to teach older people to use IT. This type of learning not only enabled children to engage with family and community members, it also attached older adults to the learning process, thus offering another layer of community interaction, which would benefit the whole family and the wider community (NIACE, 2009). Intergenerational work, especially at a community level, has the potential to encourage children or young people to achieve their potential or change behaviour. Additionally, it helps to develop sustainable and cohesive communities and to deliver increased participation and positive outcomes for older people and other cohousing members (Pain, 2005; Springate et al., 2008).

### 2.4.3 The Cohousing approach to Lifetime Homes

#### *2.4.3.1 Lifetime Home Standards*

Lifetime Home Standards (LH) were established in the mid-1990s to incorporate a set of principles that should be implicit in good housing design (The Lifetime Home Design Guide, 2010). They include 16 design criteria under five categories (Inclusivity, Accessibility, Adaptability, Sustainability and Good Value) that can be widely applied to new build and housing retrofit. These criteria were targeted to improve the property

to be flexible for a wide range of people and also introduce adaptability into the housing layout and design. Lifetime Homes can provide benefits especially to older people, disabled people, and anyone with physical impairments to make their home more accessible and inclusive. Applying Lifetime Home design to mainstream housing could allow older people to stay at home as long as possible and delay or reduce the need for expensive home adaptation and medical care. This will also benefit disable people to maintain their independence due to the appropriate housing setting (Wang, et al., 2018).

In the UK context, cohousing models can be categorised into these two types:

- The intergenerational community where older people and families live side by side, such as Lancaster cohousing; and
- The peer-group community where a range of people over 50 prefer to live in a child-free environment, such as The Older Women's Cohousing Company in London (Housing LIN, 2008, p.5).

However, limited literature can be found for applying LH into a cohousing model. It is more challenging to adopt these design standards to cohousing models than general mainstream housing due to the collective design procedure and its operational mode. A detailed discussion about the advantages and disadvantages of the LH application in cohousing communities is presented below.

#### *2.4.3.2 Lifetime Homes Standards and Cohousing Models*

In the cohousing context, LH can be applied to benefit both types of cohousing models. Therefore, Lifetime cohousing could become an effective housing model to maximise the opportunities and potentials of housing and neighbourhood design for cohousing members and promote better neighbourhood sustainability. In addition, Lifetime Homes also influences social interactions and common activities. As Kelly (2001, p.72) suggested, "flexible, usable and adaptive building design of lifetime home is able to influence social patterns and processes. It will encourage neighbourhoods to evolve

and flourish […] they represent the best way to achieve community sustainability". Even through the study acknowledged the advantages of LH, some limitations also need to be considered. On the one hand, within the 16 design criteria, LH do not incorporate sensory factors, such as room temperature, humidity, air quality, sound and lighting control. On the other hand, the design criteria may not be fully applied into intergenerational families because they exclude children from consideration and explain the life course period from adulthood to old age (Allen et al., 2002; Imrie, 2006).

## 2.5 Theories of Community Practice and Design

As discussed, the literature review of this research has two parts: a cohousing-related literature review; and the analysis of relevant theories on community practices and design. The aim of this section is to discuss the guiding theories on community practices and design, explore how they are connected and their influence on this research. These theories not only shaped the research methodology but also guided an understanding of the research aims. As an architectural based cross-disciplinary research, it was influenced by a series of theories including environmental psychology theories (Behaviourism perspectives – Behaviour-setting theories), Ethnography, urban theories, and Sense of Community theory (SOC). Based on the research questions and sub-questions (Figure 2-4), the study mainly focused on the cohousing design and its physical environment and how they could influence people's social interactions. To this end, environmental psychology, and ethnography were selected as key guiding theories for the research and methodology. The chosen theories dialectically connected and influenced each other, and greatly contributed to understanding the environmental and social aspects of a cohousing community. The theoretical framework and the interrelation of selected theories is explained below (Fig. 2-5, Fig. 2-6)

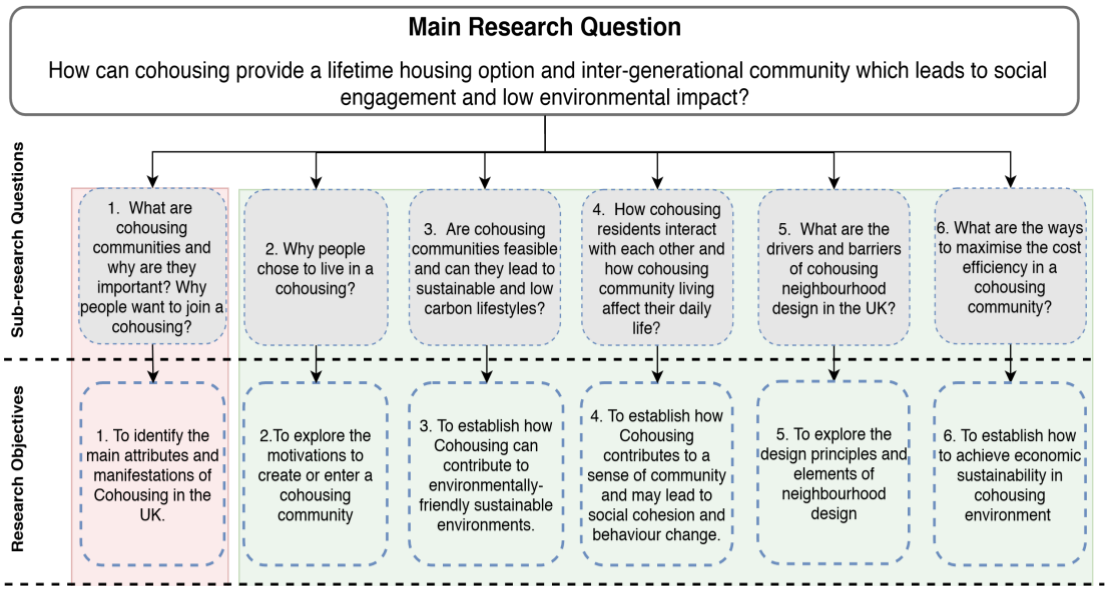



Figure 2-4. Main research question and sub-questions

### 2.5.1 Environmental Psychology

This section includes three parts: 1) background of environmental psychology, 2) positions, applications and methods, and 3) connections to the present study.

#### 2.5.1.1 Background of Environmental Psychology

The term ‘environmental psychology’ originated in the United States during the 1960s (Bonnes and Secchiaroli, 1995). It has been distinguished as a field of psychology and later as a full discipline in psychology focusing on the interface between human behaviour/ perceptions and the sociophysical environment (Altman, 1975; Stokols, 1978). Hellpach was one of the first scholars who introduced the term ‘environmental psychology’ in the 20$^{th}$ century (Pol, 2006). However, Egon Brunswik and Kurt Lewin are well-known and regarded as the ‘founding fathers’ of this field (Gifford, 2007). They strongly believed that the physical environment could have significant impact on people’s awareness and behaviour. The widely recognised definition of environmental psychology emphasised the relationship between behaviour and the physical environment (Heimstra and McFarling, 1978; Proshansky,1976). In recent years, its definition was further developed by Steg and de Groot (2019, pp.4-5):

> "Environmental psychology is primarily interested in the interaction between humans and the built and nature environment; it also explicitly considers how the environment influences behaviour as well as which factors affect behaviour that can help improve environmental quality."

In the early period of environmental-psychology research, studies were conducted to find solutions to many 'man-made' environmental problems, such as air and water pollution, increasing energy use, climate change, noise pollution and toxic accidents (Bell et al.,1984). At the same time, environmental psychologists also studied how different environments affected people. Therefore, much attention was paid to the built surroundings (e.g. homes, offices, parks, schools, prisons, and hospitals) and how they influenced human behaviour and well-being (Bell et al., 1984; Bonnes and Bonaiuto, 2002), which included exploring crowding, environmental perception, privacy and social needs. Nowadays, environmental psychology is recognised as an interdisciplinary field with a wide range of applications. For example, it contributes to research on the natural environment and its health benefits, children and natural environment, environmental stress, place attachment and belonging, changing behaviours and social environmental systems (Bell et al.,1984; Gifford, 2016).

#### 2.5.1.2 Positions, Applications and Methods

As mentioned previously, a growing concern of environmental psychologists is to explore ways to change people's behaviour to solve environmental problems, with the aim to preserve human well-being, social needs and quality of life. To this end, a broad concept of sustainability, including environmental, social, and economic aspects, has been widely adopted (Butlin, 1987). Therefore, over the past decades, environmental psychology research and studies have gradually worked with the 'psychology of sustainability' in the disciplines of architecture and geography (Giuliani and Scopelliti, 2009; Gifford, 2007; Steg and de Groot, 2019). As a research field, Environmental Psychology seeks to understand how and why our environment impacts us and what we can do to improve our relationship with the world around us. Environmental

psychology is grounded with theories about how and why we act the way we do in our environment, but they tend to fall into the following perspectives: Geographical Determinism, Ecological Biology, Behaviourism and Gestalt Psychology (Ackerman, 2021). The present study falls into the perspectives of behaviourism. Behaviourists brought an emphasis on context to the conversation, insisting that both environmental context and personal context (e.g., personality, dispositions, attitudes, views, experience) are vital determinants of behaviour.

Within this architectural research, there are three significant positions in environmental psychology closely related to architectural influence on behaviour and social aspects. The first one is coined 'Architectural Determinism', which emphasises the physical environment as the primary cause of behaviour (Bell et al., 1984). The second perspective is called 'Environmental Possibilism'. This highlights that the physical environment provides not only opportunities but also potential limitations on behaviour (Porteus, 1977). Finally, the last perspective named 'Environmental Probabilism' acknowledges both non-architectural factors and design variables on behaviour (Porteus, 1977). This study is deeply influenced by environmental probabilism and applies this concept into the research. It aims to explore the mutual interrelationships between design variables in residential physical environments and users' behaviours. Therefore, this present study is influenced by four books as fundamental source of learning environmental psychology: Research Methods for Environmental Psychology (Gifford, 2016), Environmental psychology (Bell, et al., 1984), Environmental Psychology- An introduction (Steg & de Groot, 2019) and Environmental Psychology for Design (Kopec, 2018).

More detailed 'branches' of environmental psychology have been developed, deepening and broadening the understandings of this field. For example, and useful for this research, the theories of spatial cognition and cognitive mapping methods have been essential to environmental psychology research (Garling et al., 1984). Even

though this concept is a very personal representation of the familiar environment, it provides clear instructions for defining places and also supports wayfinding. Within this discipline, urban planner Kevin Lynch (1960) found that five elements could be used to analyse cognitive maps: paths; edges; districts; nodes; and landmarks. Nowadays, these elements are still the milestones of studying architectural and various urban environments. In addition, Barker's ecological psychology model (1968, 1979, 1987) played a significant role in understanding the environment-behaviour relationships. Barker's approach views environment-behaviour relationships in two ways: they shape and interact with each other. In the meantime, the speciality of Barker's approach is that behaviour setting is an entity in itself. It is changeable, it exists, and has a physical structure (Wicker,1987). Last but not least, environmental psychology has had a great impact on understanding social phenomenon, such as place attachment, privacy, group cooperation and communication, social behaviours and social norms. Specifically, place attachment is dynamic and socially produced, which was well explained by Scannell & Gifford (2010) using a three-dimensional framework – 'person-process-place'. It is formed by people who together formulate the everyday meanings of place (Di Masso et al., 2014). According to Lewicka (2011), the stronger people are actively attached to a place, the more socially active they are. Therefore, understanding why and how people attach to a place could help to explain group's motivations, commitments, goals, and cooperation, and at the same time improve the built environment and preserve the quality of life. Furthermore, the scholar Amos Rapoport (1977) conducted his research by developing the broader meaning of environmental perception, personal space (privacy) and behaviour setting system based on environmental psychology concepts. For example, he argued that the idea of private and public domains can be related to the distinction of front and back areas, the former for display and the latter for private use (Rapoport, 1977). Additionally, he also demonstrated that these domains (private and public) can only be understood as part of the system of interactions and withdrawal. These concepts offered a broader

meaning to human-environmental relationships; they are also fundamental for environment-behaviour studies in various physical settings.

#### 2.5.1.3 Connections to the present study

This PhD thesis has been influenced by the concepts of environmental psychology which offered a foundational theory to guide the research. Additionally, the study was inspired by Paul Bell's environmental-psychology theory (1984) that demonstrated that our surrounding environment could make a huge impact on people's habituation, behaviour and adaptation. He also identified that colour, temperature, illumination, windows, orientations, furnishings, and spatial privacy were essential factors that affected people's environmental perceptions. This study also seeks deeper understandings of social aspects (e.g. interactions, motivations, and group collaborations) and environmental sustainability in cohousing communities, such as how cohousing members shape their living environment, and how the community environment shapes the residents' lives. The field of environmental psychology offers opportunities to understand the interrelationships between human and surrounding environments, and between environmental sustainability and behaviour.

Additionally, in architectural research, the built environment is the core context for understanding the social interactions in a cohousing community. To this end, the theories of environmental psychology (Bell et al., 1984; Gifford,2007; Steg and de Groot, 2019) have provided structural criteria and various assessment models (e.g. Brunswik's 'the lens model' and the 'Perceived Environmental Quality Index' (Craik and Zube, 1976) to analyse the social and built environment as a whole (e.g. the uses of front and back gardens). These theories have also explained how to measure human-environment casual relationships. The present study also benefited from the description of the residential setting from environmental psychology. Bell and colleagues (Bell et al., 1984) defined many factors for interpreting residential settings, such as residential preference, space usage in the home and residential satisfaction (complexity, naturalness, cleanliness, silence, privacy, and energy efficiency) (Gobster,

1983; Volkman, 1981). This not only provided structural guidance for evaluating the cohousing physical environment, it also provided useful directions to understand the social activities and interactions therein. This also provided guidance to reveal the connections between awareness of community living and environmental behaviour.

### 2.5.2 Ethnography and Sense of Community Theory (SOC)

Research on the social patterns and interactions of group members were also essential in this study. Based on the research sub-questions (question 3 in Figure 2-4), this study was guided by two theories: Ethnography; and SOC. Ethnography is one of the oldest qualitative research methods, originating in the field of anthropology. Yet, researchers from various disciplines are now adopting and adapting ethnography beyond its origins as a result of philosophical reflections on the processes and purposes of the method. (Wall, 2014). Simply put, ethnography is the art and science of describing a group of culture (Fetterman, 2010). It is characterised by "a written description of a people that focused on selected aspects of how they lead their routine, remarkable, and ritual lives with each other in their environment and of the beliefs and customs that comprise their common sense about their world" (Muecke, 1994. pp.189-190). The purpose of applied ethnographic research is concerned with "understanding sociocultural problems in communities or institutions and using these understanding to bring about positive change in communities, institutions or groups" (LeCompte et al., 1999, p. 6). Additionally, ethnography generates theories of cultures, provides explanations of how people think, believe, and behave in the local time and space (LeCompte et al., 1999). One of the strengths of ethnography is that the methods used produce a picture of cultures and social groups from the perspective(s) of their members. Indeed, ethnographies tell the story of a group from the group's perspectives as much as from the ethnographer's point of view (LeCompte et al., 1999).

This research valued SOC as a relevant theory because it really explained all aspects of creating a sense of community. The theory identified membership, influence, integration and fulfilment of needs, and a shared emotional connection as the four

major elements required for a sense of community. These elements helped the study to better explain various social patterns and practice changes from forming membership to the actual living in a cohousing. This study paid close attention to membership formation (with a particular focus on determining and exploring the motivations for people to join a cohousing), the influences between individual members and community, the balance between individual and group needs (fulfilment of needs) and group members' attitudes and practice changes. Accordingly, this community theory mainly contributed to the chapters on group motivations (Chapter 5), social proximity by physical territory (Chapter 7), and attitude and practice change (Chapter 8).

### 2.5.3 Theory of Public space and Human Activities

The communal area in a community setting is the unique feature of a cohousing. Even through cohousing is considered as a private form of living in the UK, for cohousing residents the community communal space has a lot in common with public areas in the city. At the same time, communities for residential purposes were seen as an intermediate level between individual houses and a city. This study argues that a cohousing community can be considered as a simplified version of a city with private areas, communal areas, paths, landscapes, and basic infrastructure. This is why Gehl's (2010, 2011) and Lynch's (1960) urban theories are significant for this study. Among these, Life between Buildings by Jan Gehl was the key theory because it analysed the relationships between the design of public space and human activities in many layers. This theory is also important in understanding the physical infrastructures and conducting on site observations because it provides structural criteria and detailed examples (e.g., the outdoor activities and quality of communal spaces; how physical environments shape outdoor activities; 'soft edges' in cohousing communities; transitions and exchanges between private and public lives) to analyse the common area and important elements in a cohousing community... Therefore, this urban theory contributed mainly to the chapters on the case study (Chapter 4); social proximity by physical territory (Chapter 7) and neighbourhood design (Chapter 9).

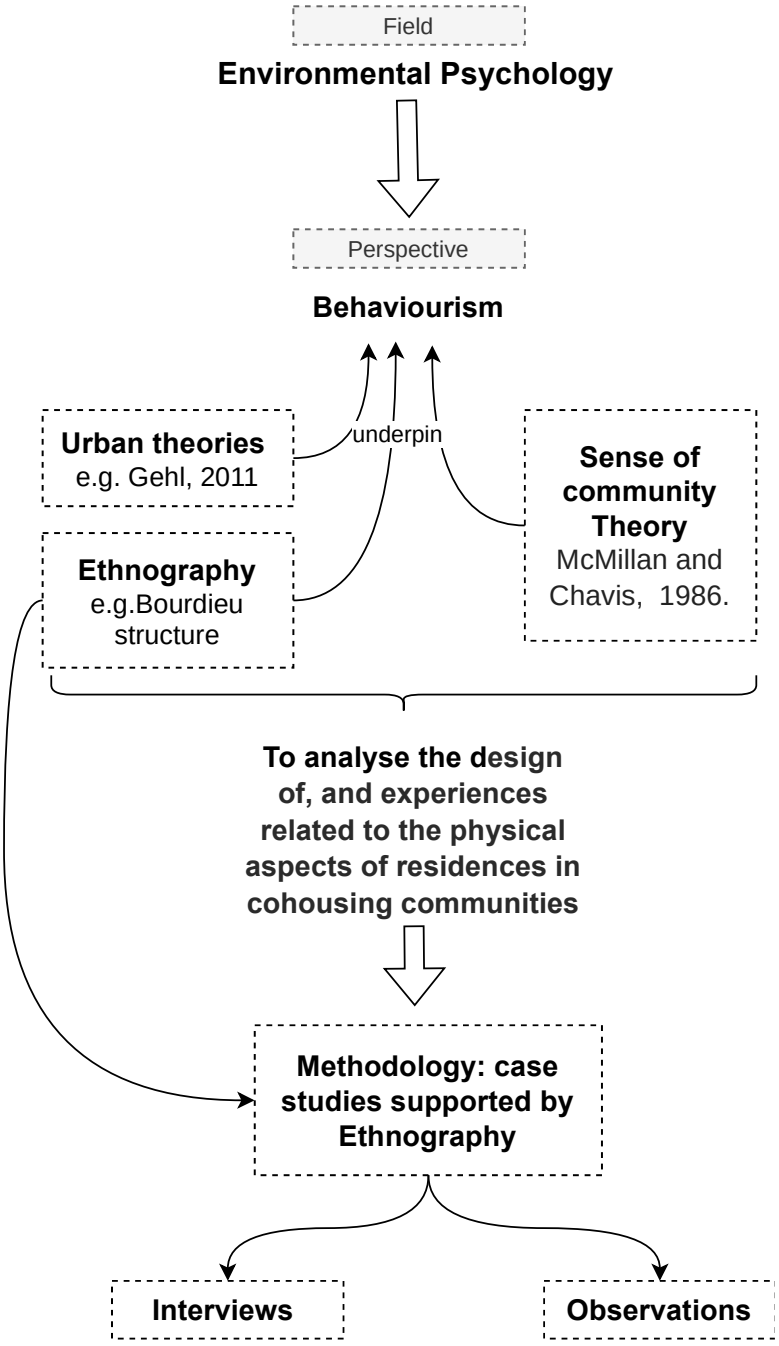



Figure 2-5. Theoretical framework

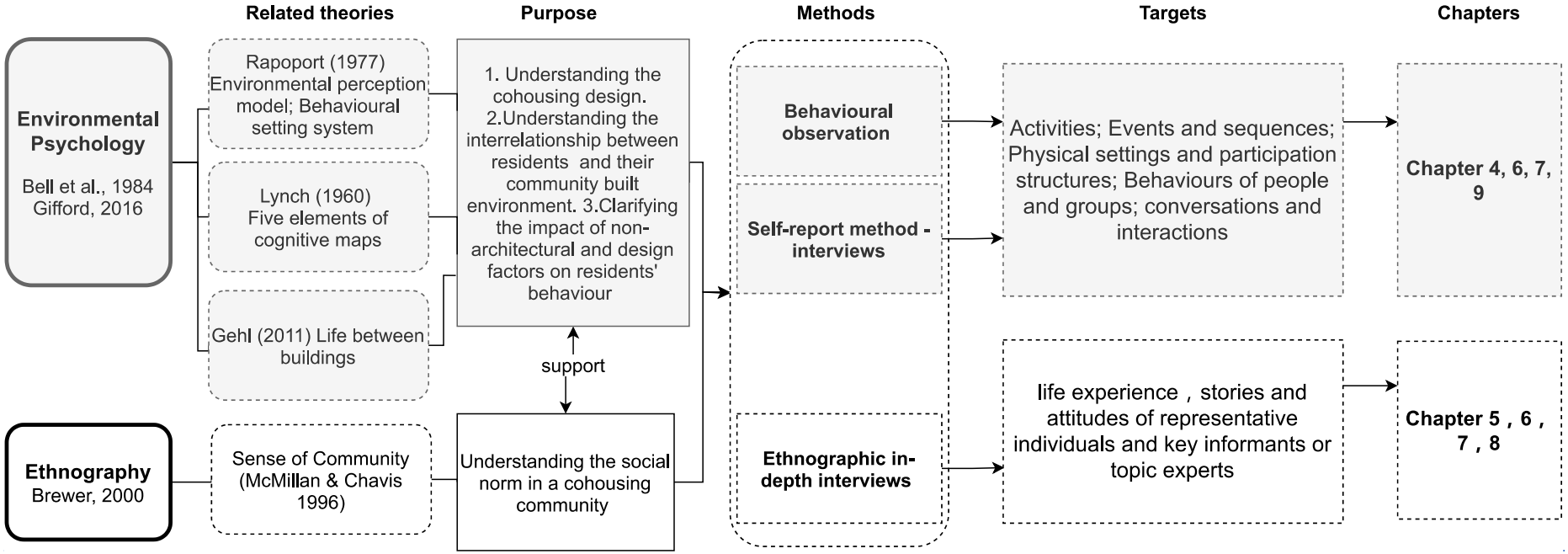



Figure 2-6. The interrelation of selected theory

## 2.6 Limitations of Cohousing

This section will summarise the limitations from existing research on cohousing. The views of cohousing living from various researchers are compared. This section enables a systematic and comprehensive understanding of the cohousing model and contributes to future research.

Regarding current cohousing research, only the positive aspects of cohousing are well-explained within published work. However, potential drawbacks to cohousing remain. It is necessary to highlight and understand these problematic aspects of cohousing for practice and policy reasons. According to Chiodelli and Baglione (2014, p.27) and Riedy et al. (2018), cohousing is interpreted as a creative form of private dwelling. Researchers have provided detailed arguments about the limitations of cohousing, namely by introducing territory-based organisations, internal community management, financial obstacles, cohousing for older people and wider support and audience.

### 2.6.1 Territory-based Organisations

The limits of territory-based organisation can be summarised as urban planning restrictions. Specifically, due to the concerns about densification and car parking impacts, one further barrier is the public perception of cohousing and its impact on local amenities (Riedy et al., 2018). Car parking is a common issue for cohousing site planning. The location and size of the parking area can directly affect group members' quality of life, and this issue invariably attracts conflicts between group members, architect(s) and developers. In addition, due to the specific ocial structure of cohousing groups, a cohousing community may become a gated community and thus become very isolated from the surrounding neighbourhoods (Chiodelli & Baglione, 2014).

### 2.6.2 Financial Obstacles

According to Riedy et al. (2018) and Brenton (2013), finance became a key barrier to cohousing members due to the high costs of land. Some communities are unaffordable

for the potential buyer depending on the size and location of the community, group members' income levels, education level, and degree of customisation. For example, some residents prefer luxury-brand / higher-priced appliances and construction materials (Garciano, 2011). Due to the shared basis of a cohousing community, although some cohousing members did not use certain common facilities, they could not avoid paying or sharing the dues since they are part of the community (Garciano, 2011).

### 2.6.3 Cohousing for Older People

It is widely known that cohousing can be a housing option for older people. However, as indicated by Garciano (2011), the cost for extra care services from caregivers and outside help for older people who choose to live in cohousing may be unaffordable. Cohousing financial and social systems are not flexible enough to adopt the extra care services from outside the community. For example, there is no plan and extra room to accept a carer to live in the community and provide long term care services (Coele, 2014). In addition, the traditional view of public pensions might be hard to change in the UK; more work is needed to 'educate' older people to adapt the cohousing concept and believe in the cohousing scheme (Brenton, 2013). Besides, if older people decide to live in a cohousing community, this may lead to less contact with family members (Fromm, 2000, p.105).

### 2.6.4 Wider Support and Audience

The audience of a cohousing community is influenced by the social, ethnic, and ideological homogeneity of society. Put precisely, "cohousing communities tend to comprise of white and well-educated middle class people" (Chiodelli & Baglione, 2014, p.27). In other words, it is lacking access for wider social groups. Lietaert (2009, p.580) has argued that:

> "20% of households in the cohousing community are built for people at the margins of society, such as long-term unemployed people or older people who cannot look after themselves. There is the risk that cohousing movement

will remain to a great extent an elite phenomenon and will not develop its full potential for society at large".

On the one hand, it is due to a lack of leadership at the national level and unwillingness to innovate towards cohousing (Brenton, 2013). On the other hand, cohousing needs more involvement and support from public authorities to help low income families and individuals (Lietaert, 2009). Vestbro and Horelli (2012) support this idea: "Cohousing as a supportive form of dwelling needs a new strong movement that is willing to act for models on the neighbourhood level that are accessible to all class".

## 2.7 Conceptual Framework

By summarising the literature review, this study produced a conceptual framework to guide the following research procedure (Figure 2-7). The aim of the conceptual framework is to make the research findings more meaningful, acceptable to theoretical constructs in the research field, to explain the path of a research and offer the foundation for establishing its credibility (Adom et al., 2018). Different from the theoretical framework (mainly based on theories in the literature), the conceptual framework is the researcher's own structured research model / plan to answer the research questions. It is based on the key concepts or main variables of the study and aims to logically show how the research will be undertaken (Adom et al., 2018). Based on this definition, this section will explain the conceptual framework of this cohousing research through its 'concepts' and 'research procedure'.

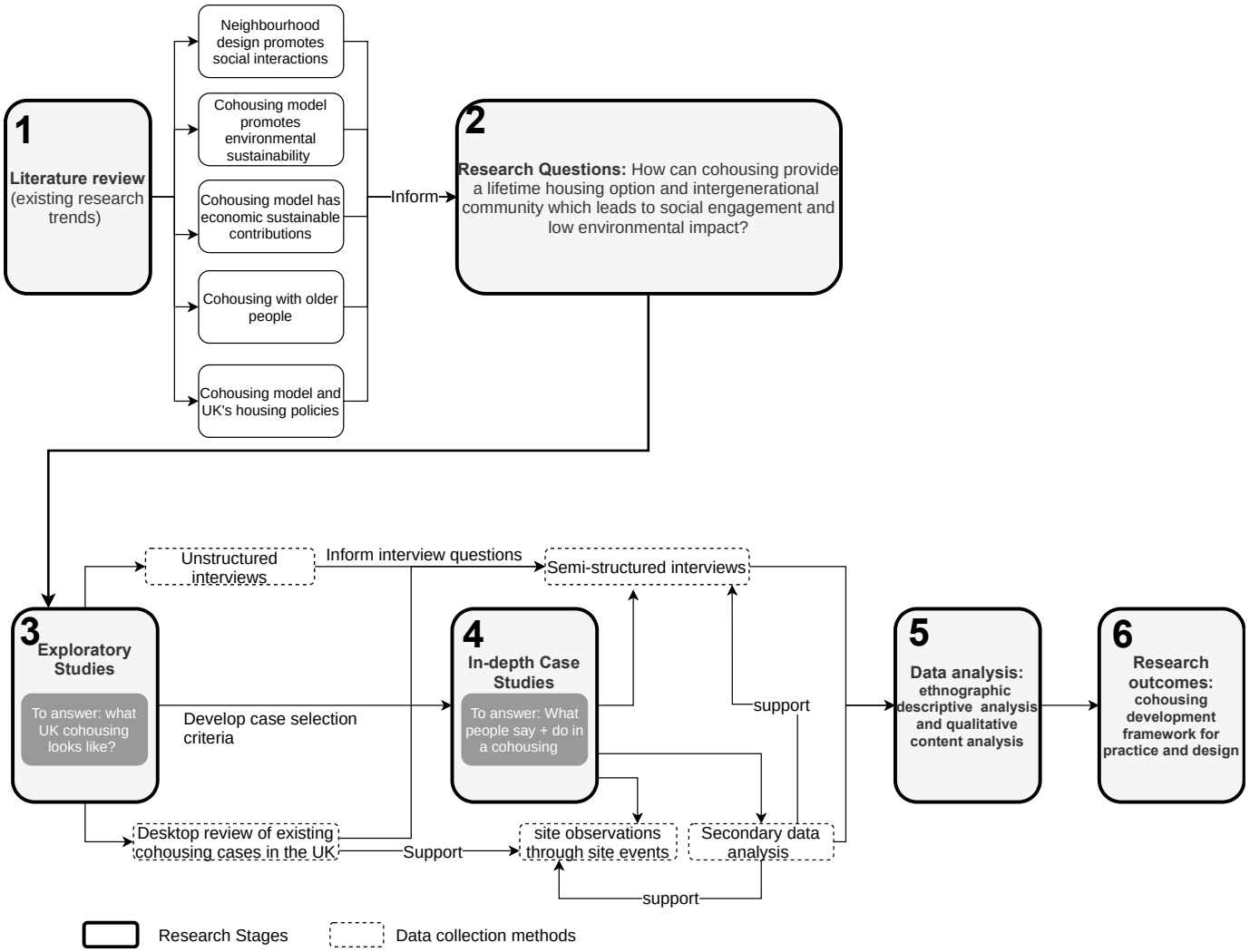



Figure 2-7. The conceptual framework

Figure 2-6 shows that the study has six research stages (noted by the numbers 1-6). The research started with a literature review. This is the foundation of this conceptual framework because it shows 'what has been done' in the cohousing research field and offers the main research directions for the study. After examining a large number of cohousing literature and theories, the study identified five research trends of existing cohousing studies:

- Neighbourhood design promotes social interactions;
- The cohousing model promotes environmental sustainability;
- The cohousing model has economic sustainable contributions;
- Cohousing and older people; and
- Cohousing and the UK's housing policies.

These trends helped the study locate the research gaps and define the research questions. Extant literature showed that studies on cohousing have been fragmented. Very few studies comprehensively evaluated the relationships between cohousing neighbourhood design and environmental sustainability, or its social patterns. This research gap informed the final research questions (see stage 2 in Figure 2-6) and also identified the two main stakeholder groups: the designer group (architects); and the user group (residents).

The data collection stage was designed in two phases: exploratory study (pilot studies); and in-depth case studies (stages 3 and 4). The interview data was collected from both project architects and cohousing group members (current residents and pre-residents). The secondary data was provided by the selected communities and project architects, including design reports, group meeting minutes, published books and client brief documents. Due to the limited literature on cohousing studies, the exploratory study aimed to answer the question 'what does UK cohousing looks like?' through site visits and unstructured interviews with cohousing residents. This step was fundamental to exploring the second phase on interview questions and case selection criteria. In

phase 2, semi-structured interviews, observations and secondary data analysis were selected as complementary data collection methods to identify the relationships between cohousing physical environments and residents (e.g. physical environment shapes social activities; social interactions and sense of community in a cohousing setting). The secondary data (e.g. design reports, project publications, group meeting minutes) were collected from the selected cohousing cases. This type of data aimed to supplement and corroborate the findings of the interviews and site observations.

In order to produce a cohousing framework to support future community design and policy making at the end of the study, Qualitative Content Analysis (QCA) and ethnographic descriptive analysis are considered as appropriate data analysis methods (stage 5). QCA will be used for analysing the interview and secondary data sets, and ethnographic descriptive analysis will be applied for explaining the findings of site observations. These methods are featured to identify the main domains, categories, and themes, as well as the relationships among themes. Various coding techniques will be applied including open, selective, axis, and quasi-statistical coding methods (Saldana, 2013; Robson ,2011). The core themes produced by the content analysis are the starting point for developing the final cohousing framework (stage 6). Secondary data categories are then developed by the further analysis of interview and observation data.

## 2.8 Conclusion

This chapter presented a review of the literature surrounding the cohousing model in relation to the living experiences of the cohousing residents and its contribution to sustainability. This chapter also guided the further fieldwork and primarily focused on five themes of the cohousing model. They included definition and background, sustainability evaluation, cohousing with older people, theories of community practice and design and limitations. The literature showed that there were a growing number of cohousing communities in the UK mainly due to social isolation, environmental needs,

and financial obstacles. The literature revealed that the cohousing model has the potential to provide a lifelong housing option and intergenerational community, leading to social engagement and low environmental impact. It also showed that cohousing could be an alternative housing option for older people. The limitations of this type of living were also discussed and analysed, showing that the cohousing model still faced various financial and internal management issues, and that this living model needed more involvement and support from public authorities and local governments. The next chapter examines the research methodology and selected methods for the study.

# Chapter 3 : METHODOLOGY

## 3.1 Introduction

The term methodology refers to “The theoretical, political and philosophical backgrounds to social research and their implications for research practice and for the use of particular research methods” (Robson, 2011, p.528; See also, Petty et al., 2012). This chapter presents the methodological approaches employed throughout this PhD study, a social science research carried out through multiple disciplines including architecture, urban design, community theories, and sociology. Further, this chapter aims to provide an overview of the approach to this research and a description of the methodology employed to reduce the research gap. This chapter starts with a description of the research aim and objectives, before discussing theoretical perspectives, research approaches, methodology (case studies), followed by data collection methods, data analysis and data visualisation. The development process of the cohousing framework is described at the end of the chapter.

### 3.1.1 Research Aims and Objectives

According to the research gap defined by the literature review, research questions were developed to refine the research area:

- Are cohousing communities feasible and can they lead to sustainable and low carbon lifestyles?
- What are cohousing communities and why are they important?
- Why do people choose to live in a cohousing?
- How do cohousing residents interact with each other and how does cohousing design affect their daily lives?
- What are the drivers and barriers of cohousing design in the UK?
- What are the ways to maximise cost efficiency in a cohousing community?

The corresponding objectives of this study were determined:

- To establish how cohousing can contribute to an environmentally friendly sustainable living environment.
- To identify the main attributes, characteristics and manifestations of cohousing in the UK.
- To explore the motivations of cohousing members to enter or create a cohousing group.
- To establish how cohousing design contributes to a sense of community and may lead to social cohesion and behavioural change.
- To explore the principles, considerations and elements of cohousing design.
- To establish how to achieve economic sustainability in a cohousing environment.

## 3.2 Understanding the Social World

Before starting the study, it was both necessary and fundamental to clarify the personal understanding, as a researcher, of how the world is constructed and what is the role of science. The research was conducted by believing that the world is socially constructed; and that science is driven by human interests (Easterby-Smith, 2012). Additionally, this study supported the views of constructivists, acknowledging the interactions and relationships between subjects. So as a researcher, I believe that:

> "Truth and meaning do not exist in some external world, but are created by the subject's interactions with the world. Meaning is constructed not discovered, so subjects construct their own meaning in different ways, even in relation to the same phenomenon" (Gary, 2004, p.17).

This study was driven by an interest in the study of 'lifeworld' human experiences and aimed to explore the construction of the individual's world. This was a crucial factor which led to the most appropriate research methods being selected.

### 3.2.1 Epistemology and Ontology

According to Crotty (1998) and Gray (2004, p.16), "Ontology embodies understanding *what is,* epistemology tries to understand *what is means to know".* Epistemology offers a philosophical background for constituting what kind of knowledge is adequate and explores whether the social world can and should be studied by using the same principles and procedures as natural sciences (Bryman, 2012; Gray, 2004). The detailed epistemological research process for this study was guided by the 'research onion' metaphor (see Figure 3-1).

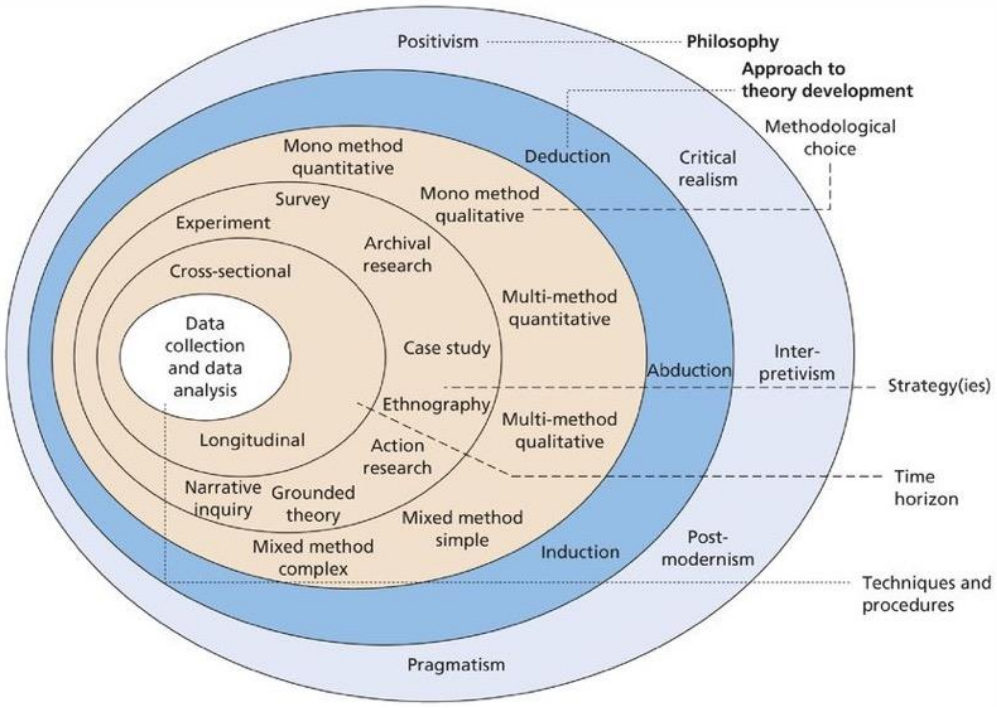



Figure 3-1. Research onion
Source: Saunders et al. (2012, p.128)

This research was originally situated in the constructivist tradition because of personal belief. According to the research questions and objectives, the position of this study fell in the sphere of interpretivist paradigm. It was decided that an inductive approach should be applied in this study through case studies. The methods of this research were divided into data collection and data analysis categories using multiple qualitative methods. Semi-structured interviews were applied to collect the research data, then qualitative context analysis was employed to analyse and visualise the research data.

The research methodology is outlined in the following flow chart (Figure 3-2).

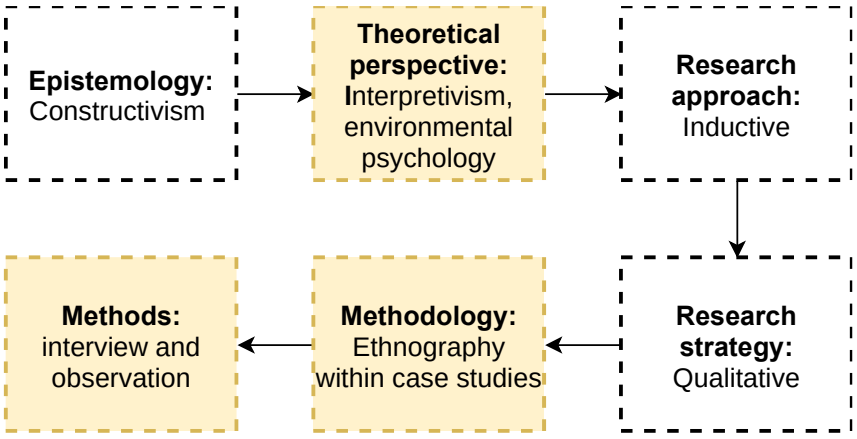



Figure 3-2. Research methodology map

### 3.2.2 Theoretical Perspectives, Research Strategy and Approach

Theoretical perspective is an abstract of beliefs and ideas that could inform an entire research. As widely recognised, the methods of social science and natural science are different (Gray, 2004). This research holds a view on the social science field, whilst paying attention to the experiences of the individuals in the built environment in order to explain how people interact with their surroundings (the physical and human environments). The theoretical perspective of this study is interpretivism.

The cohousing model emerged as a new type of living. Hence, very limited cohousing theory was found in the research area. According to the research background and research questions, this study employed a 'bottom-up' inductive approach which focused on the existing facts and aimed to generate a robust framework based on the data. Why was a qualitative research been chosen? First, this research strategy attempted to understand people's lives, lived experiences, behaviours, emotions, and feelings as well as social movements, cultural phenomena, and interactions between generations (Strauss & Corbin, 1998). Second, it is about the nature of the research problem. This type of research offers more opportunities to explore the differences and similarities of people's lives and to find out the actions and thoughts of people (Strauss

& Corbin, 1998). Finally, qualitative methods can be applied to explore the research area and gain novel understanding (Stern, 1980). In sum, qualitative approaches were deemed the most suitable way to conduct this study. The following sections present the research design in detail, to establish how cohousing may contribute to sustainable environments and communities along ecological, social, and economic dimensions.

### 3.2.3 Nature of the Research: Social Research

The term social research represents the research topic which relates to social scientific fields, such as human geography, behaviouristics and social policy, which involves research that pays attention to social sciences for conceptual and theoretical inspiration (Bryman, 2012). Compared with the natural science research (quantities and measurable characteristics), social sciences focus on the dynamic interface between people, their societies, and cultures (Singleton et al., 1988). The rationales for doing social research are: 1) filling the knowledge gap in the literature; and 2) "when there is a development in society that provides an interesting point of departure for the investigation of research question" (Bryman, 2012. p.5). This social science based study mainly focused on how cohousing communities could contribute to sustainable living in ecological, social, and financial dimensions. This topic closely associated with the impacts of living in a special built environment. This type of living challenges the traditional way of living and magnifies the advantages and disadvantages of the social aspect influences. This research covered the planning, development, and post-occupancy stages of the cohousing model, with the aim to trace the relationships between group members, public and private spaces, natural settings, and social structures.

## 3.3 Research methodology

As discussed in the last chapter, the research methodology is guided by two theories which selected for study: Environmental Psychology theories (Behaviourism perspectives) and Ethnography. The former focuses on understanding the human-

environment relationship and residents' behaviour, whilst the latter is used to explore group culture, social norms, values, beliefs and attitudes towards sustainability. On this basis, the position of the research also supported by urban theories and SOC theory. These foundation theories complement each other, and they are also useful to explain the philosophy of cohousing communities, including why it exists, how it is designed and maintained and how cohousing design contributes to sustainable living. The detailed data collection methods are explained below (Table 3-1).

### 3.3.1 Environmental Psychology

Based on the uniqueness of each cohousing communities developmental process and internal management strategy, a case study approach was deemed the most suitable for this research. Supported by environmental psychology, the key purpose of conducting case studies is to explore and understand the meaning that individuals or group(s) ascribe to a phenomenon (Steg and de Groot, 2019). As identified in environmental psychology theories (Van Maanen, 1988; Steg and de Groot, 2019), many behavioural needs of building users are not always considered in the building design, also the design intentions of architects are not explained to most users. By acknowledging this gap, a social design approach is adapted in this research; it is distinguished as a small-scale, human-oriented, and democratic approach which aims to bridge the gap between architects/building designers and users (Sommer, 1983). To this end, the study includes both parties (architects and building users) of the design process into the research and paid special attention to the future building occupants (future cohousing residents). Specifically, this was accomplished by interviewing architects, current cohousing residents and future cohousing residents, investigating their expected needs in various areas of the cohousing community, how the common space (e.g. common house) is going to be divided and used and whether any special requirements exist among them (e.g. different building design standards applied for supporting older residents).

### 3.3.2 Ethnography

Ethnographic methods work well within case studies because they focus on a single entity. However, conducting ethnographic research in each case is time-consuming because of the considerable time needed to understand the dynamics of participants' interactions, how they related to the physical environment and distinguish what are important to them (LeCompte et al., 1999). As identified by LeCompte et al. (1999), ethnographic research could be carried out for defining embedded problems, complex systems, or sectors, clarifying a range of settings associated with unclear problems, or documenting a process/trend. In this study, ethnographic theories were selected for exploring approaches to capture and interpret the social and living patterns of the cohousing community residents. Therefore, in addition to interviewing the architects and residents in cohousing communities, participant observation is another fundamental data collection method of conducting ethnographic research. The biggest difference between ethnographic participant observation and other types of observation techniques is that ethnographic participant observation requires the researcher to be involved in and recording the routine daily activities with people in the field setting rather than only as an observer (Schensul et al., 1999). According to Bogdewic (1992), participant observation provides opportunities and advantages, including the opportunity to witness events that outsiders would not have access to, and to participate in activities that might be hidden from the public, or to join activities that groups use to maintain a special group identity. In this study, participant observations were conducted closely with cohousing residents through a volunteering experience. Working closely with cohousing residents and participating in the common meals, vegetable and herb planting, fruit picking, and collective community maintenance proved essential opportunities to understand the group culture, daily routines, and social patterns.

Table 3-1. Theoretical perspectives and methods

| Disciplines | Definition and Focus | Main Data Collection Methods | Methods selected in the study |
|---|---|---|---|
| Environmental psychology | "Environmental psychology is primarily interested in the interaction between **humans and the built and nature environment;** it also explicitly considers how the environment influences behaviour as well as which factors affect behaviour that can help improve environmental quality." (Steg and Groot, 2019, p4) | - Behavioural observation<br>- Self-report measures: interview/ questionnaire<br>- POE | - Behavioural observation;<br>- Interviews with architects and cohousing residents to evaluate the relationship between community environment, design factors and cohousing residents. |
| Ethnography | Ethnography means writing about **the culture of group of people.** (LeCompte et al. 1999, p21). It aims to capture the social meanings and ordinary activities，and also address people's beliefs; attitudes; perceptions; emotions; verbal and nonverbal means of communication; social networks, involving researcher participating directly in the setting (Brewer, 2000) | - Ethnographic in-depth interviews<br>- Participant observation<br>- Spatial mapping | - Ethnographic interviews;<br>- Participating in community activities as a volunteer; observation conducted while participating common activities (e.g., common meals) with cohousing members. |

## 3.4 Type of Methodology: Case Study

According to Yin (2009), the case study is a research method focused on contemporary phenomena within a real-life context; it is a significant inquiry especially when the boundaries between fact and theory are insufficiently clear. Adopting a case studies approach enables an in-depth understanding of the phenomenon that can be based on any mix of quantitative and qualitative approaches (Rowley, 2002). Typically, data is gathered from a variety of sources by using several different methods such as observations and interviews (McLeod, 2008). However, case studies as a commonly used social research method have been questioned as lacking rigour and objectivity compared to other social research methods (Rowley, 2002). This is the fundamental reason why social researchers thinking very carefully about adopting case-study research design, testing and validation. However, case studies are commonly adopted because they could provide insights that might not be achieved by other research approaches (Rowley, 2002). The earlier expression of case studies can be found from Eisenhardt (1989, pp.548-549):

> "This type of work is highly complementary to incremental theory building from normal science research. The former is useful in early stages of research on a topic or when fresh perspective is needed, whilst the latter is useful in later stages of knowledge".

In this research, the case study approach aimed to identify features and various interactive processes of the research (Bell, 2010); and to show how cohousing communities may affect the implementation of sustainable environments and influence people's thinking and behavioural changes.

### 3.4.1 Why Case Studies?

Yin (2014, p.4) suggested that "the more the research questions seek to explain some present circumstance, the more that case study research will be relevant". In other words, case studies allow the investigators to understand a 'case' in the real world.

Besides, as compared with other social research methods (e.g. experiment, survey, archival analysis, and history), case studies are helpful to seeking answers to ‘How?’ and ‘Why?’ questions, particularly for exploratory, descriptive, or explanatory research (Rowley, 2002). As ‘How?’ questions led this research as a main research question, case study research was deemed the most suitable method to theory building of the cohousing model. In this study, alternative cases guided the researcher to understand different types of cohousing communities, how they worked, their limitations and how community living influenced people’s real lives. Moreover, case study could combine the theories with reality and be part of a wider range of evaluation. Data gathered from the residents and architects can play an important role, with the findings helping to refine the contexts and conduct further research.

Case study research is well-developed and commonly used in social science research as a method to explore and help understand wider phenomena (Berg, 2001; Creswell, 2017; Yin, 1994). Additionally, it is an empirical inquiry that investigates both historic and contemporary settings (Groat & Wang, 2013; Johnson & Harris, 2002). In this study, the selected eight cohousing cases included established cohousing projects, cohousing projects under construction, cohousing in the planning stage, urban cohousing, cohousing in rural areas, intergenerational cohousing groups, and low impact affordable cohousing. Different types of cohousing were involved in this research to maximise the commonality of people choosing a cohousing way of living and better understand ‘cohousing philosophy’ among various developments. The selection of cohousing cases was largely affected by the data accessibility of the community and site location. The overall case study design for this research is illustrated through the case study procedure (Figure 3-3). It shows that the study had three phases: exploratory studies; in-depth case studies; and analysis and framework development. The detailed explanations of each phase are discussed in the following sections.

## Multiple Case Study Procedure

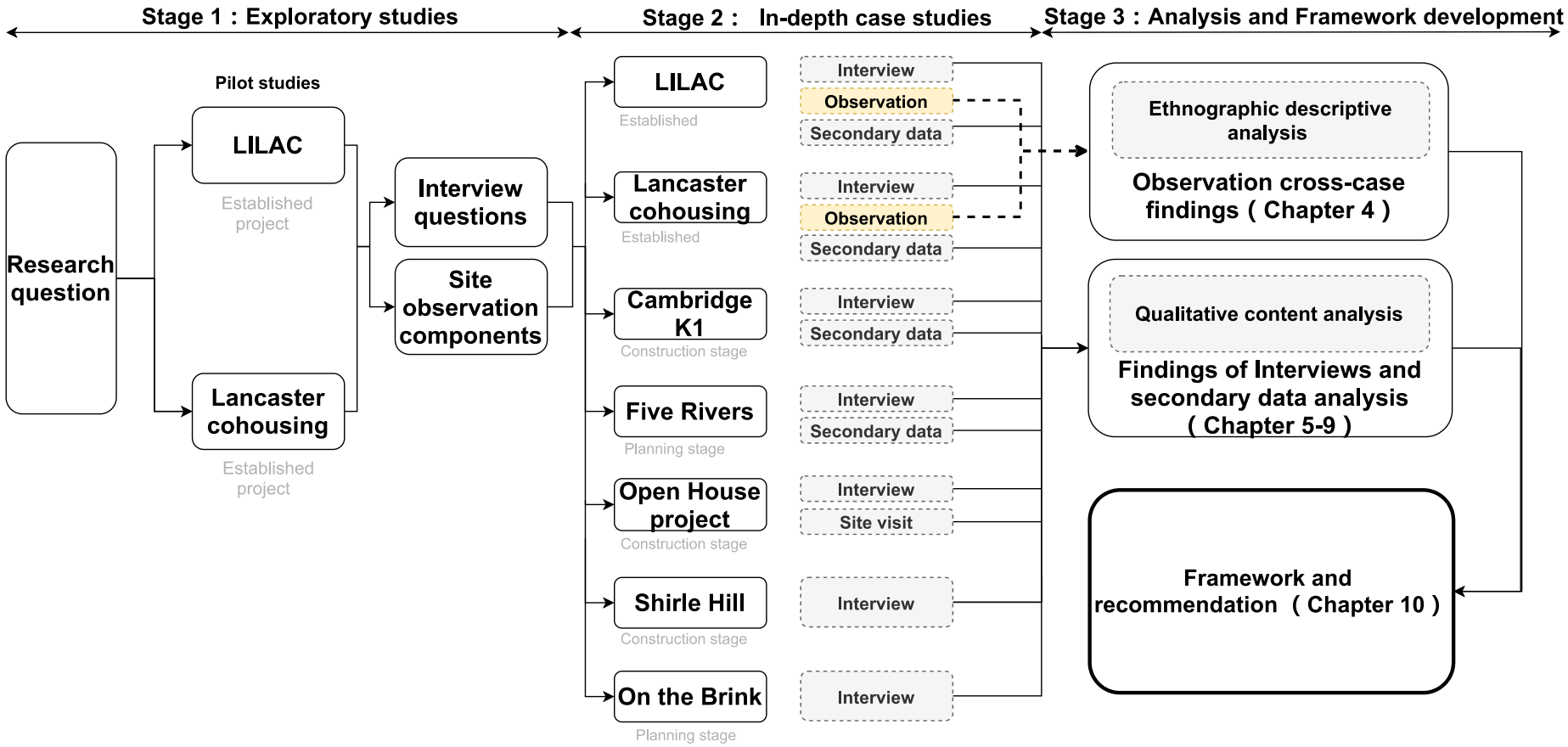



Figure 3-3. Multiple case study design

### 3.4.2 Selection Criteria

This section discusses the case study selection criteria. Case selection here was not only determined by the research aims, questions, propositions, and theoretical context, but also by considering data accessibility from individuals or organisations, resource availability (support travel and analysis costs), time availability (Rowley, 2002), site locations, stakeholder engagement and case concepts. The selection criteria were established through the literature review (Chapter 2).

#### *3.4.2.1 Selection Criteria for Exploratory Case Studies*

As beginning stage of the research journey, the exploratory case study aimed to explore the rich details of community living in the UK. Therefore, the researcher only picked the cases which were established and started functioning into consideration. Urban and rural cohousing were both considered. Cohousing sites with sustainable features (e.g., sustainable building techniques, sustainable technologies, rainwater harvesting and food growing and car sharing) were listed as a priority. In order to capture more social features or activities within the community, groups with less than 20 adults were excluded (a cohousing community is normally a group of between 15 and 40 households) (Lietaert, 2009). According to the data access and site location, the selected pilot cases were:

- Lancaster Cohousing
- LILAC Cohousing project

#### *3.4.2.2 Selection Criteria for In-depth Case Studies*

Selection criteria are characteristics that the prospective cases and stakeholders must have if they are included in the study. The inclusion criteria of the research have been considered in the following aspects:

<u>Cohousing Type, Size, Location</u>

- The concept of the case or the residents' living styles has to meet the definition of cohousing or co-operative living communities;
- The case location is in the UK and is accessible; and
- The size of the cohousing or the cohousing community can be measured.

Community Design and Sustainable Technologies

- Shared facilities and spaces (e.g., common areas, cars, bikes, washing machines, kitchen electric appliances, gardens, etc.) are included;
- Environmentally-friendly technologies (e.g. biomass, thermal mass, solar PV, timber frame, rainwater harvesting/ collection system) are included;
- Waste classification facilities are included; and
- Sustainable design standards (e.g., Passive House, Lifetime Homes) are considered or applied by group members.

Data Access and Availability

- Valuable existing data is accessible, for example, the data can be found in books, journals and reliable websites;
- Data can be collected from the case individual or organisations;
- Priority: Different age groups, various kinds of stakeholder (e.g., architects, householders, tenants and residents) are accessible; and
- The data gathered from selected cases can be fitted into data categories of 'community design features', and 'social interaction and social sustainability'.

The cases from pilot stage (stage 1) are selected again (LILAC and Lancaster Cohousing) to gain the in-depth understanding.

### 3.4.3 Selected Cases

The selected cases of the study are shown below (Figure 3-4) by following the case selection criteria. Seven cases were selected for the entire study, all located in urban or sub-urban areas. They were distributed in the middle part of England.


Figure 3-4. Geographical distribution of case study sites in the UK

### 3.4.4 Validity of Case Studies

This section represents the reasonableness or rationality of the research. The validity of the case studies has been evaluated by considering the construct validity, and internal and external validity (Rowley, 2002; Frankfort-Nachmias, 1992). The tactic of checking the case study design was guided by Jennifer Rowley (Table 3-2). Because all selected cased were running in parallel, the criteria of internal validity for causality between 3 cases were not applicable for this study. Triangulation was considered to

evaluate the construct validity of the case studies (section 3.8.1). External validity was assessed by using case study protocol (documents containing the case studies, introduces the procedures, general rules, and research stages, which was followed by conducting the case studies).

Table 3-2. Validity checking of case studies

| Tests | Case Study Tactic |
|---|---|
| Construct validity | Use multiple sources of evidence (triangulation).<br>Establish chain of evidence;<br>Have key informants review draft case study report. |
| Internal validity (NA) | Do pattern matching;<br>Do explanation building;<br>Do time series analysis. |
| External validity | Use replication logic in multiple case studies;<br>Use case study protocol. |

Source: Adapted from Rowley (2002, p.21)

## 3.5 Data Collection Methods

The methodology presents the research design to establish how cohousing may contribute to sustainable environments and communities. The approach considered in this research was based on qualitative methods, such as interviews, site visits and focus groups through case studies. The research methodologies were divided into two stages: exploratory case studies; and in-depth case studies.

### 3.5.1 Phase 1: Exploratory Case Studies

The exploratory case studies were completed in the first-year of study at the University of Central Lancashire. The research phase 1 started with the literature review and the pilot interviews of cohousing residents. These methods not only provided a general understanding of this research field but also offered different perspectives and research possibilities to the entire study. Additionally, the case study selection criteria

were established during this time period using the literature review and cohousing community websites. The criteria were also tested by considering community data access, site location, ethical issues, and other practical conditions. The two selected cases for this stage were Lancaster Cohousing and the LILAC project in Leeds. The piloting interviews were conducted through community open day tours, community working day events and volunteer weekends. The target interviewees were co-founders, architects, and residents of the cohousing communities. In order to understand and experience cohousing and community living to the greatest extent, the researcher maximised the time spent in the community by joining some common activities, including gardening, common house maintenance toward common meals with the groups' permissions.

#### *3.5.1.1 Exploratory Case Study 1: Lancaster Cohousing*

Lancaster Cohousing is an urban cohousing project, located in Halton, Lancaster, Lancashire. The phenomenological methods employed for Lancaster Cohousing were applied through an open day tour (site visit). The tour lasted about 2 hours. The unstructured interviews were conducted with cohousing residents during the tour walk in an informal manner. Two residents were involved in the interview activity. Additionally, field notes, sketches and photos were taken with community permission; collected information during site viewing included site layout, uses of common space, uses of common facilities and tools, sharing (e.g., meals, transports), personal or communal activities (if available), sustainable technologies, waste management, financial information and the feelings of community living.

There were two parts to the data analysis, social and environmental. Both were processed based on the community site plan, and community environmental features were marked on the field map. For the social aspects, the community social features were analysed by considering the distribution of common, private, and semi-private

zones in the community and also the activities that happened in the common area. During the limited time of the visit, the social activities (e.g. greeting, talking, reading in the common house) and living patterns were captured and illustrated. For the environmental aspects, the analysis drew upon the efforts made from the residents towards sustainable living, such as the design of the heating system and car sharing.

#### *3.5.1.2 Exploratory Case Study 2: LILAC Cohousing Project*

LILAC Cohousing is an urban cohousing project, located in Leeds, Yorkshire. The phenomenological methods used in LILAC Cohousing were applied through a one-day site visit. Information gathering activities included a volunteering landscape session, bring-a-dish common meal, site tour, a workshop, and informal unstructured interviews. The entire site visit lasted about 8 hours.

During the landscape session, the researcher joined the community members as a volunteer to help them to do some community work, such as gardening, cleaning the pond, helping to prepare a common meal, and repairing the stone stairs in the common area. During this session, the researcher paid attention to the following:

- How was community work distributed? Working in teams or as individuals?
- The hierarchy of community management; and
- How did the individuals or working teams interact with each other?
- Any community physical features in the common area promote social engagement?

In addition, the researcher also gathered information through other activities:

- Site layout; uses of common space (site tour);
- Sustainable technologies and waste management (site tour);
- Community members eating behaviours and preferences (common meal);
- ‘Boundaries’ between private and public areas in the community setting (workshop); and

- Financial information (workshop).

Field notes, sketches and photos were taken with the community's permission. Information was processed and analysed visually using the community site plan and mapping techniques to illustrate the relationship between the occupier and their physical environment. Community environmental and social features were marked on the field map. In particular, the data collected on-site were analysed by mapping the distribution of common, private, and semi-private areas, and evaluating quality of outdoor spaces, as well as understanding work-distribution and interactions between landscape working teams, feelings of the shared meal, interpreting the openness and closure of community living and understanding the definition of 'soft edges' in the community and how people connected through them.

### 3.5.2 Phase 2: In-depth Case Studies

The aim of this stage was to develop a model that could fill the knowledge gap, indicate the contemporary tendency of cohousing communities, and offer lessons to future cohousing initiatives. This was achieved through in-depth case studies and framework development. The research methods involved in this phase were interviews, secondary data documentary work and observations.

#### *3.5.2.1 Interview*

This stage focused on in-depth case studies in seven locations in the UK. This involved interviews with two groups of stakeholders: architects; and cohousing residents. Interviews were conducted on-site with the residents (founder members, new members, pre-residents, and tenants) and architects. A set of open-ended questions (11 questions) were used to elaborate on the opinions and views of the participants who were involved with the project. The interviews in each case were semi-structured in nature. The use of semi-structured interviews in this study allowed the researcher to 'probe' for more detailed responses when the respondent(s) were asked to clarify what

they had said. This allowed participants an opportunity to reflect on the interview activity and to be able to discuss the aspects which went beyond the scope of the interview questions (Bryman, 2012; Gray, 2004). Semi-structured and unstructured interviews are widely used in qualitative research design (Robson, 2011). Compared with the unstructured-interview, on the one hand, semi-structured interviews has an interview guide which has more control to cover all targeting topics. On the other hand, it is more flexible to follow up on what the participant says without the limitation of wording and order of the interview questions.

The interview process started when the researcher contacted the cohousing communities through their official website with an interview request. Participants who took part in this research were recommended by the community. Participant samples were selected according to ease and convenience. Subsequently, the snowball sampling method was applied, where participants nominated other potential participants within the cohousing project (Petty, 2012). All participants were invited to join the study voluntarily. If the participant was willing to take part in this research but was unable attend in person on site, a telephone-interview was used instead. The length of the interview was 40-60 minutes, with conversations tape-recorded with interviewees' permissions. Between 2-5 people were chosen for the interview for each selected case. Twenty-two people were interviewed within the seven selected cases.

#### *3.5.2.2 Secondary Data Documentary Work*

Secondary data is a type of data which is collected by someone who is the person other than the user, and the data has already undergone analysis (Goodwin, 2012; Vartanian, 2011). Common sources of secondary data include censuses, surveys conducted by government departments and organisational records; secondary data is also available from other sources, such as published sources, websites, open access sources and internal sources (Vartanian, 2010). In this study, the sources of secondary

data included design reports provided by architects (or architectural companies), project/ clients' briefs, cohousing member handbooks, group vision and mission statements, project development procedures from original websites, cohousing project design group meeting minutes, and other published documents, such as books and academic journals. The documents were collected and grouped by cases; the same type of information was compared and analysed between cases using qualitative content analysis methods (see Section 6). Secondary data is very important for data enrichment, and the precision of the research is improved by adding key attributes and values (Gibson & Brown, 2012). The purposes of the documentary work were to fully understand the individual case. At the same time, secondary data can provide a baseline for comparing primary data, for example, explaining the findings (what the researcher has seen and felt in cohousing communities) of doing desktop review in the deeper level at Phase 1. Finally, a comparison between primary and secondary data can reveal gaps between the planning stage and the reality of the project, for example, if certain goals of project cannot be achieved, the reasons behinds it can be the latent content, and this has the potential to improve future cohousing development.

#### *3.5.2.3 Observation*

The site observations were guided by a theoretical framework. This framework was developed based on the related theories. It consisted of two steps: theoretical concepts; and observation components (Figure 3-5). Two cases were selected for in-depth site observations, LILAC, and Lancaster Cohousing. As a cross-disciplinary research, multiple theoretical concepts were extracted to guide the site observations dependent on the literature review and pilot studies (Figure 3-6). Next, a detailed observation component list was developed to lead data collection for each case (Figure 3-7). All components were classified into three categories: 'design'; 'ecological sustainability'; and 'social pattern and interaction', that aligned with the research question and sub-

questions. The site observations were carried out by taking site notes and photos through open day events.

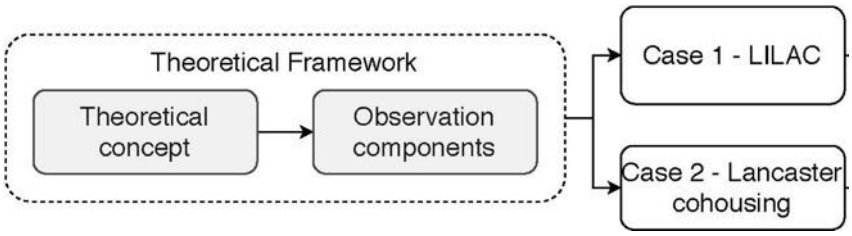



Figure 3-5. Procedure of site observation

| Theoretical concepts | Case 1: LILAC | Case 2: Lancaster cohousing |
|---|---|---|
| **Jan Gehl: Life between buildings** | | |
| Boundaries between public and private area | ● | ● |
| 'Public -private' indicates 'front-back' | ● | ● |
| Soft and hard edges | ● | - |
| **Kevin Lynch: The image of the city** | | |
| Nodes, edges and paths | ● | ● |
| **Amos Rapoport: Human aspects of urban form** | | |
| Public and private domains | ● | ● |
| Components of environment quality | ● | ● |
| Behaviour setting system | ● | - |
| **McMillan & Chavis: Sense of community** | | |
| Group influence | ● | ● |
| Shared emotional connection | ● | ● |

Figure 3-6. Theoretical concepts for case studies

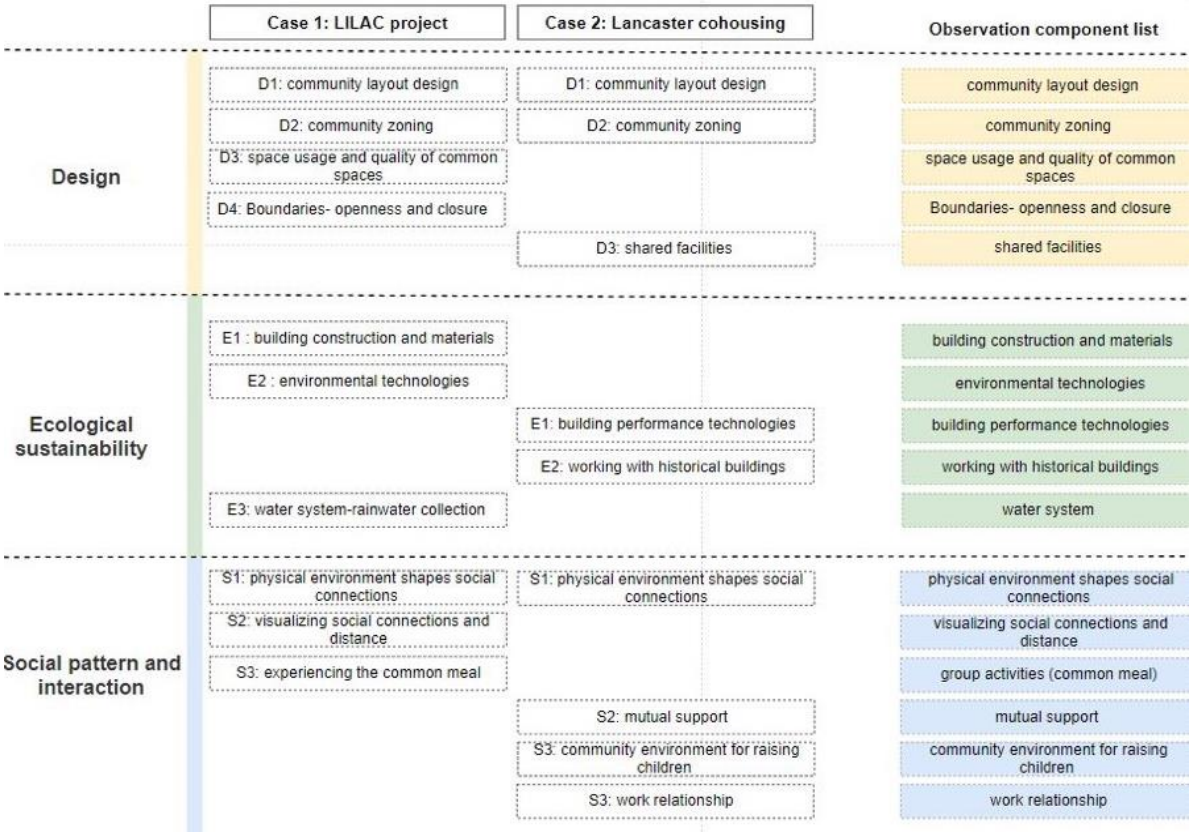



Figure 3-7. Site observation components

### 3.5.3 Relationship between Phase 1 and Phase 2

Figure 3-8 shows the correlations between phase 1 and 2. The information gathered from phase 1 through informal interviews and desktop review was valuable for developing well-structured interview questions for phase 2. The personal experience in cohousing communities can be explained and developed further by interviewing different stakeholders. Additionally, the secondary data interacted with the observation experience to enrich the findings.

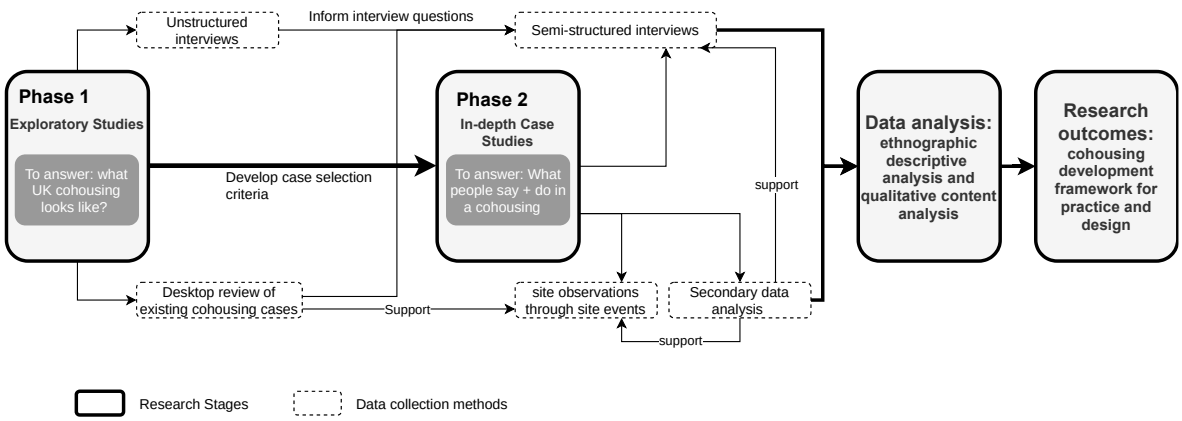



Figure 3-8. Relationship between phase 1 and phase 2

## 3.6 Ethics Process

The research interview activity was approved by the University of Sheffield Ethics Committee on the 12th January 2017. The data collection process followed the University's code of practice and ethical guidelines to recruit participants and used a Participant Information Sheet (PIS) and Consent Form (CF). The PIS was used to explain the background information of the study, research phases, participant recruitment, voluntary participation mechanism, research funding, researcher information and complaint contact details. The CF informed the participants that their confidentiality and anonymity would be maintained throughout the study. No personal information (e.g. names, email addresses, and telephone numbers) was used in any research papers, reports, and thesis without the participant's permission. Additionally, no identifiable information (e.g. name, income capability, age, family conditions) collected during the interviews of participants were used. Furthermore, the interview data were fully transcribed after the interview, and the audio recordings were not used directly in the research files or shared online.

When using the telephone interview, the researcher would email PIS and CF to the participants at least one day before the interview so the participants would have

enough time to read and sign it. Then, they gave their written/ oral consent to take part in this study before the interview started.

The language (verbal and written information) were given in English, and the academic terms were adequately explained (e.g. through examples) for each participant in order to make sure the participants fully understood the information and process. The data was not stored or transferred through unreliable network locations. Non-electronic records were safeguarded at all times and not left unattended or in view of unauthorised people. Laptops, USB sticks and other devices, papers or any other form of personal data were stored securely in file cabinets on university premises.

## 3.7 Data Analysis Methods

The nature of qualitative analysis can be demonstrated as a circular process (see Figure 3-9). Precisely, data can be broken down into smaller parts and units, connections and correlations can be explored between concepts, providing the foundation of new descriptions (Dey, 1993; Gray, 2004). There are several approaches that can be used to analyse the qualitative data. Robson (2011) summarised three approaches for qualitative data analysis: the quasi-statistical approach; thematic coding; and grounded theory. Similarly, Gray (2004) identified two main analytical approaches: content analysis; and grounded theory. He also pointed out specialised competing approaches, such as conversational and discourse analysis.

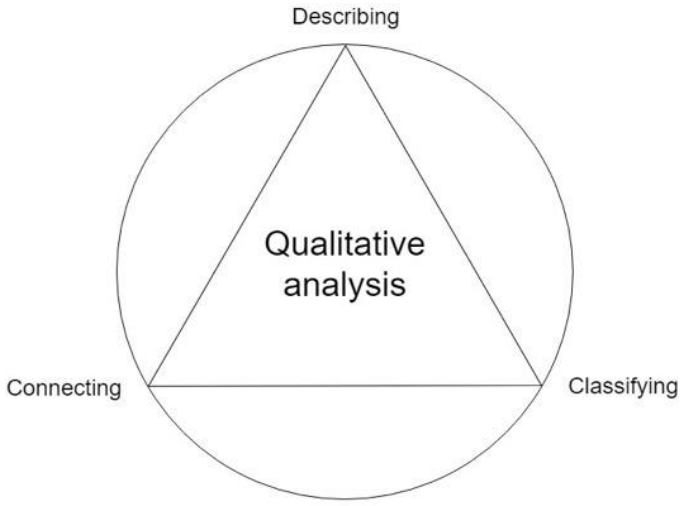



Figure 3-9. Qualitative analysis process

Source: Dey (1993)

The quasi-statistical approach is typified by content analysis, which uses word and phrase frequencies to measure the corresponding importance of the concepts and phrases. Thematic coding mainly represents that all or part the data are coded or labelled, and those coded with the same label are classified as a theme. Then, the patterns and correlations between themes are developed (Bryman, 2012; Robson, 2011). The grounded theory approach can be seen as a version of thematic coding, it used to generate a theory grounded in the data (Bryman, 2012; Gray, 2004; Robson, 2011).

Selecting an appropriate analysis method is fundamental to successful research. Based on the nature of qualitative research with the inductive approach, grounded theory and qualitative content analysis are considered first as both can be used to analyse qualitative data and they are designed to identify themes and patterns and involve rigorous coding procedure (Bryman, 2012; Cho & Lee, 2014; Robson, 2011). In order to choose the most suitable data analysis method for this study, the differences of these two analysis methods are summarised below (Table 3-4).

In terms of producing a framework to represent the role of cohousing in contributing to sustainable living, qualitative content analysis was deemed suitable for this study. Additionally, as influenced by ethnography theory, this study also considered ethnographic description as the analysis method for site observation. The following sections introduce the selected data analysis methods in detail.

Table 3-3.Comparison of grounded theory approach and qualitative content analysis

| **Differences** | **Grounded Theory** | **Qualitative Content Analysis** |
|---|---|---|
| Characteristics | 1. Constant comparative analysis;<br>2. Theoretical sampling;<br>3. Requiring high degree of transformation and data interpretation;<br>4. Treated as a research methodology (Crotty, 2003) | 1. A flexible method can be used in both inductive and deductive approaches in data analysis;<br>2. Allowance for analysing the manifest or/ and latent content meaning of communications;<br>3. Treated as a research analysis method (Crotty, 2003) |
| Goals and Research Outcomes | Generate a theory | Develop categories or themes and describe meanings (Moretti et al., 2011) |
| Evaluation method | 1. Conceptual density;<br>2. Theoretical sensitivity | 1. No specific evaluation methods only for content analysis;<br>2. Qualitative research criteria can be applicable;<br>- Credibility (truth value): triangulation; member checking; showing representative quotations and peer debriefing.<br>- Transferability (applicability)<br>- Dependability (consistency) |

Source: Adapted from Cho & Lee (2014)

### 3.7.1 Qualitative Content Analysis

As Schreier stated (2012, p.1), “Qualitative content analysis is a method for systematically describing the meaning of qualitative material”. Specifically, the core of

this analysis method is the “systematic classification process of coding and identify themes and patterns” (Hsieh & Shannon, 2005, p.1278). As mentioned in Table 3-3, this method differs from grounded theory approach, which aims to generate themes and patterns rather than explore the theory grounded within the qualitative data (Cho & Lee, 2014). In addition, qualitative content analysis is a flexible research method which has strong potential for social work research (Anastas, 1999; Drisko & Maschi, 2015). Mayring (2004, 2014) defined qualitative content analysis as a set of techniques for the systematic analysis of texts, addressing not only manifest content but also the themes and core ideas found in texts as a primary content. Within this approach, the meaning of the content may be expanded by identifying categories or domains that are summarised in the full dataset (Drisko & Maschi, 2015).

In this study, the data were analysed through a process of qualitative content analysis using thematic coding techniques (Robson, 2011; Saldaña, 2013). Due to the different interview questions (e.g. ‘what’ and ‘how’ questions), the analysis coding methods were slightly different depending on the breadth and depth of the foci. The following sections will introduce the applications of the two coding techniques.

#### *3.7.1.1 General Coding Techniques*

Coding is the fundamental step for qualitative content analysis. The coding process aims to arrange data in a systematic order, to make something part of a system or classification, to categorise (Saldana, 2013). In other words, the codifying process allows data to be “segregated, grouped, regrouped, and relinked in order to consolidate meaning and explanation” (Grbich, 2007, p.21). As Bernard (2017, p.338) summarised: “Analysis is the search for pattern in data and for ideas that help explain why those patterns are there in the first place”.

This study used two cycles for the coding process. The first cycle aimed to produce the main categories from the interview transcripts. Subsequently, the second cycle was applied to find the links between categories to produce the patterns within architects and residents' groups. Open Coding and Selective Coding were employed for the first coding cycle. Open Coding is appropriate for qualitative studies, as it aims to test out the theoretical possibilities in the dataset. The coded part can be a keyword, a phrase or a sentence. This could help to find the categories (Corbin & Strauss, 2014). Subsequently, the Selective Coding took place, with the aim to seek the core conceptual categories and themes to help understand the focus and priorities of the participants (Corbin & Strauss, 2014). Structural Coding and Axial Coding were chosen for the second cycle of coding. The Structural Coding technique is generally used in the identification of large datasets on broad topics (MacQueen et al., 2008). This process aimed to examine comparable segments' commonalities, differences, and relationships (Namey et al., 2008). Finally, Axial Coding aimed to reassemble data which were 'split' or 'fractured' during the first coding cycle. The number of initial codes was "reduced and sharpened to achieve its best fit" (Glaser, 1978, p.62). During this cycle, codes were sorted into categories again for further theme comparison.

#### *3.7.1.2 Quasi-statistical Coding*

This type of coding is typified by content analysis; it is a data analysis approach which uses "word or phrase frequencies and inter-correlations as key methods of determining the relative importance of terms and concepts" (Robson, 2011, p.467). However, the validity and rationality of this coding type have always been questioned. Therefore, in order to increase the rationality and reliability of the data analysis, the results were reached by calculating how many times the **key concept** (rather than key words) was **agreed and repeated** for each category and **how many people said it** in each participant group. This type of coding only applied when the interview question needed to find out certain degrees, ranking, order, or priorities. For example, exploring what

factors motivated people to join a cohousing community and which factors were the most fundamental factors for residents to make decisions. The frequency with which participants spoke about the motivations they valued is an indicator of its relative importance. The final ranking of each factor-domain concluded an overall result calculated by the sum of each concept within that domain being repeated. The domain with the highest number is the most important domain to identify residents' motivations. When the factor-domain ranking was completed for both groups, the two participant-groups ranking was then compared. The quasi-statistical data analysis process was as follow:

- Using open coding and selective coding to produce main categories and themes;
- Calculating concept frequency to produce priority themes and the order of all themes;
- Finding out within each theme which concept has been heavily repeated;
- Comparing the similarities and differences between two participant groups; and
- Displaying the findings and describing the data patterns.

### 3.7.2 Description as analysis for participant observation

As a method, ethnography is meant to refer to the process of participant observation by a single investigator who immerses himself or herself in the group for a period of time (Marvasti, 2014). Consequently, the simplest way to present observation is to describe them. Therefore, this descriptive analysis method is applied to analyse participant observations in cohousing communities. In other words, "Ethnographic descriptions are generally in sections where the authors attempt to convey the ambiance of the setting where the observations were collected" (Marvasti, 2014, p.361) The purpose of using descriptions of cohousing settings was to develop deeper meanings for the community design and spatial divisions, examine the quality of outdoor common spaces, and provide an overview of social connections and distance

from the researcher's perspective. During the data analysis process, the research concentrated on transforming field notes (and pictures) into themes, and clustering themes and looking for data patterns for cross case analysis. The was carried out through exploring the deeper meaning behind the physical (cohousing design aspects, quality of community space) and social environments (social connections, social distance, work relationship, mutual support, and environment for raising children) in the selected cohousing communities. In addition, ethnographic descriptions also included personal understandings and critical thoughts raised during the observation procedure.

## 3.8 Data Visualisation

Data visualisation means displaying data in a graphic format, which has been considered an important step particularly in the qualitative data analysis and writing up stages (Dey, 1993; Grbich, 2012; Yin, 2011). Data visualisation has the potential to portray information succinctly and efficiently, allowing the reader to acquire insights, develop a detailed understanding and new knowledge in more ways than just textually (Verdinelli & Scagnoli, 2013; Yin, 2011). It also can help in the telling of an analytical story by classifying complex concepts into simple visual summaries (Pokorny et al., 2018). The main goal of data visulisation is to deliver ready access to information, messages, or a particular perspective on a specific data or topic (Illiinsky, 2010). Because grounded theorists have acknowledged that creating visual representations can be valuable to theory building (Clarke, 2005; Strauss & Corbin, 2014), this strongly encouraged the application of diagrams and figures to articulate the theoretical concepts and their connections (Verdinelli & Scagnoli, 2013). From existing studies, the applications of data visualisation can be found in the following ways:

- In showing detailed explanations (Burke et al., 2005);
- In generating research hypotheses and developing theory (Burke at al., 2005; Mile & Huberman, 1994);

- In representing a model, framework or relationships between concepts, terms and attitudes (Verdinelli & Scagnoli, 2013); and
- In illustrating participatory and collaborative analysis (Verdinelli & Scagnoli, 2013).

According to Morse (2006), the use of visual display has been increasing in qualitative articles. The formats of data visualisation are various. Verdinelli & Scagnoli (2013) summarised the commonly used formats, such as boxed display, matrix, flow chart and decision tree modelling. In this study, the format selection of data visualisation greatly depended on the coding pattern, interview question and the findings of the study. The selected data displayed types were flow chart, Venn diagram, network, taxonomy, and mapping (using the site plan or district maps). These types of formats were used in different stages of the study, for example, applied during the literature review stage to illustrate existing trends in cohousing research, or used in the data analysis to show the attitude differences and similarities of stakeholder groups. Supporting computer software includes draw.io, Nvivo, Adobe InDesign and Adobe Illustrator.

Data visualisation is very time-consuming. The biggest challenge was that qualitative coding is text-based (i.e. interview transcripts) rather than numerical (Pokorny et al., 2018). The data visualisations for the data analysis were produced following the coding process. The criteria considered in the data visualisation process were:

- Easy to read;
- As uncomplicated as possible (choose black and write figures rather than coloured figures), avoiding unnecessary content or information;
- Reaching ‘the figure speaks on its own’ to the maximum extent, then adding an appropriate amount of annotations and comments; and
- Keeping with the transparency of the analytical process.

## 3.9 Research Credibility

No specific evaluation criteria have been created specifically for qualitative content analysis; however, the criteria of qualitative research can be applicable (Cho & Lee, 2014). The credibility of the research findings is considered one of the important criteria to measure the trustworthiness and quality of research (Guba, 1981). Within this study, two strategies were used: triangulation; and representative quotations from various participants' groups.

### 3.9.1 Triangulation

The term 'triangulation' represents that the evidence can be collected from multiple sources (Rowley, 2002). In other words, it is described as the use of more than one research method, sample group, or source to validate research findings (Kane & O'Reilly-de Brún, 2001). Triangulation is indicated as one of the great strengths of case studies compared with other methods (Rowley, 2002). The purpose of triangulation is to minimise researcher bias in the data and reduce misinterpretation and subjectivity when checking the findings through various data sources and perspectives (Cho & Lee, 2014). Two different types of triangulation were used in this research: data triangulation; and methodological triangulation.

#### *3.9.1.1 Data Triangulation*

Data triangulation aims to reduce the bias from the researcher by looking at the phenomenon from multiple perspectives. In this study, a literature review and exploratory study were carried out during phase 1 to gain a general understanding of cohousing communities, whilst in-depth interviews with different stakeholders and secondary data were conducted during phase 2 to explore the manifest and latent contents from cohousing model. The data gathered from multiple case studies were abstracted from the following sources:

- The project developmental experience and living experience of cohousing

group members (including existing residents, ex-residents, co-founders and tenants);

- Cohousing project architects' working and design experiences;
- Researcher's personal volunteering and living experience with cohousing members; and
- Supporting documents: cohousing group handbooks; vision and mission statement; architects' design reports; clients' briefs; and cohousing group meeting minutes.

Subsequently, in order to produce a more comprehensive framework of cohousing development towards sustainable living, multiple aspects of sustainability were considered. The interview questions were designed to cover the following aspects:

- Environmental aspects (ecological sustainability);
- Social aspects (social sustainability); and
- Financial aspects (economic sustainability).

Figure 3-10 illustrates the process of the entire data triangulation. Research data was gathered from various sources, which enabled the datasets to comprehensively cover the three sustainability domains. These three domains comprised the fundamental parts of developing a cohousing framework.

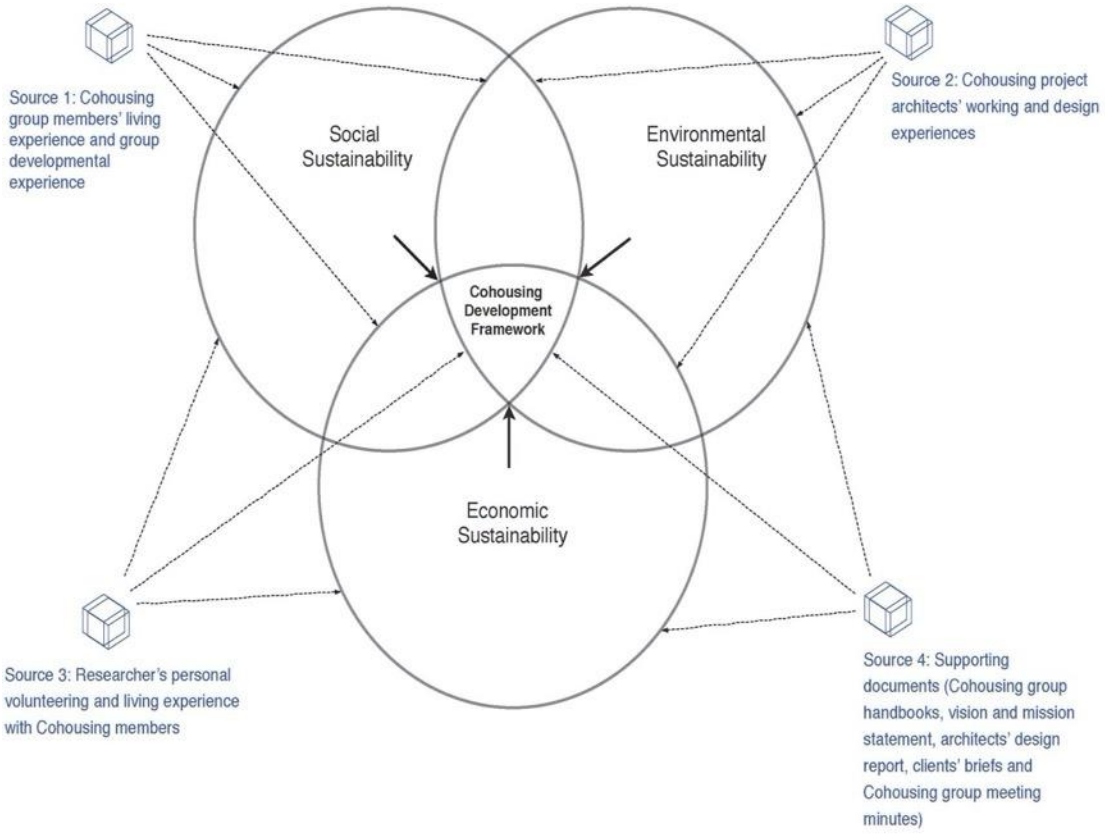



Figure 3-10. Data triangulation

### *3.9.1.2 Methodological Triangulation*

Methodological triangulation is interpreted as the use of more than one method to collect (or analyse) data about the same phenomenon and also provide additional support to increase the legitimacy of the data used in answering the set questions (Gerrish & Lacey, 2006). In this study, research data were collected using three methods:

1. Semi-structured interviews with cohousing group members and architects;
2. Participant Observations (by capturing cohousing members' daily routine and living experience in cohousing communities); and
3. Secondary data (documents provided by cohousing groups and architects).

In addition, qualitative content analysis was employed to analyse the research data. Various coding techniques were applied to explore the multiple meanings and relationships of the participants' answers. The uses of these techniques depended on the focus of the interview questions:

- Open Coding;
- Selective Coding/ Structural Coding;
- Axis Coding;
- Emotion Coding;
- Values Coding; and
- Quasi-statistical Coding (word frequency account).

### 3.9.2 Representative Quotations

Showing representative quotations can be applied as a strategy to increase the credibility of the study findings (Cho & Lee, 2014). This is a conductive and direct method to show the similarities and differences towards the same topic or subject. This evaluation strategy was used in this study to support the research findings. Representative quotations were coded, extracted, and processed anonymously to support certain concepts which generated from the study. Quotations from different participants with same attitude were listed together to increase the universality of the findings.

### 3.9.3 Data Sample Size

The sample size of this study was evaluated using Malterud's Information Power (IP) model. For Malterud et al. (2016, p. 1753), "Information power indicates that the more information of sample holds, the lower the number of participants needed." They identified the following considerations related to IP: the study aim, sample specificity, use of established theory, quality of dialogue, and analysis strategy. Based on IP, the sample size was sufficiently large to clarify the aims of the study. Data saturation was achieved in this study; and interviewing more participants in the selected cohousing

communities would not affect the results. However, the research findings are meaningful only in the social context of a cohousing community.

## 3.10 Cohousing Development Framework

The central purpose of this framework was to establish a clear structure of the interrelation between the cohousing knowledge base and future practice. This aimed to provide an articulated rationale for the methodological choices and implementation of cohousing development. Specifically, the cohousing development framework, then, comprised the combination of all stages of the research findings. Based on the main research question, the framework consists of four themes: motivation; sustainability; social environment; and neighbourhood design. It was designed for supporting four stakeholder groups: practice group; policy makers; residents; and housing providers. These four groups were chosen because they worked with cohousing groups and were heavily mentioned by cohousing residents during the interviews. The framework can be used as a tool which explores an effective developmental method for future design and practice of a cohousing.

Based on legibility and accuracy principles, the final cohousing framework was visually presented using a wheel diagram format with three levels of information (primary/ core, secondary and tertiary themes). Each quarter of the circle represents a theme, each theme is distinguished by a colour code with corresponding grey scale. The core themes are shown centrally in the framework and summarised from the findings of interviews, observations, and secondary data analysis. The framework should be read from the centre. In order to provide recommendations and 'solutions' for cohousing future design and practice, the keywords or phrases that best represented the results of the study were selected and listed in the framework. Each theme and its sub-themes are in line with the structure of corresponding thesis chapters. Detailed applications of the framework can be found in Chapter 10.

### 3.10.1 Transferability

According to Jensen (2012) and Anney (2014), transferability implies the degrees to which the findings of the research can be transferred to other contexts and situations beyond the scope of the study context. To increase transferability, Bitsch (2005， p.85) suggested two strategies, through “thick descriptions and purposeful sampling”. Anney agreed, explaining that thick description meant rich and extensive details considering methodology and contexts (Anney, 2014; Li, 2004). This enabled readers to “make a judgment about it fitting in with other possible contexts” (Guba, 1981, p.86). Purposeful sampling indicated that the most adequate units (individuals, groups, or institutions) were selected for specific purposes to answer the research question. This technique is mainly used in naturalistic studies (Anney, 2014).

In this research, both strategies were used to increase the transferability of the study. The detailed and extensive descriptions were used to introduce my on-site experiences, methodology, data analysis process and research outcomes in two phases of the research. The framework produced from this study covered both environmental, social, and economic dimensions of the sustainable developments, as well as the motivations of group members and lifelong living options for older people. The findings of the study aimed to provide a full picture of the cohousing model and allowed the reader and stakeholders to determine if the work was transferable to their context. The framework is user-friendly and can be transferred to other living forms, such as social housing with shared spaces.

Project architects and cohousing group members were selected to participate in the research. Several considerations listed below explain why only these two groups were chosen. First, due to the unique development process of the cohousing model, many cohousing groups are developed from a friendship group. It is extremely important to understand the cohousing living or development experiences from the user’s

perspective. Second, as an architectural research, this study aimed to produce the framework to assist future design. This led the researcher to retrospectively demonstrate how the communities were designed and built. Within the cohousing context, architects are in the best place to answer this question. Generally, residents and architects worked collaboratively from the very beginning of the project. These two groups were familiar with the development process; however, they typically hold different perspectives. Finally, data gathered from these two groups was able to answer the research question. In addition, these two groups of participants could also serve as the main user-group to test and validate the practicability of the framework.

## 3.11 Conclusion

This chapter explained the research methodology and selected methods for the study. Seven cohousing communities and twenty-two participants were involved in this study. The research was influenced by environmental psychology and ethnography theories and identified that the case study approach was the most suitable methodology for the study. On this basis, interview and observation were chosen for collecting data in the selected cohousing communities, and then, QCA and ethnographic descriptive analysis were employed for generating the data categories, themes, patterns, relationships and revealing the research results. In addition, data visualisation techniques were applied to demonstrate the research process and findings. This research aimed to produce a cohousing framework to guide future sustainable design and practice. Furthermore, the credibility of the study was evaluated by multiple methods, such as, data and methodological triangulations, representative quotations, and the appropriate number of samples. The findings of the study are transferable to other residential contexts, particularly to the community-led housing models and social housing with shared spaces. The next chapter demonstrates the findings of the site observations which were carried out in the seven selected cases.

# Chapter 4 : SITE OBSERVATION ANALYSIS OF CASE STUDIES

## 4.1 Introduction

As discussed earlier in Chapter 3 (Methodology Chapter), case study is defined as a research methodology and also a strategy, which concentrates on understanding the dynamics present within single settings or project (Eisenhardt, 1989). The aims of the case study in this research were to examine the design of physical infrastructure in a cohousing setting and identify the main shared facilities and their impacts to the regular social patterns. I argue here that the cohousing model has the potential to deliver a low impact lifestyle and multi-layered, harmonious social interactions. The relevant theoretical concepts (e.g., the principles of private-public area distribution in urban design) reviewed in Chapter 2 (Literature Review) have been analysed and refined the case-study data collection. Moreover, the findings of case studies provided significant evidence for cohousing recommendations and guidelines provided in the final framework in Chapter 10.

Based on the case-study data collection protocol discussed in Chapter 3 (Methodology), three data collection methods guided by environmental psychology and ethnography were involved in the case studies: site observations; semi-structured interviews; and secondary data collection. Only the findings of site observations will be discussed in this chapter. Due to the data collection plan, data accessibility and developmental stages of the selected cases, two cases (Lancaster cohousing and LILAC cohousing) were selected for in-depth observation analysis in research stage 2. Based on the design of study's conceptual framework and the site conditions, participant observations carried out within these two selected cases have different priorities. The results of interviews and secondary data analysis will be discussed jointly from Chapter 5 to Chapter 9. Further, data collection was guided by three

principles, ‘design’, ‘ecological sustainability’ and ‘social pattern and interaction’, driven by the research question and sub-questions.

This chapter consists of three parts, from introducing the case-study theoretical framework, followed by a discussion of the observation findings of the two selected cases. Finally, the Cross-Case Analysis (CCA) will be conducted (Figure 4-1).

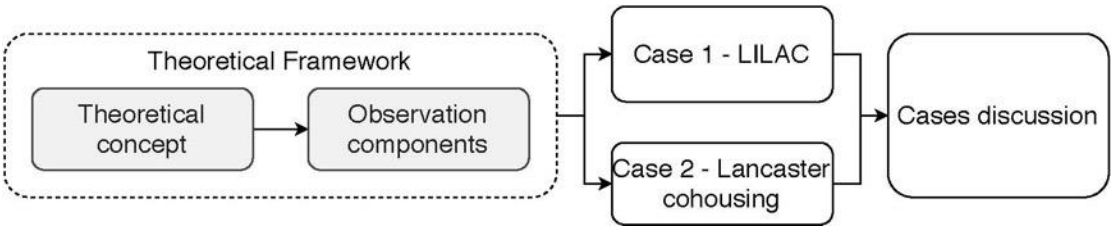



Figure 4-1. Structure of the chapter

The theoretical framework is used as a guide for research (Osanloo & Grant, 2016). It is based on existing theories and reflects the research questions. As a cross-disciplinary research, multiple theoretical concepts are extracted to guide the site observations. As discussed in Section 3.4.2.3 in Chapter 3 (Methodology), the observations were conducted in common areas of the community by using the list of site observation components, while at the same time, considering the relationship between physical environment and social patterns in the community.

## 4.2 Case study 1: LILAC

### 4.2.1 Desktop Study

LILAC is a cohousing community located in the Bramley area of west Leeds, England. All construction work was completed and the first wave of residents moved in 2013. LILAC has 20 eco-build households. It has been developed in the sub-urban area using an old primary school ground. The name LILAC is an abbreviation for Low Impact Living Affordable Community. LILAC community lies in a safe and quiet neighbourhood, occupying an L-shaped strip of land surrounded by the neatly-

arranged family houses. The roads around the community are suitable for walking with light traffic and restricted road speed (20km/h). The community has access to convenient transportation. Local facilities (e.g. shops, supermarkets and parks) are within walking distance. This neighbourhood also has a primary school, an activity centre and a care home (Figure 4-2, 4-3). The project is guided by sustainable principles to reduce $CO_2$ emissions, and aims to provide permanently affordable homes in a community where “all residents feel they are part of a strong, flourishing neighbourhood where they can directly participate” through environmentally “low impact living” (UK Cohousing Network website, 2019). The community consists of five private dwelling blocks, three entrances, a common house with a pond, two outdoor car parking lots, food growing area, tools sharing, bike shed and other social activities (Figure 4-4,4-5). The community plan All houses are timber framed (Fig, 4-6). Dwelling blocks contain six 1-bed, six 2-bed, six 3-bed and two 4-bed houses. The housing floor plans are shown below (Fig. 4-7). The common house is placed centrally within the community. The shared facilities include a central garden, a kitchen and dining area, meeting room, cars and car-parking area, a laundry and guest rooms.

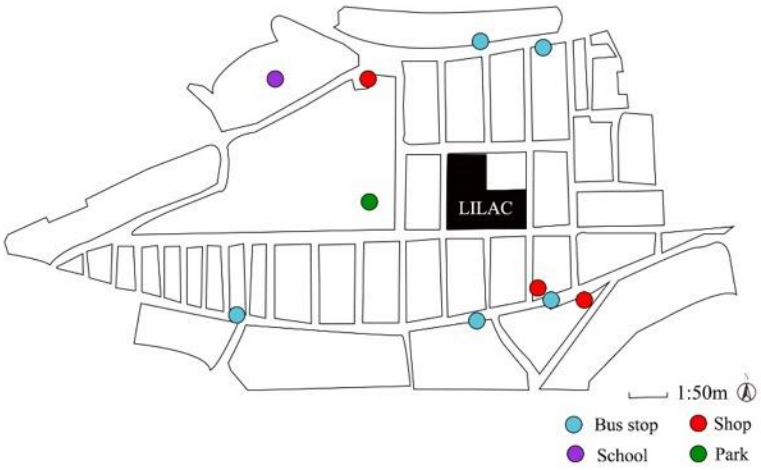



Figure 4-2. Roads and local infrastructure


Figure 4-3. Site location and surrounding neighbourhood


Figure 4-4. LILAC community final building plan
Source: LILAC

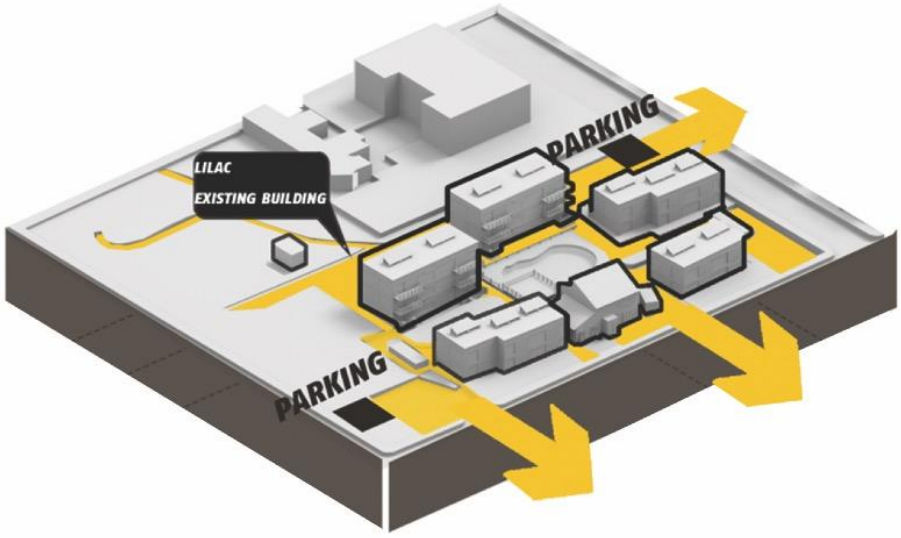



Figure 4-5. LILAC entrances and parking lots

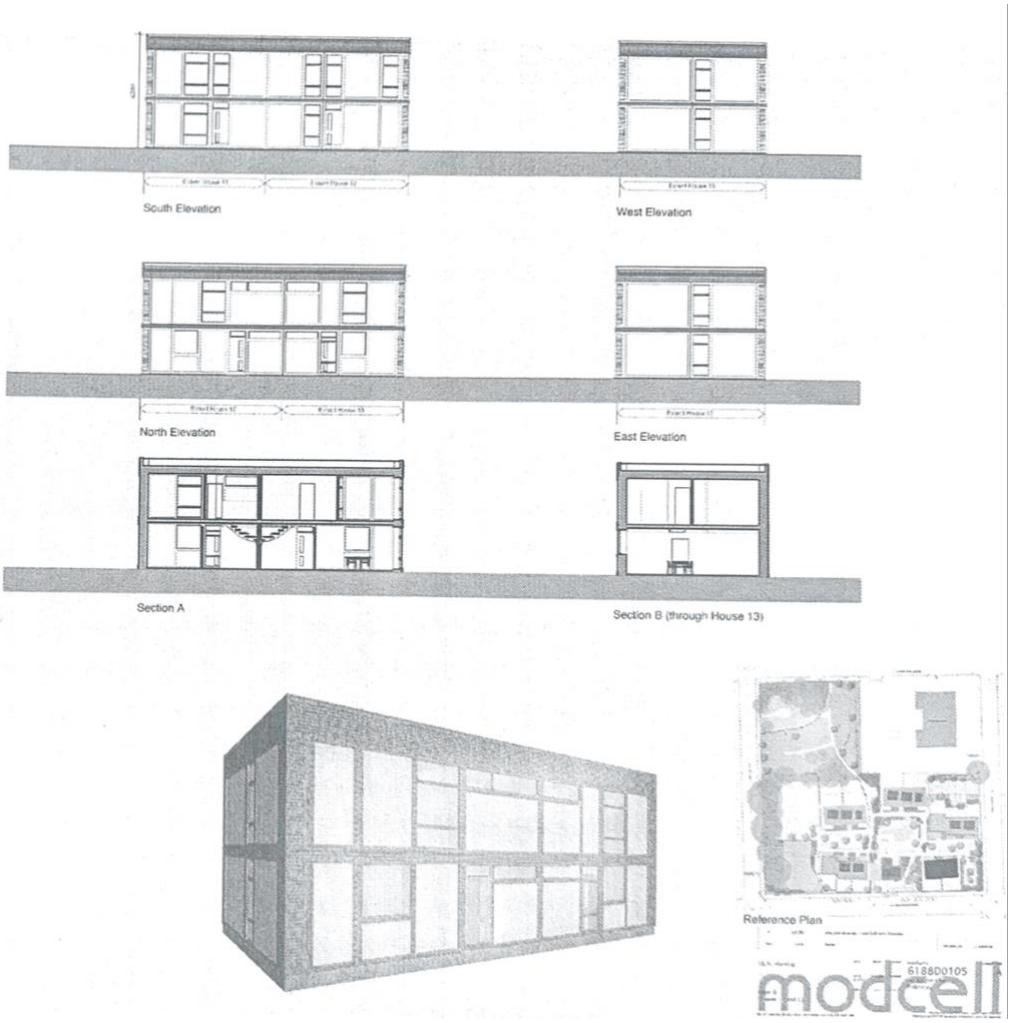



Figure 4-6. Home layout and timber frame. Source: modcell.


Figure 4-7. Housing floor plans. Source: issuu, Amy Hill, 2015.

### 4.2.2 Site Observation

The observation of this cohousing community was carried out through volunteering experience at the community regular open-day event. This event lasts about seven hours, in order to increase the credibility of the collected data, I have attended this open-day event for three times by working with different community task groups in different seasons. At the same time, I have also experienced the community common meals, food preparation and washing up process. The sketches, field notes and photos were taken to document and illustrate my personal experience. The open day event consisted of four parts: landscape session; 'bring-a-dish' meal; site tour; and a workshop. The observation findings are presented through the following sections guided by the following site observation components: design; environmental aspects; and social aspects.

#### *4.2.2.1 Design Aspects*

Influenced by foundation theories and site observation experience, this study defined the following aspects / elements which are essential to LILAC cohousing design: ~~Design aspects refer to~~ community layout, zoning strategy and space usage, and spaces boundaries. Influenced by Rapoport (1977), a more detailed interpretation of community space subdivision has been proposed by myself. I argue that the physical space of cohousing community consists of three parts: private (individual houses); common (common sitting point and key common areas) and semi-private (open-plan balcony, outdoor private sitting area and private garden) areas. The community uses a 'courtyard' layout, with private homes arranged around shared facilities. Cars are pushed to the edges, which enables the large car-free landscaped areas (Figure 4-8, 4-9).


Figure 4-8. LILAC zoning plan

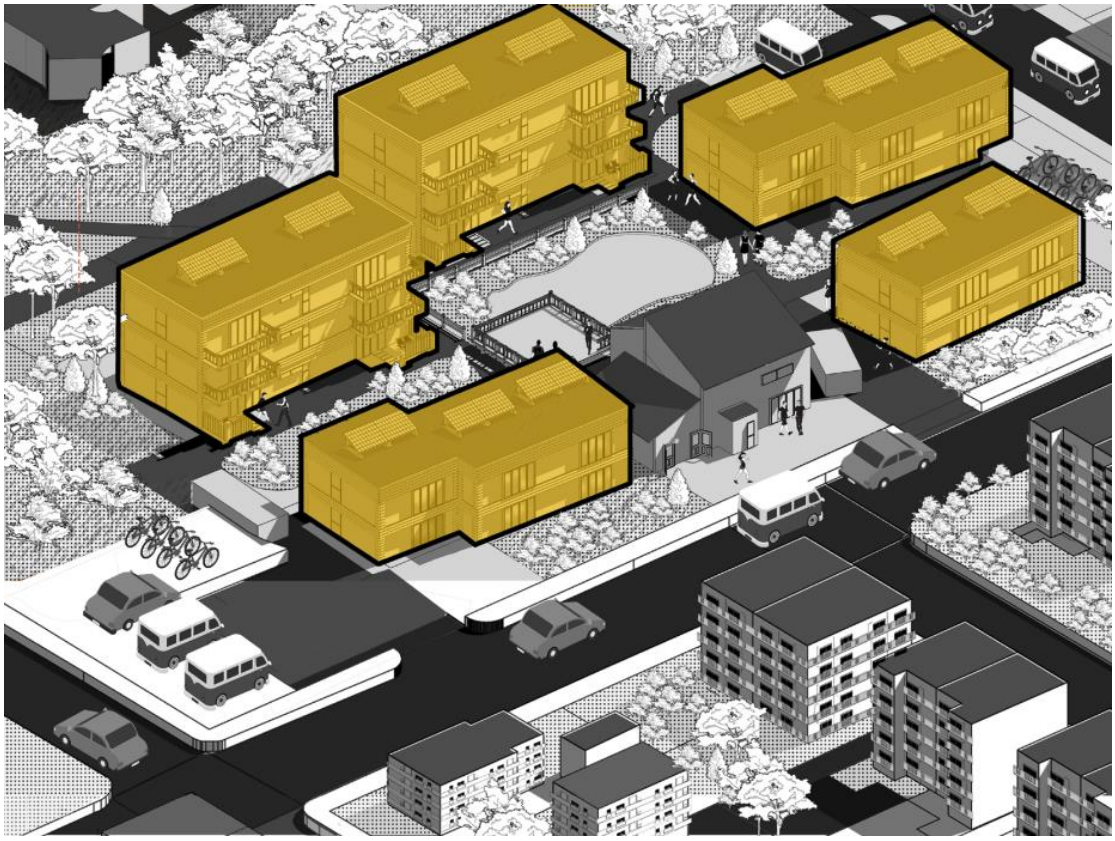


Figure 4-9. Three-dimensional community layout and carparking.

*Community space usage*

According to Rapoport (1977), the idea of private and public domains can be viewed as the distinction between front and back areas. The front for display, presents a formal face to the world. The back for private represents places where behaviour can become less self-conscious or “where the mask can be taken off” (Goffman, 1978, p.292). This concept is reflected in LILAC. The front (e.g. lawn, flowers) and the back (e.g. back garden, stacked flower pots) are clearly distinguishable. There are no front gardens in the community for the households. Only small common areas for flowers which are tidy and organised (Figure 4-10). On the contrary, some of the back gardens are stuffed and stacked with many flowerpots and gardening tools. Things are arranged in a more casual way than the front (Figure 4-11).

Figure 4-10. Front of the private units

Figure 4-11. Back of the private units

During the site tour, residents highlighted that two common areas (enclosed by the red line in Figure 4-12) were essential for daily living: ‘common house area’ (No.1 – including common house, kitchen garden and central pond); and ‘pocket garden area’ (No.2). The bi-folding door is used for the common house, which breaks down the territorial boundary between common house and outdoor resting area; makes central pond and outdoor sitting area become the ‘extension’ of the common house (Figure 4-13). The pocket garden area (productive gardens) is fundamental for community landscaping work. It is the most symbolic feature of environmentally sustainable living, providing spaces for growing fruits and vegetables (Figure 4-14), composting (Figure 4-15) and card board collection and recycling. The collaborative way of working in a shared community garden becomes a unique feature of cohousing scheme, meanwhile, this is the essential part of food self-sufficiency contributing to the

sustainable living.  This area enables some degrees of food sufficiency for the whole community and resource cyclic usage.

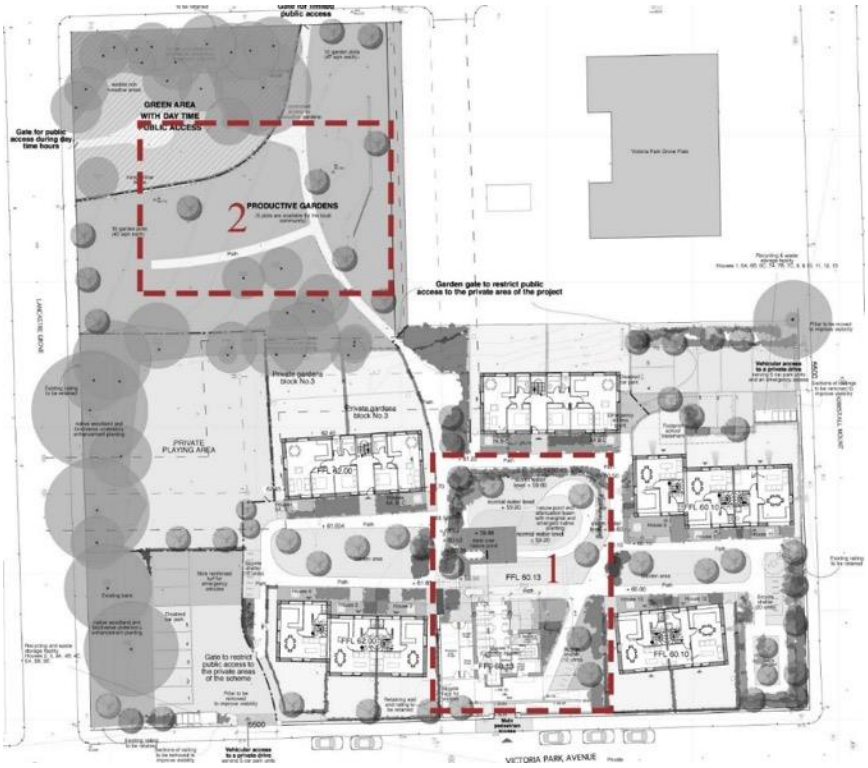



Figure 4-12. Main parts of the common space

Figure 4-13. Bi-folding door for the common house

Figure 4-14. Food growing


Figure 4-15. Recourses cyclic usage

From my personal perspective, the ‘edge’ between private dwellings and common spaces have been named as the semi-private area. This area can be interpreted as either private facilities (e.g., chair or bench) placed in the common area, or open-planned private area enabling social interaction. In LILAC, the following physical features have been grouped into the semi-private area according to the uses of these features: 1) private seats or bench placed in the common area; 2) Open balcony; and 3) private garden with low fence. These areas (or facilities) are privately owned; however, they enable the user certain levels of openness and connections to communicate and interact with other group members.

To conclude, the mixture of private, common and semi-private areas provides for a diversity of community living space. The community layout and design purposefully promote social interaction through physical proximity and provision of communal, semi-private and private spaces. In other words, cohousing scheme is expected to promote social support and interactions, the residential building blocks of social sustainability, within community members. This becomes a distinctive cohousing feature and makes cohousing model different from standard housing in the UK context. Private areas maintain the privacy, common areas are for sharing, while semi-private areas have multiple meanings and capabilities to enhance social connections and

interactions. The way cohousing residents use these areas creates the unique social pattern of the community.

*Boundary between openness and closure*

The boundary between openness and closure indicates the boundary of private and public lives in a cohousing. The degree of openness and closure can be interpreted in many ways, and it can be expressed through architectural design. For example, each unit has windows facing the common area. On the day of the event, some dwellings' windows and doors on the ground floor were wide open throughout the day, with most of the curtains of the windows facing the common area open. The window orientation and open curtains can represent the 'conversation between private and public' in the community. In other words, this indicates 'dual-attributes' between 'common surveillance (look out of the window)' and 'trust (allow people to look inside though the window)'. The design of window orientation and the placement of residential block allows this 'hidden conversation' to happen. This becomes a special community feature for cohousing scheme and greatly enhances the sense of security in the common area.

The boundary of 'exposure' and 'closure' in the community is not always easy to define. Whether inside the buildings or in the outdoor common space, many examples can be found that residents leave their personal belongings in the common area for various purposes (Figure 4-16). On the premise of not affecting the passage of others, this type of behaviour gives more meaning to the space. This also can be a sign of expressing certain messages (e.g. 'I am at home', 'you can use it' or 'I return this to you') which enrich the content of community life and represent a degree of 'transparency' of personal life. Meanwhile, it builds trust between neighbours and enhances the sense of belonging.

Figure 4-16. Personal items in the common area

#### *4.2.2.2 Environmental Aspects*

As a sustainable cohousing project, low impact living is one of the priorities of developing LILAC. During the site observation, I captured several ecological design details which could significantly contribute to environmental sustainability and low impact living. These details fall into the following two categories: ‘construction process and building materials’; and ‘environmental technologies and rainwater collection’.

*Construction process and building materials*

A low-carbon modern construction method using panel timber walls and straw-bale is the key contributor of achieving the ecological sustainable target in LILAC (Figure 4-17, 4-18, 4-19). This construction method is a crucial innovation of greatly reducing $CO_2$ during the construction process (LILAC, n.d.). Besides, the straw-bale is also a clean, cheap, long-lasting and insulated building material to reduce the heating bills for the residents. Furthermore, this construction method can also reduce the negative impact of building demolishment to the ground and surrounding environment. Moreover, it is worth mentioning that group members were involved in the construction process to assist builders in adding the straw-bale to the timber frame (Figure 4-20). This participatory building procedure is extremely rare in any form of residential building construction. As such, it can build a strong awareness of eco-build methods and increases the sense of home and sense of belonging for all group members. This is also a very typical aspect of co-design process which will discussed in section 9.3.4.

Figure 4-17. Straw-bale wall
Source: LILAC

Figure 4-18. Panel timber and straw-bale
Source: LILAC

Figure 4-19. Timber frame and straw-bale. Source: LILAC

Figure 4-20.cohousing residents and children involved in the straw-bale construction process. Source: LILAC

*Environmental technologies and rainwater collection*

After discussing the construction and building materials, the environmental technologies and rainwater collection system are also viewed as essential sustainable features for low impact living in the community. MVHR systems, solar thermal and solar PV are the main environmental technologies employed by LILAC. The following figure (Fig.4-21) shows how can solar PV, solar thermal, condensing gas boiler and MVHR work harmoniously to provide the energy efficiency for LILAC. As the LILAC residents reported, the overall carbon balance of the energy systems across all their homes is negative due to the greater amount emissions offset from the electricity generated by the solar PV array and the solar thermal heating units. I argue that if the straw-bale wall is a symbol of passive energy conservation and emission reduction, then the MVHR design of the building is a sign of active energy conservation. Meanwhile, the use of solar energy (renewable energy) is an important consideration for the diversity of energy sources. It becomes the main energy source. Combining passive solar and MVHR design could greatly reduce the need to input heating energy. Besides, each home and common house benefit from 1.25kw installed solar PV and solar thermal for space heating and hot water, respectively. At the same time, the rainwater collection system is a commonly used system for sustainable cohousing projects (Figure 4-22). Collected rainwater is used for outdoor cleaning and vegetable gardens. The rainwater buckets are connected to the small pond in the community, which means that the rainwater harvesting system creates a natural landscape while recycling. In the meantime, rainwater recycling promotes the diversity of environmental technologies in the community.

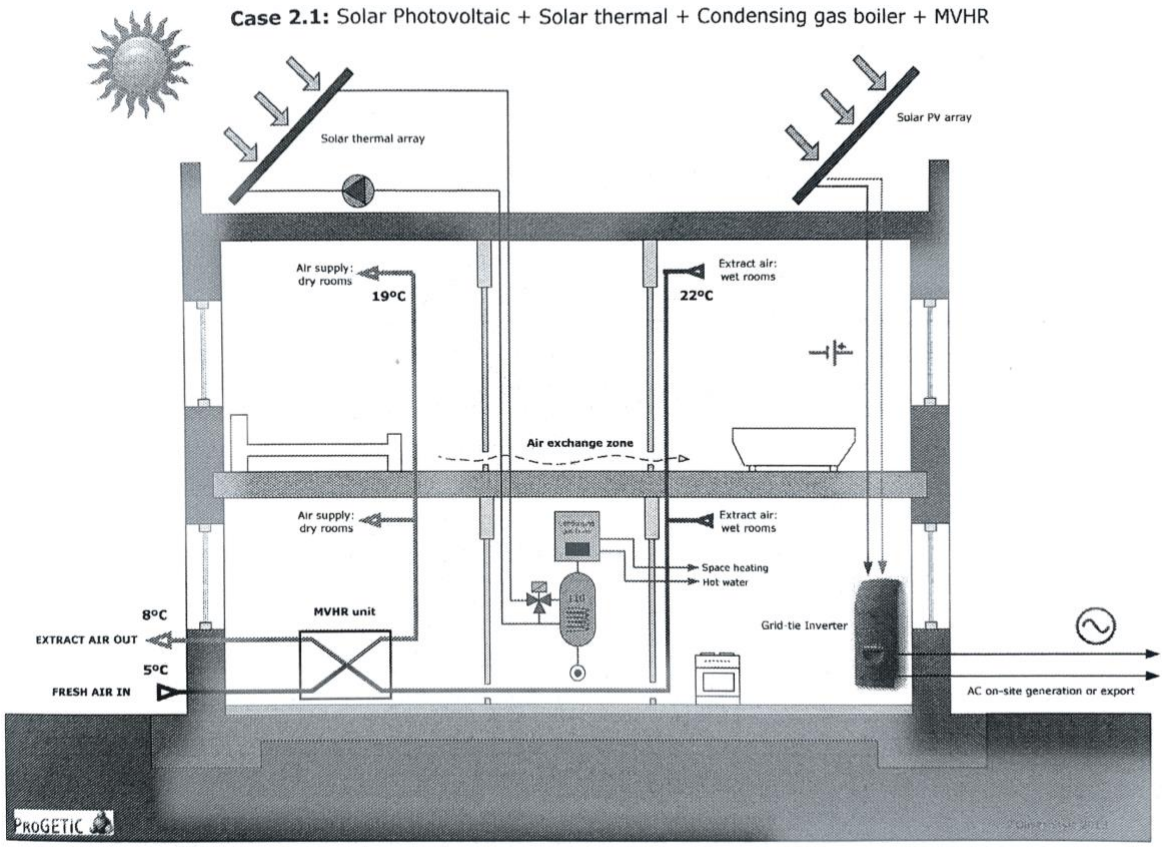



Figure 4-21.Drawing of energy system in LILAC. Source: Progetic.

Figure 4-22. Rainwater collection system

*4.2.2.3 Social Aspects*

Social connection can be captured in various ways. From my personal perspective, I identified the social connections in semi-private and common areas by understanding: a) the arrangement of common and private sitting points; b) intersecting paths; c)

functions of the open layout balcony; d) social distance control; and e) the common meal. These features guided me to understand how the common spaces are used and which activities are allowed to develop within this community layout.

The social environment will be analysed the through the following sub-sections:

- Physical environment shapes social connections (sitting, path, open layout balcony);
- Visualising social connections and distance (close phase, far phase, visual connections, oral and hearing distance); and
- Experiencing the common meal.

*Physical environment shapes social connections: sitting*

According to Gehl (2011), availability or lack of good sitting opportunities can be considered as one of the important factors in evaluating the quality of the public environment. The good sitting area in public spaces can provide opportunities for numerous activities: eating; reading; sleeping; knitting; playing; chess; sunbathing; watching people; talking; and so on. In LILAC, there is plenty of space for residents to enjoy outdoors. There are 13 sitting 'points' outdoor and several rooms in the common house contain seats. The outdoor sitting area can be divided into seven private sitting areas and six shared common sitting areas as shown in Figure 4-23. The small chairs and wooden benches close to the private-unit entrance are used for private sitting; the bench with shade, round and square tables with chairs, and the wooden bench under the tree are used for common sitting (Figure 4-24 to Figure 4-31).

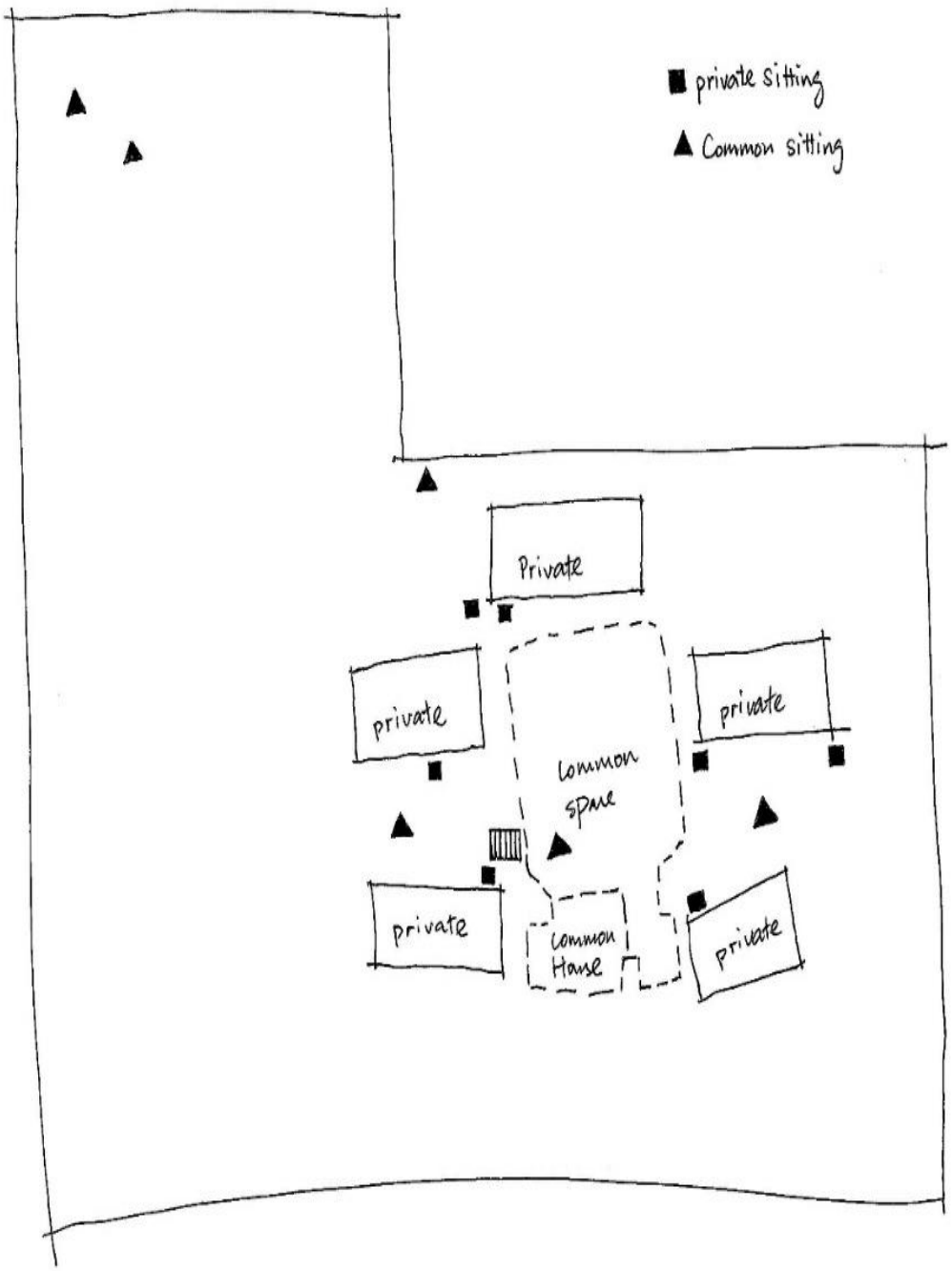



Figure 4-23. Outdoor sitting area

Figure 4-24. Small chairs for private sitting

Figure 4-25. Wooden bench for private sitting

Figure 4-26. Private sitting in front of the dwelling

Figure 4-27. Shared sitting: the wooden bench with shade

Figure 4-28. Shared sitting: round and square tables with chairs

Figure 4-29. Shared sitting: square tables with chairs

Figure 4-30. Shared sitting: the wooden bench under the tree

Figure 4-31. Shared sitting between houses

Gehl stated in his book (2011, p.156): “The most popular places to sit can be found at the edges of open spaces, where the sitter’s back is protected and the view unobstructed”. The private sitting in LILAC was designed carefully to meet this ‘criteria’. They were placed at the edges of the green or next to the common path, against private dwellings and facing the common space. All are placed at the front of the private units. Most of the chairs or benches are oriented towards the central common space. The orientation of the sitting points plays an important role because it provides ‘views’ for the residents – being able to see other people in action (people passing by, gardening, children playing). This constitutes the community’s main attraction. For many older residents in LILAC, being able to sit is more important, the comfort and practicality of the seat are also required. All of the private seats have backs. Some of them have armrests. Benches and chairs are wide enough, easy to use. In addition, residents have flexibilities to decide the placement of seating in the common area, for example, one private sitting has been placed behind the bicycle shed (Figure 4-26). This remains a degree of privacy, however, it still has the opportunity to ‘see and hear’ other people in the community.

Figure 4-16 above shows that there are three shared common sitting areas (triangles) in between private units. The one in the middle is facing the common house. The other two are on the green. All of them have parasols for shading. The uses of these sitting areas were much higher than other common sittings in the community because they were closer to the private dwellings, surrounded by paths and have more 'views' to attract residents to stay. In general, the sitting activities took place where external conditions are favourable, as Figure 4-32 shows, during a sunny day an adult is sitting on the common seat and watching the child playing outside. As Gehl (2011, p.15) stated: "Opportunities for meetings and daily activities in the public spaces of a city or residential area enable one to be among, to see, and to hear others, to experience other people functioning in various situations". Shared sitting areas and private sitting areas are close by, in between private dwellings, providing visual access and connection for the residents.

Figure 4-32. A Child is playing on the green

In sum, the forms of outdoor sittings (both common and private sittings) are very diverse. Sufficient outdoor sittings bring more opportunities for people to stay and also improve the quality of the outdoor common area. Well-placed sitting points with

residents occupying them makes the community alive and brings varied and meaningful community life. Life in the common area becomes a key attraction of the cohousing communities.

*Physical environment shapes social connections: paths*

According to Lynch (1960), paths can be seen as one of the predominant elements of cities. They may become important features in a number of ways. For example, paths can be a special identity of a city. In this section, I will discuss the importance of paths in a community context for structural and social reasons. First, paths helped tie the community together. They connected each part of the community: common area; private living units; productive garden; children's play area; and car park. The paths in LILAC are not very wide (about 1.2-1.6m), and the surface of the path is flat and smooth (Figure 4-33, 4-34). Paths between dwellings are levelled with the green area, it is safe for walking and playing for both adults and children even in rainy weather. There is a difference in the level of the community site, and both flat ramps and stairs were used. It is accessible for wheelchair users. Tactile material was applied at the start and end of the stairs (Figure 4-35). In a small community with narrow paths, I can see buildings, details and people around me at close range. I experienced buildings and activities with great intensity. The outdoor lighting is also considered. Low lighting is placed next to the path, which helps the residents to use the common spaces safely at night (Figure 4-36). In addition, some landscape features make the path more interesting, such as plants (flowers and fruit trees), a small arch with decorative lighting and a special road sign (Figure 4-37). These features provide more details for the paths and also make the entire environment richer and liveable.

Figure 4-33. Paths between private dwellings

Figure 4-34.common paths of LILAC neighbourhood

Figure 4-35. Tactile features

Figure 4-36. Nighttime in LILAC

(source：Modcell)


Figure 4-37. Road sign and small arch

Regarding social purposes and living needs, most paths are winding and placed around the living area in the compact and small-scaled community site. Several sitting points on the green are next to the path. They provide views for both sitters and people who are using the path. The core common area (common house and the pond) in the

central community can be seen from different angles. The paths for entering, exiting the community, going to the common house and the bin area are overlapped for the residents. This provides multiple chances for people to meet, stand and talk (Figure 4-38). I perceived the community scene as warm, liveable, personal and welcoming.

Figure 4-38. Residents are staying and talking outside

To summarise, as a fundamental part of the common area, community paths connected people, landscapes, common areas and dwelling blocks together as a whole. Furthermore, they provide traffic flows for entering, exiting and moving within the community, and also offer meaningful views for all the residents and visitors.

*Physical environment shapes social connections: open layout balcony*

In LILAC, only two blocks have balconies, all of them open layout balconies. This type of design not only provides space for drying your washing and growing flowers, but also showcases the opportunities of the special layer of social interaction. The balconies are not very big. They have wooden fences and floors (Figures 4-39 & 4-40). Theoretically, the balcony is a part of the private space. However, the reason why they are grouped into a ‘semi-private’ area is primarily because they have the ability to be ‘public’ if the residents wish this. In other words, open layout balconies can be one of the soft edges between private and common areas, as the openness of the balcony enables residents to have certain social interactions with other community members.

The distance between same-floor balconies, and the distance between first-floor balconies to the ground, are ‘talking distance’. People can talk to each other when they are both standing on the balcony, or when drying clothes on the balcony, whether saying a ‘hello’ to the people who are just passing by, or just sitting on the balcony, ‘seeing and hearing’ others.

Figure 4-39. Open layout balconies

Figure 4-40. Open layout balcony and resident

*Visualising social connections*

Visualising social connections is a unique way of interpreting the relationships between the built environment and cohousing residents’ social activities. It directly explains the usage of community spaces and how social activities are affected by the community physical environment. Common and private areas were clearly separated; thus the semi-private area has multiple meanings to enhance social connections. Social interactions and contacts were analysed by using the staying points (e.g., outdoor sittings) and the interactions that happened in the common house area and productive garden. In addition, three human senses were involved in this visualisation process: Feeling (touching distance, included in close phase of social distance); seeing; and hearing. The process of visualising social connections was largely influenced by Edward Hall’s spatial theory The Hidden Dimension, via adopting his spatial measurement phases. The social connection visualisation will be explained through close and far phase social distance, visual connections, and oral and hearing distance.

Hall (1966) defined four types of distance to measure the degree of intimacy between people – intimate distance, personal distance, social distance and public distance. Each type of distance includes two phases: far phase; and close phase. In discovering the social pattern and different types of social contacts, the social distance from Hall's theory can be taken into account and it is important to visualise the social pattern in a direct way. But what is 'social distance'? As Gehl (2010, p.47) stated: "Social distance described the distances at which conversations about work, vacation memories and other types of ordinary information can be exchanged". As early as 1966, Hall (1966, pp.126-127) identified that the close phase of social distance is 4-7 feet (1.2-2.1m), and the far phase is 7-12 feet (2.1-3.7m). He also explained the distance of recognising people's face details and expressions (30 feet, or 9.14m). There is also the oral and hearing distance (7m or less) illustrated by Gehl (2010). Based on the case study experience, the places where people generally stayed were marked on the community plan (e.g., outdoor sitting, garden). Then, applying Hall and Gehl's theory into the community (considering the measuring scale, using the distance as the radius to draw the cycle on the stopping points), the visual interpretation of the theory is shown in Figure 4-41.

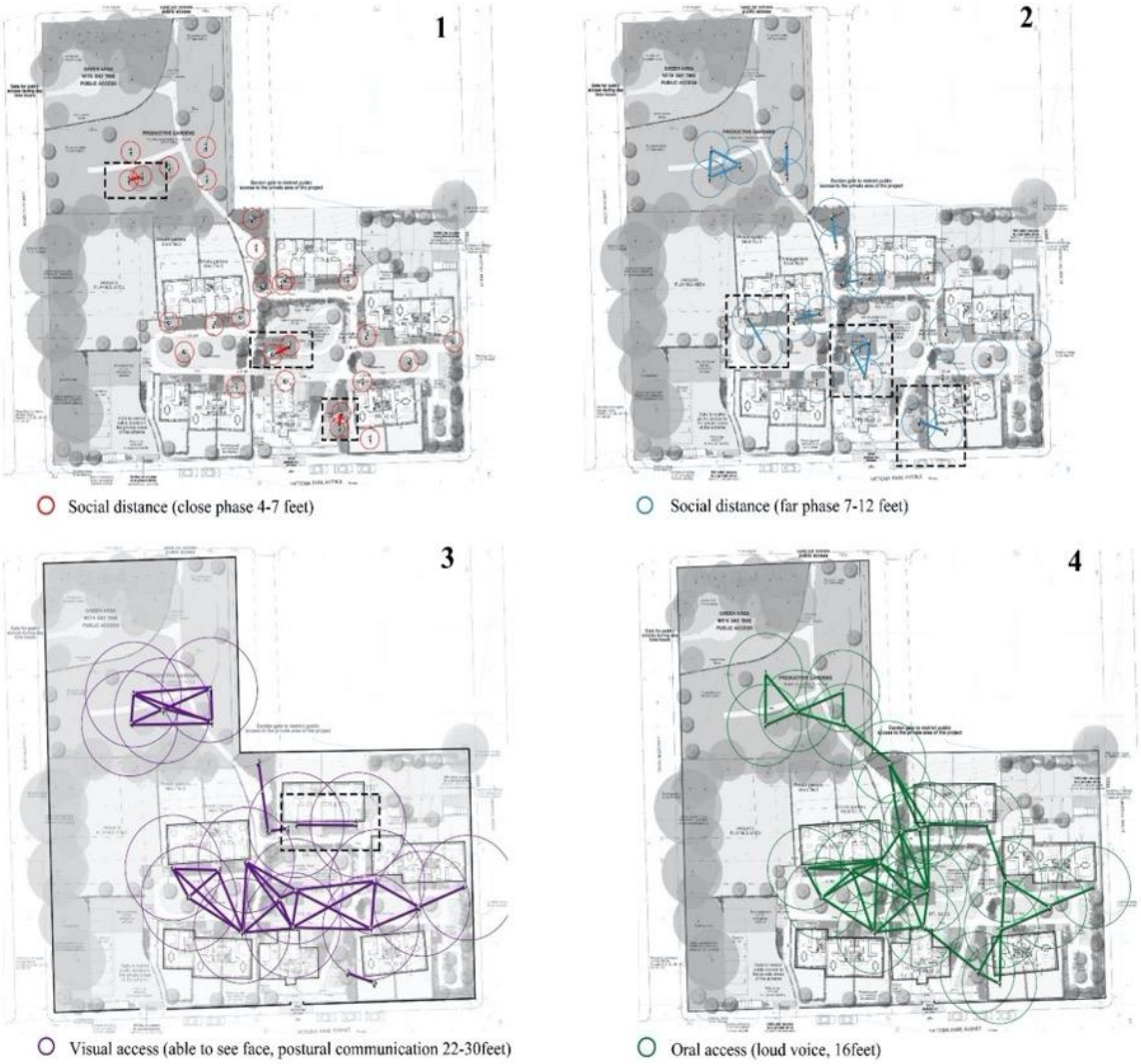



Figure 4-41. Outdoor social connections

- *Close phase of social distance*

Figure 4-42 shows that within the close phase (4-7 feet) of social distance, the reduced distance is mainly captured via group gathering, casual meetings or other common activities (e.g., gardening). As mentioned earlier, there are two key common areas in the community: central pond and common house; and productive garden. Three examples of social activities in close proximity (highlighted in Figure 4-42) are found in these two areas, which also demonstrates the importance of these areas in the community. When I participated in the gardening work as a volunteer, LILAC residents worked just next to me, and took my hand to teach me how to use the tools step by step. The distance between me and other group members was less than 1m. When

observing the landscape works of other working groups, whether in the process of carrying goods or working in the designated area, the distance between group members was often less than 1m. The distance measurement through common mealtimes also shows a similar pattern. Positively related to Hall's theory, I believe that social activity is a flexible process, and social distance cannot be easily measured by giving a fixed numerical interval. It must be analysed within its cultural background and local context. I would argue that many social activities in LILAC can take place within very short distances (within touching distance, less than 4 feet), I assume that the close phase of social distance in LILAC might be shorter than other residential and public settings because of the sharing of tools and facilities, the small scale of the community and working team members' common interests.


Figure 4-42. Social connection (close phase)

- *Far phase of social distance*

According to Hall (1966, p.116), “A proxemic feature of social distance (far phase) is that it can be used to insulate or screen people from each other. This distance makes it possible for them to continue to work in the presence of another person without appearing to be rude”. There are some interesting examples to explain the far phase (7-12 feet) of social distance in LILAC. People keep this distance (neither closer nor

further) to socialise for certain reasons, for example, having a chat with someone who passes by when you are watching the children play outside, or two residents doing gardening on two adjacent planting areas, or enjoying watching a group of people doing some activities without interrupting them, keeping distance to have a full-scale view, or having physical barriers in between, such as the ground level difference or a fence.

Thinking back on the volunteering experience, I would argue that the far phase social distance is important under some circumstances, however, it can be easily reduced and turned into the close phase if both parties have similar interests. When I was doing gardening in the community kitchen garden, I saw a lady tidying her back garden (her back garden is next to the kitchen garden). She was very friendly and said “hello” to me. There was a low wooden fence between us (see Figure 4-43). She was interested in the work we were doing, so she stopped her work and came forward and stood behind the fence, speaking to me until I finished working. The distance between myself and this lady changed and became significantly closer. However, the distance change did not interrupt my work, on the contrary, the conversation with her made the whole process more enjoyable. This example shows that physical barriers may be used to show where the boundaries are and separate people. However, close social interactions can still happen to cross these boundaries if some common interests exist. The common interests and the social desire will attract people to get closer, for example, when sitting in the common house, and realising that a group of residents are sitting outside (Figure 4-43), one may want to join them. In contrast, when common interests disappear or the physical conditions change (e.g. too cold, too noisy), people will withdraw to the far phase but still interact with others.

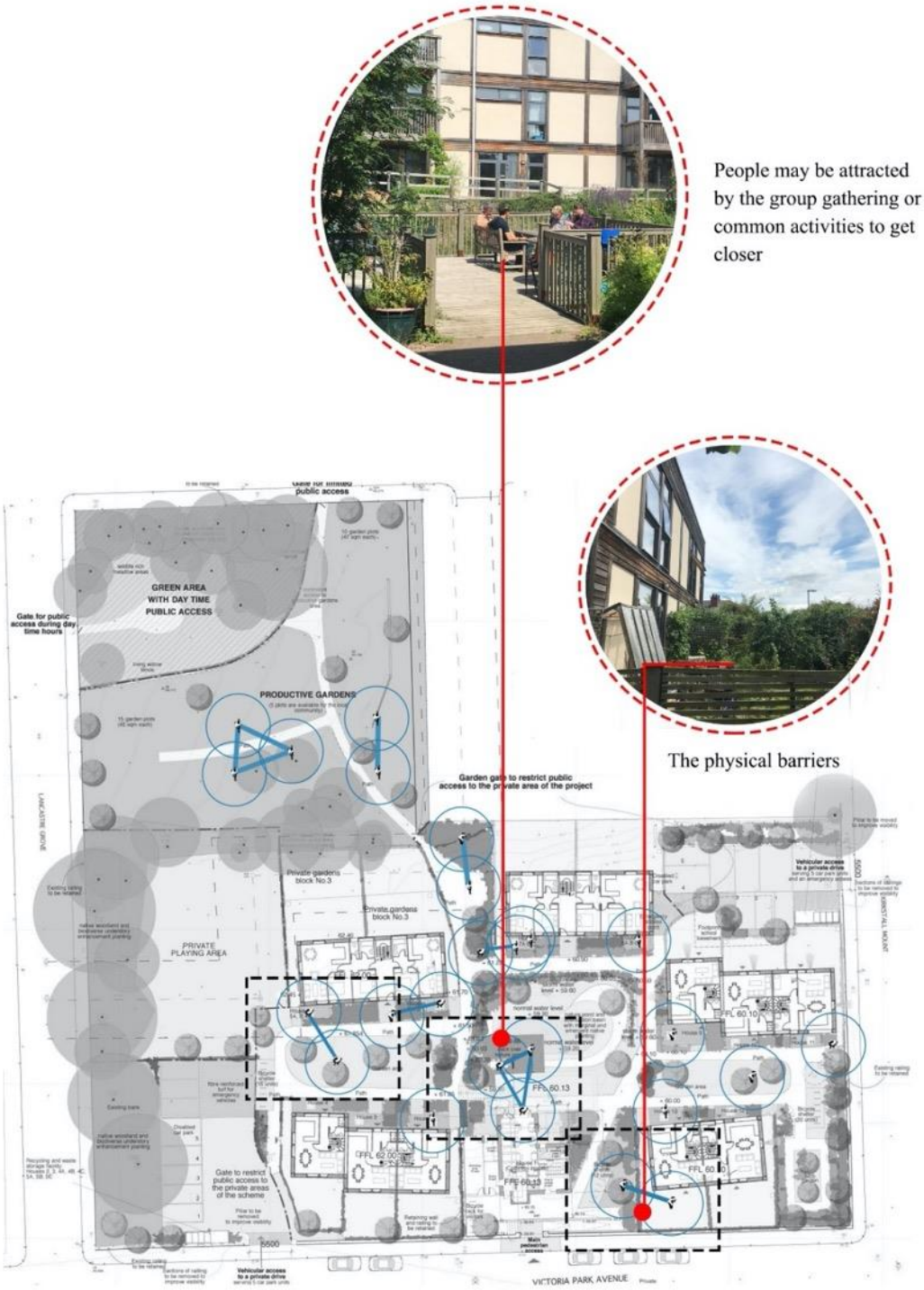



Figure 4-43. Social connection (far phase)

- *The Visual connection*

The visual connection is another layer of social contacts explained by Gehl (2011) in his book 'Life between Buildings'. As an example of the passive contacts between people, Gehl named visual connection as 'see (and hear) others'. Gehl (2010, p.33)

stated that “sight is most highly developed of our senses”. It is significant to include this level of social contact to understand the full image of social connections in a cohousing setting. The distance for visual connection has been clearly defined from Hall’s theory (1966): if the distance is less than 30 feet (9.14m), a person can be recognised by their detailed facial features, facial expression and dominant emotions, if external conditions are favourable. Differently, Gehl (2010) summarised that we usually recognised the person at somewhere between 50-70m by body features, body language and hair colour. At a distance of 22-25m, people can read expression and emotions. Considering the community scale, taking Hall’s theory as an example and using 9.14m as the radius, when people stay in the ‘stopping point’, the visual connections can be illustrated (Figure 4-44). The lines between points were used to show that people can be visually connected. When discussing the visual connection, the objects and barriers that block the view must be considered. As highlighted in Figure 4-44, first of all, there are no tall objects (such as a big tree, high fence or buildings) to block the view between the private dwelling blocks and the productive area. Views are unobstructed and maximised, and this provided the basis for visual communication. Second, vertical visual connection makes the communication richer and more interesting, and people are able to see others passing by and communicate with them when using the balcony (Figure 4-45). Third, the visual distance allows eye contact and postural communication between two people when they are using common areas and balconies. Therefore, living in this unique community environment with the common-space-centred layout design, the visual connections can be seen as a new ‘phase’ of social distance. This phase can complement Hall’s theory in a cohousing context. It is difficult to provide the precise numerical range of the visual distance, however, from my observation, the visual connection and its inspired interactions (e.g. wave to someone) happened more often at long distance. I would argue that the visual connection can stimulate more social interactions in the community. Compared with other public and residential environments, this type of

social connection is easier to happen in a cohousing because like-minded people share the space, paths, community tasks and facilities with similar values and common interests.


Figure 4-44. Visual connections

Figure 4-45. Vertical visual connection (source: The Guardian)

- *Oral and hearing distance*

Oral and hearing distance was defined by Hall (1966): if the distance was less than 16 feet (4.9m), people are able to communicate without raising voices or shouting to each other, under favourable exterior conditions. Similarly, Gehl (2010, p.35) stated that: "the shorter the distance in the range from 7-0.5m, the more detailed and articulated the conversation can be". To maximise the possibilities, 7m is the important threshold. Using 7m as a radius to draw the cycle, Gehl's theory can be visually interpreted as in Figure 4-46. The community scale and placement of the stopping points allows one to communicate and hear each other between the buildings and the food growing area. An interesting point I wish to make is that hearing can complement the visual, leading to changes in social distance. When visual perception is completely blocked, sound can guide people to draw closer or withdraw. When I was working in the community, I was asked to collect some wood chips from another working group on the other side of the community. The resident showed me the direction of the place. Although I could not see it, as I crossed the common house area, getting closer, I could hear someone talking, so I followed the sound and found the place. Therefore, I would argue hearing can be a useful wayfinding factor to trigger social interactions leading to changes in social distance.


Figure 4-46. Oral and hearing distance

*Experiencing common meal*

The common meal is a shared meal hosted in the common house. It is prepared based on the idea of vegetarianism and served on a long table as a buffet (Figure 4-47). For promoting resources' circulation and sustainable development, paper plates were used. Part of the salad ingredients and herbs were grown in the community and handpicked by the residents and some volunteers. The residents and volunteers discussed the fruit tastes and the experience of fruit picking during the landscape session. Some residents expressed that they felt fresh and healthy living there because they had opportunities to grow and manage their own food.

The residents were very polite to each other, both residents and visitors lined up to take the food. Two residents were in charge to prepare drinks, they asked preferences

for drinks and helped visitors to make tea and coffee. It is very flexible to have the food inside of common house or at sitting area outside. Some residents sat together and kindly invited volunteers to join them (Figure 4-48). Based on my observations, about 12 people sat in the common house for the meal, they were facing each other, chatting when they were having their food. Everyone can talk in several directions (to people sat left and right, and to people who sat opposite) without raising voices (Figure 4-49). The distance between people makes them relaxed and comfortable. I was informed from the conversations with residents that the weekly common meals in the community are generally voluntary based. Residents signed up to help the common meal, three residents volunteered as a team, two for cooking and food preparation, and one for washing up. If only two people signed up for the common meal, residents who joined the common meal would help to wash up together.

Figure 4-47. The common meal

Figure 4-48. Common meal: residents and visitors are sitting outside

Figure 4-49. The seat positions of the common meal

### 4.2.3 Ethnographic Descriptions

As discussed in the last chapter (section 3.7.2), ethnographic description as an analysis method is applied for the participant observations to identify meanings for residents living, cohousing design, and sharing behaviour. During the data analysis process, this research concentrated on transforming field notes (and pictures) into themes, clustering themes and also looking for data patterns for cross case analysis. The description about LILAC cohousing was divided into three parts: quality of outdoor common spaces; overview of social connections and distance; and my personal thoughts on the LILAC cohousing community.

#### *4.2.3.1 Quality of Outdoor Common Spaces*

Gehl (2011) identified three types of outdoor activities, which are necessary, optional, and social activities. He also emphasised that these three types of activities were particularly dependent on the quality of the outdoor spaces. If there is a need to evaluate the common activities and social involvement in cohousing, it is necessary to understand what type of outdoor environment can encourage these social interactions. A good example can be found in Gehl's (2011, p.31) research; he described that a good environment for people to live and socialise in is like "closely spaced buildings, accommodation for foot traffic, good areas for outdoor stays along the streets and in direct relation to residences, public buildings and place of work".

During my time working in the community, I felt the following reasons of outdoor common space in LILAC, which make the LILAC community meet the 'criteria' and create a liveable place for residents. First, it is a car-free landscaped community. This provides a quiet and safe place for children and adults. Second, the shared facilities with a cascading courtyard landscape are centred in the community. The possibility of meeting neighbours often in connection with daily comings and goings implied a valuable opportunity to establish and later maintain acquaintances in a relaxed and undemanding way (Gehl, 2011). Visits and gathering can be arranged on short notice.

It is easy to drop by or to have coffee/ tea if the participants pass by one another's front doors. The natural landscapes (trees, plants and a pond) provide a pleasant, fresh and peaceful atmosphere. These could provide opportunities for residents to enjoy outdoors. Third, the private and common sitting areas are spread out in the common space, most of them facing the direction of the central pond. This layout offers the platform for residents to 'stay', rest and watch children playing outside, with the chance to see and hear other people, discover how others work, behave and dress. The close relationship between residents can also be developed based on the outdoor activities, such as sharing a table outside to put teacups on or helping someone to do gardening. Finally, the food growing area and the herbs garden attract residents to do more work outside. This makes more 'necessary activities' become 'social activities'. Being among others, seeing and hearing others, working with others, imply positive feelings rather than being alone (Gehl, 2011). Such daily activities increase the chances to develop contacts with group members and the wider neighbourhood.

#### *4.2.3.2 Overview of Social Connections and Distance*

As previously discussed in the paragraph of Visualising Social Connections (in Section 4.2.2.3), when 'social radius' changes, the social connections are fundamentally changed. In other words, social distance can be a significant factor for examining social activities in cohousing (Figure 4-50). Driven by the similar intestates of cohousing members and the scale of the community, examples are explained earlier that the social distances were shorter than the distances documented in the theory. Additionally, social distance between people is completed variable, particularly in a cohousing community. Common interest is a significant factor which influences people to approach closer or withdraw. This research also found that visual connection was another interesting layer of social contacts. Based on my experience, visual connections can stimulate more inspired social actions, such as waving to someone. The measurement of the social distance in this study is influenced by the Hall (1966)

and Gehl's (2010) theories, however, the meanings behind the social distance and relevant social activities must be analysed based on the local context, culture and their built environments.

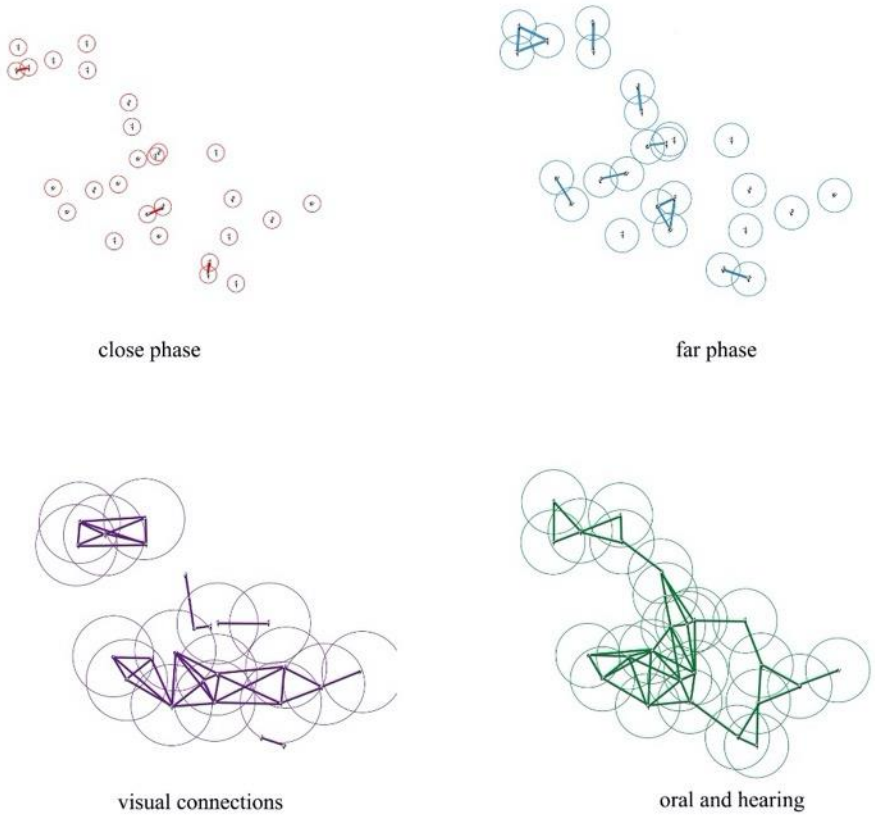



Figure 4-50. Social connections summary

#### *4.2.3.3 What I have learnt from LILAC?*

As a typical example of a British cohousing model, LILAC provides a very detailed and in-depth understanding of my cohousing research. First, the private and community shared areas can be the common factors for all British cohousing communities. However, depending on the land that such communities occupy, the shapes and the site plans of the community are fundamentally different. Therefore, the semi-private (or semi-public) area can be a very special area to focus on when exploring community layout, neighbourhood design and relevant social activities. Semi-private areas in

LILAC are the sensitive areas in between private houses and the shared common area, and these areas have very subtle and interesting effects to connect and shape people's daily lives and social interactions.

Second, based on my observation, the boundary of private and public may not be easy to define. This strongly depends on how space is used by the group members and if there is a strong sense of belonging and trust between residents. Many examples found in LILAC were able to show the degree of 'penetration' between personal and shared community life (e.g. display of personal belongings, the opening and closing of the window). These micro-scale details form the unique understanding of the cohousing model, which were rarely revealed in previous cohousing literature; and this is also a dynamic presentation of the beauty of cohousing philosophy and sharing culture.

Finally, "We shape our buildings; thereafter they shape us" (Churchhill, 1943). Reflecting on Churchhill's quote, I believe this is a two-way process of designing and living in a cohousing, which means residents 'shape' the community environment and then the community 'shapes' people's lives. In other words, the physical environment has strong influences towards the residents' social contacts, activities and social patterns. Many outdoor facilities such as sittings and paths helped to 'facilitate' the social activities and provide the media for the residents to stop and stay. When the social connections were visualised by measuring the social distance, the physical and social environments become combined and work harmoniously as a whole. This research found that social distance in a cohousing may not be similar with the documented theories, some common activities in LILAC were performed in a very short social distance between residents. Therefore, social distance should not be simply measured and interpreted by the distance itself. Rather, it should be analysed by considering the local context and culture.

## 4.3 Case study 2: Lancaster Cohousing

### 4.3.1 Desktop Study

Lancaster Cohousing is an eco-cohousing community located in Forge Bank, Halton, England, UK. This project is a typical sustainable cohousing projects completed in 2013, consisting of private homes (41 eco homes), community facilities, workshops, offices, studios, and shared outdoor space (Lancaster Cohousing, n.d.). The cohousing group includes 65 adults and 15 children. Public transportation is available around the community, and it is accessible by train and buses to Lancaster city centre and Halton from the site.

The buildings on site are a mixture of new builds and historical buildings (Halton Mill). It is a sub-urban cohousing project built along the river Lune and adopts a linear layout for the community (Figure 4-51). The common house is placed centrally in the community (the red point in Figure 4-51), with a terrace area with views over the Lune. The community common space and private dwellings are linked by a long pedestrian street, part of which has a glazed canopy. The project was guided by sustainable design principles from the planning to the construction stage. The homes in the community meet Passivhaus and Code for Sustainable Homes (CSH level 6) standards, and employed renewable technologies, such as biomass, solar panels and hydroelectricity. Besides, residents also benefit from a very high level of airtightness and MVHR technologies fitted to the living units. In addition, the historical mill building is used as a workplace for all cohousing members. It is a mixture of serviced workshops, offices and studios (Lancaster Cohousing, n.d.)


Figure 4-51. Lancaster Cohousing 3D site plan

### 4.3.2 Site Observation

Due to the limitations of data access for this community, the site observation was carried out twice through open day tours. The observation procedure placed a strong focus on the community layout and zoning strategy, shared facilities, environmentally sustainable features, social connections, mutual support, community environment for raising children, and shared working relationships. These components are classified into design, environmental, and social aspects.

#### *4.3.1.1 Design Aspects: Community Layout, Zoning and Shared Facilities*

*Community layout and zoning*

The project evolved through a participatory process with individual householders and Eco Arc Architects (eco arc, 2011). Different from the LILAC community, Lancaster Cohousing employed a linear layout based on the geographical condition of the site. The architectural plan is shown below (Fig. 4-52). Based on the plan, the community layout and zoning has been simplified and colour coded. The neighbourhood has been divided into private space, common space, and highlighted the pedestrian street and heart of the social area. A long pedestrian street serves as the central axis, with community buildings distributed on both sides of the street. This street is a fundamental common feature for all residents because it connects all private dwellings (Terrace A

– G) and common facilities (working space, common house, children's room, guest room and laundry), and provides the route for walking traffic for the daily living (Figure 4-52). In addition, Figure 4-52 also shows the zoning strategy (distributions of private and common space) of the community, which further indicates two 'social activity centres' in the community with different priorities: 1) shared work relationships in the mill building; and 2) general daily communications and social events in the common house. The territory boundaries between private and common areas are clearly defined in the community and highlighted through colour codes in Figure 4-52.

As discussed in Chapter 2 (Literature Review), the common house is generally placed 'centrally' in the cohousing community to maximise accessibility for all residents. This aligned with the design principle of Lancaster Cohousing. Glazed canopies are installed at both north and south sides of the common house (Figure 4-53). The benches and chairs are placed in the transition area under the glazed canopy (Figure 4-53), and these sitting points can be viewed as stopping points for residents to stay (e.g. wait for the washing from the common laundry), meet and chat. Additionally, the bi-fold door is used at the south side of the common house, and can be used to break down the physical barrier between the common house and the outdoor cohouse terrace and integrate the indoor facilities with the outdoor space.

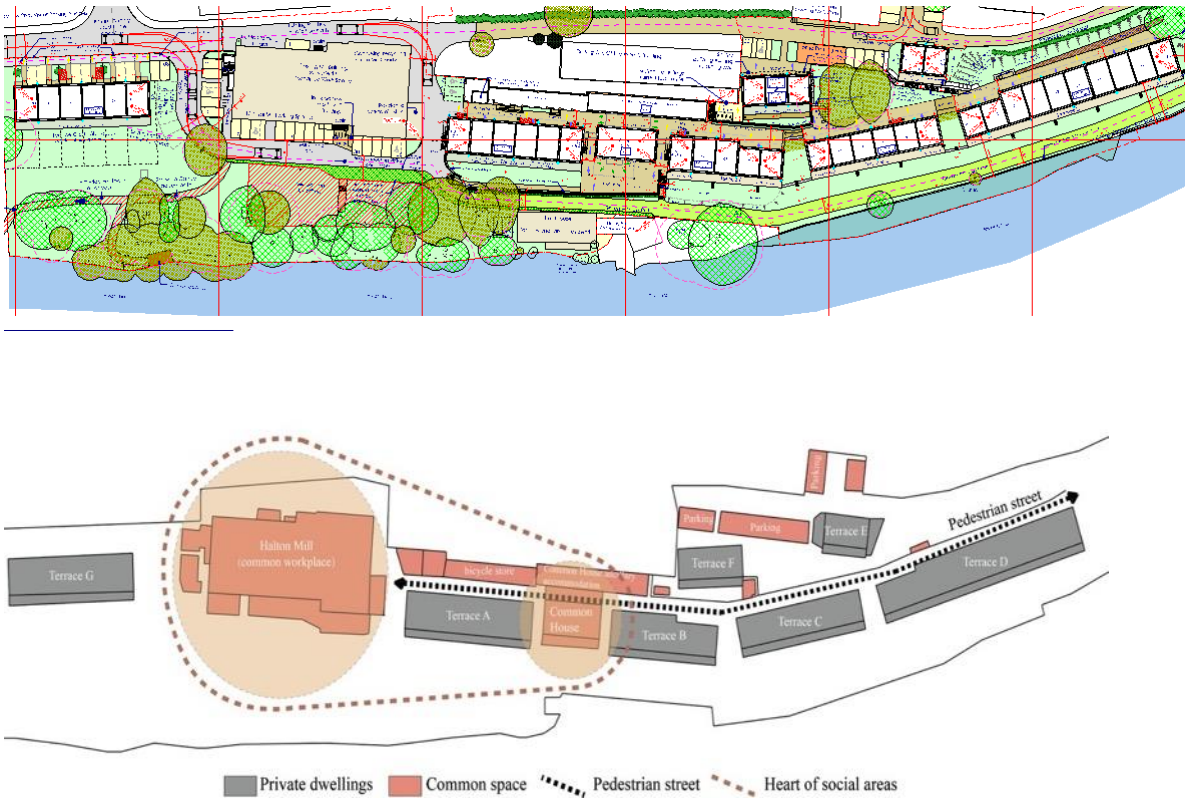



Figure 4-52. Lancaster Cohousing site plan analysis

Figure 4-53. Glass canopy between common house and ancillary accommodation

*Shared Facilities*

The shared facilities in Lancaster Cohousing include a common house with a shared kitchen and common dining space, laundry, storage room, a small food shop (Figure 4-55), children's room, guest rooms, workplace (workshops, offices, and studio), bikes (Figure 4-56) and car sharing. The distribution of the shared space is shown below (Fig.4-54). The shared area has a variety of functions with a compact arrangement,

which forms the heart of social area in the neighbourhood. The common spaces are connected by the pedestrian street with a glass canopy. The entrances of the common area (e.g. common house, laundry) face the pedestrian street, which provides the opportunities for residents to meet and make daily contacts. Space in the old mill building was divided into workshops, offices and studios for group members to use. The common house was placed in a single-storey building. Inside the common house, red walls created a warm and cosy feeling. The design of open layout kitchen in the common house breaks down the physical barriers of the indoor space, compared with the enclosed kitchen, providing more possibilities of interactions during the common meal and other social activities (Figure 4-58). The sofa lounge area in the corner satisfies the residents' seating preferences and meets social needs for small group gatherings with some degree of closeness (Figure 4-57).


Figure 4-54.Architectural plan of the common house

Figure 4-55. Small food shop

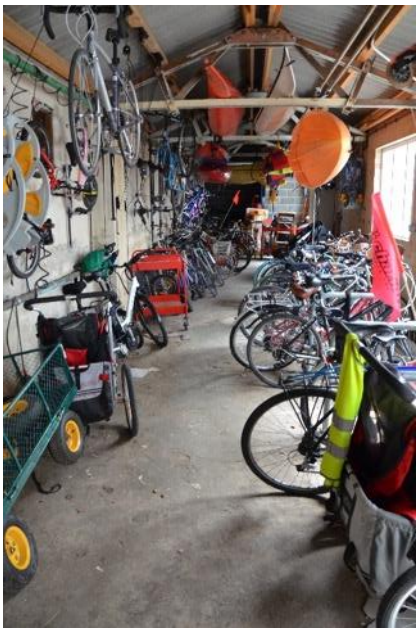


Figure 4-56. Shared bike shed

Figure 4-57. The sofa lounge area

Figure 4-58. The open layout kitchen

#### *4.3.1.2 Environmental Aspects: Building Preference Technologies and Historical Building*

During the desktop review, the study found that achieving environmental sustainability was the one of the drivers of developing Lancaster Cohousing. Based on the site observation experience, the environmental aspects were summarised into two categories: the building performance technologies; and the experience of working with historical buildings.

##### *Building performance technologies*

Lancaster Cohousing project is the first certified Passivhaus cohousing project in the UK (eco arc, 2013). Residents in Lancaster Cohousing benefit from several environmental technologies/ standards, including CSH (level 6), Passivhaus achieved through a south facing aspect and very high levels of insulation, airtightness (Figure 4-59) and MVHR, district heating system, a woodchip fuelled biomass boiler, solar panel, and a hydro-electric scheme. The biggest contribution of these technologies is to dramatically reduce the need for space heating. In particular, the airtightness, wind-tightness and water-tightness technologies largely contribute to the reduction of heating demands for each living unit. The airtightness barriers, insulation materials are also used for the sloping cathedral ceilings and windows (Figure 4-59, 4-60). These technologies work concordantly and contribute to different aspects of sustainability.

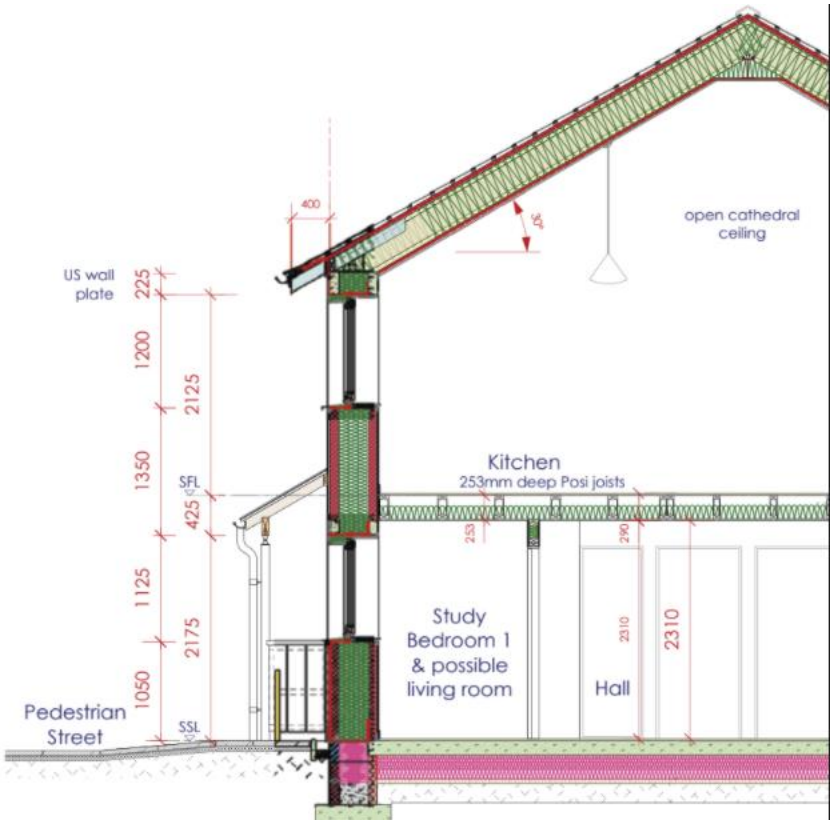



Figure 4-59. section of resident dwelling - wall and ceiling structure (Eco arc)

Figure 4-60. ceiling structure (Eco arc)

According to Lancaster Cohousing (n.d.), the PH can help the Forge Bank homes to reduce heating bills by 90% compared with conventional homes. Heating to each property is provided by means of a district heating system, and hot water in the community is provided by a woodchip fuelled biomass boiler (Figure 4-61) in the mill

building supplemented by solar thermal collectors. Hot water for domestic use (kitchen and bathroom) is also provided from the same system (Lancaster Cohousing, n.d.). Furthermore, solar energy played an important role in energy saving. Solar energy is collected by two types of solar panels: solar PV; and solar thermal, and both contribute to the creation of electricity and heating (water or air). Solar energy from rooftop solar PV panels is also used to power the group's electric car (Figure 4-64).

During the site observation, the study found that all of the environmental technologies were managed in turn by the residents rather than professionals. A unique phenomenon was captured within the management procedure, which is the training delivered among the residents about how to use and maintain building performance technologies in the community (Figure 4-62), for example, handing over the instruction books (Figure 4-63) to others and showing them how to operate the boiler room. This process was performed verbally by the residents. The training includes information regarding the heating controls, MVHR operation and filter replacement, ventilation controls and biomass boiler room operation. This process can build a very strong environmental awareness within the group, namely learning by doing, and also represents the spirit of collective management and shared duties among group members.


Figure 4-61. Biomass boiler

Figure 4-62. District heating controls

Figure 4-63. Instruction books


Figure 4-64. Electric vehicle charging point

*Working with historical buildings*

Halton Mill is a historical industrial building, built in the late 19th century as shown in Figures 4-65 and 4-66. (Halton Mill, n.d.). As part of the Lancaster Cohousing development, the mill building was developed as the shared workplace for the group. The building has been eco-renovated and produces electricity through rooftop solar PV panels. Further, it has been awarded a top A rating Energy Performance certificate and it is run completely on renewable energy (Halton Mill, n.d.). The renovated Halton mill has two floors, consisting of workshops, offices, studios, a common meeting area and a café. (Figure 4-67). Recycled and environmentally friendly materials were used for the internal refurbishment to create a vibrant and inspiring environment for small

businesses, community-based organisations, craftspeople, artists and freelancers. Retrofitting an existing building can oftentimes be more cost-effective and more sustainable than building a new facility. Following the site observation, the old mill building was retrofitted in an environmentally friendly way, it has been given new functions and new life. Instead of abandoning this historical mill building, this cohousing group's approach of working with the existing is more environmental friendly and valuable for preserving historical memory. The environmental practice conducted by the cohousing group towards this historical building not only represents the inheritance of history, but also shows the common vision of group members to reduce environment impacts and their achievement of a broader environmentally sustainable target.


Figure 4-65. Halton Mill

Figure 4-66. Indoor space of the mill


Figure 4-67. Halton Mill indoor plan
Source: Halton Mill

#### *4.3.1.3 Social Aspects*

The social aspects mainly focus on the subjective social activities of residents. As identified in the list of site observation components, the components related to social aspect for Lancaster Cohousing included: a) physical environmental shapes social connections; b) mutual support; c) community environment for raising children; and d) shared work relationship.

##### *Physical environmental shapes social connections*

Compared with the courtyard layout of the LILAC Cohousing project, the liner layout of Lancaster Cohousing has a stronger impart for residents' social lives. Specifically, it provides more opportunities for people to meet because, in order use the public facilities in the middle of the community, people have to pass their neighbours' front doors. This is highlighted in Figure 4-68. This liner walking traffic in the community offers more stopping points for residents to slow down, stop, meet and chat. Reflecting on Rapoport's (1977), components of environmental quality, he summarised that

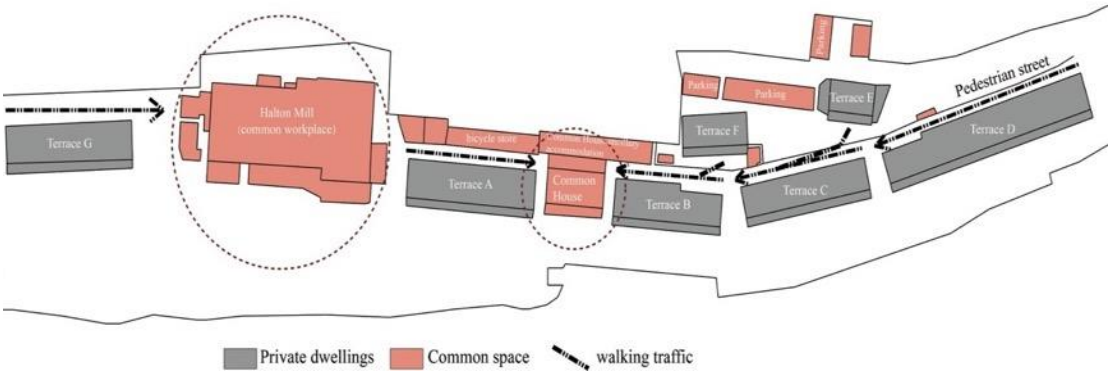



Figure 4-68. The linear walking traffics

‘neighbours’, ‘accessibility to various facilities’, ‘privacy’, ‘good place for children’, and ‘proximity to some services’ are the repeating components of evaluating environmental quality. These components are all reflected and linked through the linear pedestrian street, making the community more diverse and liveable.

As discussed in the LILAC project, the idea of private and public domains can be viewed as the distinction between the front and back areas of a dwelling; the front for display, presents a formal face to the world, and the back for private, places where behaviour can become less self-conscious (Rapoport, 1977). However, in Lancaster Cohousing, the ‘front’ and ‘back’ are not easy to define because of the community layout. Based on Rapoport’s definition, the side with a deck overlooking the river (highlighted in red in Figure 4-69) is identified as the front side of the terrace. Within the ‘front’ area, the deck preformed as the ‘edging area’ (the area between common and private areas) for people to put their plants, socialise, enjoy the river view, sit and chat (Figure 4-70). However, the ‘back’ area evidences no physical boundaries and is hard to define. As there is a green access path on the river side, the pedestrian street was placed in the middle of the community (Figure 4-69), therefore, the original ‘back’ areas are exposed to the pedestrian street with much less privacy for each household (Figure 4-71). Accordingly, I argue that there is much less private outdoor space in the

community than LILAC Cohousing. The edging areas are also limited because of the community layout.

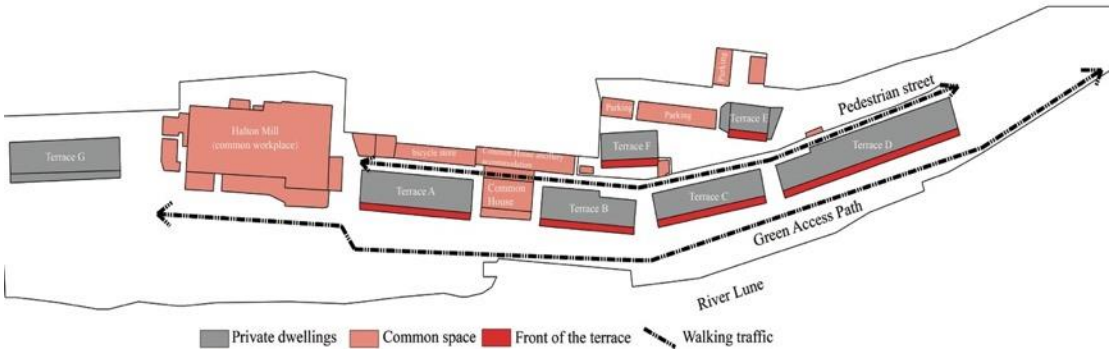



Figure 4-69. Front and back areas

Figure 4-70. Front side of the terrace

Figure 4-71. Back of the terrace

*Mutual support*

Mutual support is often understood as an intangible social feature in a cohousing community because it requires actions and is hard to record in the short time duration of site observation. However, in Lancaster Cohousing, I captured the following details

which can represent this supportive process. They include a ‘request for help’ board (Figure 4-72) and the ‘shared room for re-useable items’ (Figure 4-73).

Figure 4-72 shows a transparent process of ‘asking for help’ from others. This also provides a platform to support others by knowing where the help is needed. The board is divided into three columns, named as ‘essential-urgent’, ‘essential-not urgent’ and ‘desirable’. Each working team or individuals can list the task on the board with a description. I argue that this ‘list and receive’ process, through the provision of a simple board, fully demonstrates the essence of mutual assistance in a cohousing community.

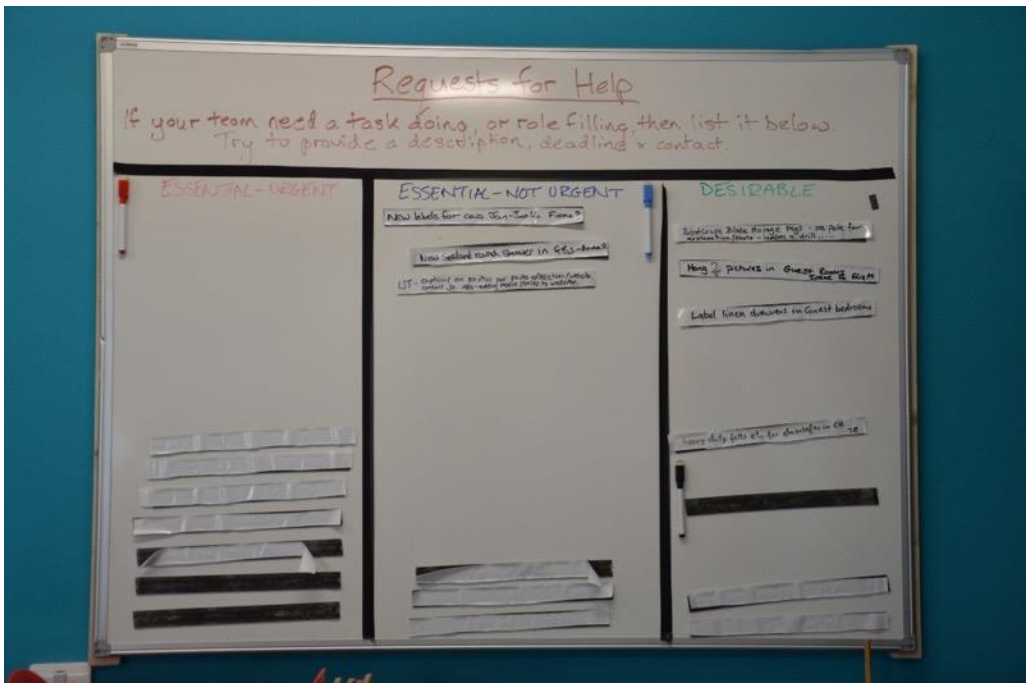



Figure 4-72. 'Requests for help' board

Additionally, this also represents the efficient and focused communication between group members and could reduce long and intensive meetings by just saying what is needed. The second feature is the shared room for re-useable items (Figure 4-73). It looks like a community non-profit ‘charity shop’. Residents donate reusable and clean items (e.g., books, CDs, clothes and bedding) into the room for recycling purposes. Sometimes, the group also donates items from the room to poor communities or

homeless people. The establishment and management of this room not only explains the community residents' understanding of environmental protection and sustainable use of resources, but also further illustrates the mutual support within and between communities.

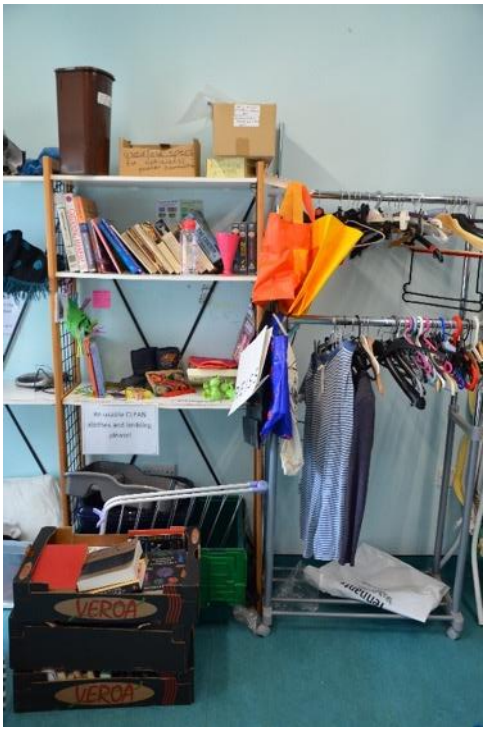



Figure 4-73. Shared room for re-useable items

*Community environment for raising children*

During the site observation, I captured the children running around and playing on the pedestrian street, the terrace of the common house, children's room and the river side. In Lancaster Cohousing, all cars are parked at the edge of the community or at the periphery. This arrangement provides a safe place for children to walk down and play with others. The residents are familiar with the children, they can check on them when they are passing by. There are many outdoor common facilities designed for children, including a climbing wall (Figure 4-74), trampoline and tree house. Meanwhile, children have their own space – the children's room (Figure 4-75), which means they do not have to play in someone's house. This provides them a degree of freedom and

independence and inspires them in terms of how to collaborate with others. Additionally, the common meal can help children to build familiarity with adults and other children. A resident I met during the observation procedure mentioned that children in the community very much enjoyed the common house meal every week. This not only relieves parents from the pressure of cooking for their children every day, but also acts a fantastic opportunity for children to make a contribution to the community by doing small things, such as helping with food preparation.

Figure 4-74. The climbing wall

Figure 4-75. The children's room

*Shared work relationship*

A shared work relationship is a very rare social feature in the UK cohousing model, in accordance with the site condition, group priorities and income level. In Lancaster Cohousing, the shared work relationship in the mill building can be viewed as a very unique form of social bonding in understanding the social pattern in the community. This also provides the cohousing group opportunities to develop community-level businesses for the community financial income and explore other levels of cooperation with the wider neighbourhood. This aspect will be explained in the following two

aspects: a) enlarged social-sustainable impact to the wider neighbourhood; and b) mutual learning and multiple levels of group collaboration.

First, although the mill building is part of the Lancaster Cohousing development, it is managed by a cooperative called Green Elephant. The mill space is not only used by cohousing group members, but it is also open to other individuals, small businesses and events from outside of community, for activities including conferences, art and craft workshops, films and courses. The empty desks are also available for people to rent. This management strategy creates opportunities for cohousing group members to communicate and engage with other social groups or individuals outside the community through the shared workspace, thus not being socially isolated from the surrounding neighbourhood. In other words, the shared workplace is performed as a platform for communication and interaction with the outside world. This building also 'invites' people from outside communities to understand the eco-renovated historical building and Lancaster Cohousing development.

Second, from the perspective of the cohousing members who use the shared workplace, exchanging their expertise, skills and knowledge is valuable for mutual learning (including intergenerational learning), and further enhances the multiple levels of group collaboration, such as developing a joint business or project. This also represents the concept of intangible sharing (e.g. sharing skills and knowledge) in a cohousing community.

### 4.3.3 Ethnographic Descriptions

The ethnographic description as a data analysis method is applied to illustrate the design focuses, social aspects and what I have learnt from Lancaster cohousing.

*4.3.3.1 Design Focuses*

First, the design strategy applied in a linear-planned community involves various linear design components, such as a pedestrian street, connected terrace, and glass canopies to connect common facilities. Due to geographical reasons, the intersecting community paths are replaced by a main pedestrian street. The private terraces and common facilities are arranged on both sides of the street. This linear layout can provide an unobstructed view for residents. In other words, the outdoor common life become more 'transparent' with less transition area between the terraced houses and the common area. This also provides rich opportunities for 'seeing and hearing' contacts (e.g., eye contact, wave to someone) for the residents (Figure 4-76).

Figure 4-76. Lancaster Cohousing linear plan

Figure 4-77. The open layout balcony

Furthermore, the private outdoor space with clear physical boundaries (e.g., a fence) in the community has been greatly reduced because of the arrangement of two paths (the Green access path and the pedestrian street), the private 'indoor' area in the community only includes private dwellings with a balcony (Figure 4-77). Between common facilities, glazed canopies are used to create some 'grey space' (transitional

space) that not only connects the common house with other shared areas, but also invites daylighting into the space and provides more possibilities and flexibilities of using indoor and outdoor spaces (such as the terrace) around the common house area. This also offers a sense of spiritualty and makes the space more interesting and interactive.

#### *4.3.3.2 Social Aspects*

Many characteristics can influence a community's social pattern, such as age, gender, language, religious beliefs, family structure and income level. During the site observation of Lancaster Cohousing, I mainly captured and discussed the following three social features: 'good environment for children'; 'shared work relationships'; and 'physical environment shapes social pattern'. By reviewing the observation notes, I argue that the social interactions and boundaries are geographically determinable. Specifically, the social activities are greatly influenced by the community layout and planning strategy. Living in a linear-planned community, the usage frequency of the overlapped path has greatly increased, which also creates more chance for people to meet. However, during the site observation, I identified one aspect which might be a disadvantage of living in a linear-layout community. This concerns the walking distance between private dwellings and common facilities, especially the common house. Some 'distant' residents have to walk a longer distance to use common facilities than those living nearby. This may lead to the residents dwelling further away having fewer social interactions with other group members or requiring a secondary level of common space close to their dwellings. This point has also been identified through participant interviews; detailed explanations can be found in Chapter 7 (section 7.2.2). Additionally, I argue that all group collaborations were fuelled by a common goal and shared interests. The common environmental concerns, low impact living, shared childcare and work relationships form the evidence. The common goal makes the community more cohesive and it is also key to problem solving for the cohousing group.

#### *4.3.3.3 What I have learnt from Lancaster Cohousing?*

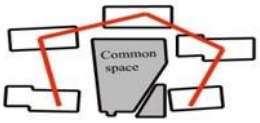
As a unique example of a sustainable cohousing project, Lancaster Cohousing provides detailed and comprehensive insights on cohousing studies. First, the linear layout of the community offers different approaches for managing the common, private and edging areas in the community. The pedestrian street connects all private dwellings and common facilities, and also provides unobstructed visibility for distance interactions and more opportunities to meet neighbours. Additionally, I identified that the edging areas (e.g. connected deck) become more open without concrete boundaries or fences between households, and also the private outdoor areas are greatly reduced. This is interpreted as the outdoor 'public life' for group members has less visual privacy and more opportunities for social connection. Therefore, I argue that the relationship between living space and residents in cohousing communities is mutual and cyclical. When people design and manage their living spaces, the living environment is also shaping the users' lives. Perhaps residents simply change the location of a bench, which indirectly changes the subsequent social interactions.

Second, the historical mill building on the site is endowed with new life. In other words, it not only contributes to the sustainable goals of the cohousing development, but also promotes a new dimension to the social life – shared workspace and work relationships – for the group members. Finally, all environmental technologies used in the community are managed by the residents themselves rather than outside professionals. This procedure is very rare but inspiring because, in managing these technologies, the residents not only learn about the operating knowledge of relevant technologies, but also develop a common awareness of environmental protection and a common sense of community responsibility.

## 4.4 Cross-case Analysis (CCA)

This section aims to compare the observation findings between the two selected cases and identify key points or categories to conduct design recommendations for policy making and future practice. The discussion was produced by considering the design, ecological, and social domains. Comparable information between cases was selected based on the ***common*** components ('community layout design', 'physical environment shapes social connections') of data collection listed in Figure 3-7 in Section 3.4.2.3. The comparable components included: 'community layout design'; 'community zoning'; and 'physical environment shapes social connections'. I summarised all valuable concepts or items from both cases; these are listed in the last column of Table 4-1 which provides detailed information.

Table 4-1. Cross-case comparative analysis

| **Domains** | **Design items from LILAC** | **Design items from Lancaster Cohousing** | **Comparative analysis for conducting recommendation** |
|---|---|---|---|
| community layout design | Site topology: courtyard plan   | Site topology: linear plan   | Two types of typical cohousing community layouts. The common houses are placed centrally in the community |
| community zoning | ■ Private, common and semi-private areas.<br>■ Communal productive garden.<br>■ Most of the common facilities are arranged in the common house or in the common house's extension.<br>■ Intersecting paths.<br>■ Cars are pushed to the edges of the community.<br>■ Bi-folding door is used to connect the indoor and outdoor spaces. | ■ Private, common and semi-private areas (connected terrace for each dwelling).<br>■ Shared workspace in the mill building.<br>■ Common facilities are distributed in the different single-storey buildings, connected by the glazed canopy.<br>■ Main pedestrian street.<br>■ Cars are pushed to the edges of the community.<br>■ Bi-folding door is used to connect the indoor and outdoor spaces. | ■ Define the boundaries between private, semi-private and common areas. Activating semi-private area is key to social interaction.<br>■ Common working area (e.g. a productive garden, a shared workplace) is desirable.<br>■ Designing paths for social needs. Considering the |

| | | | |
|---|---|---|---|
| | | | distance between dwellings and common facilities.<br>■ Car parking area should be placed at the edges of the community to offer a safe and walkable community environment.<br>■ Bi-folding door and canopy are useful components to connecting indoor and outdoor spaces. |
| physical environment shapes social connections | ■ The orientation of windows and the locations of outdoor sitting points are important.<br>■ Good quality of outdoor sitting.<br>■ Accessible paths with ramps and tactile features for supporting people in need.<br>■ Lighting for the community paths.<br>■ Decorative features and a planted landscape makes the community more liveable, identifiable and interactive.<br>■ Open layout balcony designed for multiple-layers communication (eye contact and body language). | ■ The pedestrian street connects all family, private and common areas. Overlapped walking traffic in the community provides rich opportunities for residents to meet.<br>■ Sitting points are provided in the common-house area;<br>■ Reduced 'back' area without physical barriers for each household.<br>■ Open layout balcony designed for multiple-layer communication (eye contact and body language). | ■ The courtyard plan (windows and sitting points face towards the common area) can provide a common view and a sense of security.<br>■ Consider the location and types of sitting point.<br>■ Consider the accessibility of the community paths. Age friendly features should be included (e.g. ramp, tactile materials).<br>■ Decorative features and a planted landscape can greatly improve livability.<br>■ Open layout balcony could increase the multiple-layers communication. |

## 4.5 Conclusion

To conclude, this chapter identified site observation priorities, data collection procedures and findings for each selected case. The observation activities guided the theoretical framework and considered design, environmental, and social domains for the cases. The CCA was produced at the end of the chapter. I employed same writing

structure to analyse each case. It started from the desktop review, followed by the explanation of site observation findings, finally, the ethnographic descriptive analysis was conducted. As two typical cohousing communities in the UK, LILAC Cohousing with courtyard community layout and Lancaster Cohousing with linear layout can create completely different social patterns in the community. I summarised that the social interactions and proximities are greatly shaped by the physical environment. The strong social focuses have been placed between two cases in the following aspects: visualising social connections, common meal, good environment for children and common work relationship. Furthermore, the study found that these two cohousing communities could largely contribute to ecological sustainability by adopting various design standards, environmental technologies and water system. Environmental concerns are one of the priorities of designing of the community. Finally, the CCA were provided in accordance with the common design components of the two cases identified in the theoretical framework. The CCA results, interview findings and results of secondary analysis will be combined to produce the overall design recommendations for multiple stakeholder groups of the cohousing model. The next chapter will examine the housing motivations of cohousing members in the UK context.

# Chapter 5 : MOTIVATIONS OF COHOUSING GROUPS

## 5.1 Introduction

The UK is facing challenges in the housing market including meeting sustainability targets and achieving low carbon lifestyles (Meltzer, 2005; New Statesman, 2019). In recent years, there has been a debate highlighting cohousing and its collaborative living style. Scholars have identified a number of benefits that cohousing can provide, particularly for older people (over the age of 60 or 65) (Brenton, 2013; Durrett 2009; Glass 2009; GMHA, 2018; Stevens-Wood, 2018; Williams, 2005). However, cohousing developments and shared community living face a number of particular challenges and obstacles, such as urban planning restrictions and financial difficulties (Chiodelli & Baglione, 2014; Riedy et al., 2018). Therefore, it is necessary to investigate a cohouser's motivation for creating or entering into cohousing communities in the UK in order to inform cohousing community living for the future.

This chapter aims to identify what motivates people to enter a cohousing project and to understand the differences between architects' and group members' opinions towards collaborative living. Semi-structured interviews with six architects (the architects from LILAC cohousing and Open House Project are also the cohousing residents who live in the community) and 16 cohousing group members (seven pre-residents, nine existing residents) were undertaken in order to answer the central research sub-question : What is your motivation to create or enter a cohousing community?

This study argues that social aspect was the driving characteristic attracting people to a cohousing project. This chapter focused on social aspects related to cohousing, but environmental, financial, family, and health aspects were analysed as well. Potential issues were identified based on the experiences of group members and the architects,

which showed the concerns and obstacles experienced by cohousing group members. The study used content analysis methods to explain the social phenomena and identify the importance level of group motivations. The data collected was examined through a process of qualitative content analysis using thematic coding techniques (Robson, 2011; Saldaña, 2015). In this study, the analysis started from breaking data down into smaller units to reveal their characteristics and structure (Dey, 2003). The key categories were then produced by summarising participants' interview answers using open, selective, and structural coding. This importance level could be useful to understand group member's needs and preferences in the UK context and to guide better community housing design in the future.

## 5.2 Group Members' Motivations

The 'human needs theory' from Maslow (Maslow, 1943; Mcleod, 2007) and human's decision-making theory (Edwards, 1954) guided the study in terms of needs hierarchy, such as family aspects, sense of security and respect of/ by others (which are discussed in this section). This research found that the motivation for entering cohousing represented a very difficult and complex decision-making process. Entering a cohousing community demands a higher investment of time, energy and money compared to standard housing. Many aspects simultaneously affect the housing decisions of group members, such as health, marital status, and financial assets. Reflecting on decision-making theory, cohousing group members made housing decisions based on an understanding of themselves, their lifestyle, emotions, and previous life experiences. The interview results show that social purpose is the dominant aspect for people to consider joining a cohousing community within selected cases. For both groups, there were similar social aspects as indicators to define their motivations, including 'sharing', 'community belongings', 'like-minded people', 'multigenerational living' and 'previous living experience.' At the same time, environmental sustainability and financial aspects became important aspects which

can largely influence a group member's decision making. The analysis was also conducted to understand the relationship between older people and cohousing communities.

Concepts summarised from the responses of architects and groups members were presented separately (see Table 5-1 & Table 5-2). The results were reached by summarising the data correlation patterns (e.g. residents' experiences were different, they use different ways and terminologies to describe similar ideas.) from the coding procedure of qualitative content analysis, also by calculating the key-concepts frequency and also considering how many concepts have been suggested in each aspect. Key-concepts frequency presents how many times the key concept was agreed and repeated for each aspect by each participant. The frequency with which participants spoke about the motivations that they valued is an indicator of its relative

Table 5-1. Categorised concepts summarised from Cohousing architects' interviews

| Ranking | Aspects | Key Concepts |
|---|---|---|
| 1 | **Social aspects** | • **Living closely with like-minded people (e.g. friends, similar ages)**<br>• Sharing (meals, time and values)<br>• Multigenerational living<br>• Social interactions<br>• Previous (living) experience<br>• A sense of belonging<br>• A sense of security<br>• A housing option |
| 2 | **Environmental sustainability** | • **Low/ less environmental impact**<br>• Sharing resources<br>• Reduced car use |

| | | |
|---|---|---|
| 3 | **Financial aspects** | • **Inability to afford a larger house, needing to downsize**<br>• **Better insulated, reduced living costs**<br>• Not necessary to have a car |
| 4 | Family aspects | • Child care; A safe and healthy environment for children to grow up in |
| 5 | Health (physical & mental) | • Personal physical conditions mean an inability to cope with larger properties<br>• Feeling isolated and lonely |
| 6 | Location | • The Community is located within an urban area |
| - | Older people's housing options | • Intergenerational living with mutual support<br>• Financial choice |
| - | Boosting factor | • Site for sale |
| - | Policy | • Special funding available |
| - | Personal preference | • Testing architectural skills<br>• Wanting to do something different and having fun |

Table 5-2.Categorised concepts summarised from Cohousing residents' interviews

| Ranking | Aspects | Key concepts and frequency |
|---|---|---|
| 1 | **Social aspects** | • **Previous (living) experience**<br>• Multigenerational living<br>• **Living closely with like-minded people**<br>• Community living is found to be more interesting<br>• Asking for support and supporting others; giving and taking<br>• Cohousing means private spaces with shared facilities |

| | | |
|---|---|---|
| | | • Trusting people<br>• Sharing (meals, time, values)<br>• A sense of belonging |
| 2 | **Environmental sustainability** | • **Ecologically sustainable living (e.g. growing food)**<br>• Ecological principles on which to build<br>• Eco housing: saving energy<br>• New-build<br>• Sharing transportation; encouraging the use of public transport |
| 3 | **Financial aspects** | • Finding a site for sale at a reasonable price<br>• **Having a low income, this community is affordable for me**<br>• Inability to afford a larger house, needing to downsize<br>• Interested in affordable eco-housing, Cohousing was a good choice for me<br>• Dysfunctional housing market in the UK means that mainstream housing is very expensive<br>• Cohousing as an investment project helping young people to join and rent, giving them a housing alternative<br>• Financial benefit |
| 4 | Health (physical & mental) | • Personal physical conditions mean an inability to cope with larger properties<br>• Feeling isolated and lonely<br>• Delaying or avoiding going into a care home |
| 5 | Family aspects | • A family member is the project architect<br>• Getting older, wanting to live closely with children<br>• A family member wanting to try Cohousing<br>• Childcare; A safe and healthy environment for children to grow up in |
| 6 | Location | • The location is good, I like this city |

| | | |
|---|---|---|
| | | • The Community is located within an urban area |
| - | Older people's housing options | • Intergenerational living with mutual support<br>• Financial choice |
| - | Boosting factor | • Sheffield Cohousing Network<br>• An American book about Cohousing<br>• Visited built Cohousing communities<br>• Friend recommendation |
| - | Policy | • The site has been donated to Sheffield city council, where the council has allowed a change of its use to residential |
| - | Personal preference | • I wanted a place that was already up and running. I didn't want to spend too much time looking for property and waiting for it to be developed |

importance. The sum of the concepts and key-concepts frequency were balanced out to avoid computational vulnerabilities, such as very high word frequency but very small quantity of concepts.

This section provided more details for the interview data. The meaning and focus of each aspect were analysed and supported by participants' quotes. The similarities and differences were compared between the two groups. Through content analysis procedures, this research identified that the top three motivations from participants were: social aspects; environmental sustainability; and financial aspects. This finding echoed with the sustainable reasons (environmental, social and economic) of choosing a cohousing as evidenced from the literature review. The answers of architects and group members showed a similar pattern within selected cohousing communities. The two groups worked closely to co-design [1]the neighbourhood and demonstrated a high

[1] Co-design: this term is an abbreviation of collaborative design. It represents the collaborations between architects and residents in the design and planning stage

level of mutual understanding. They acknowledged that social aspects became the determining aspect for people to consider joining a cohousing community (see Figure 5-1).

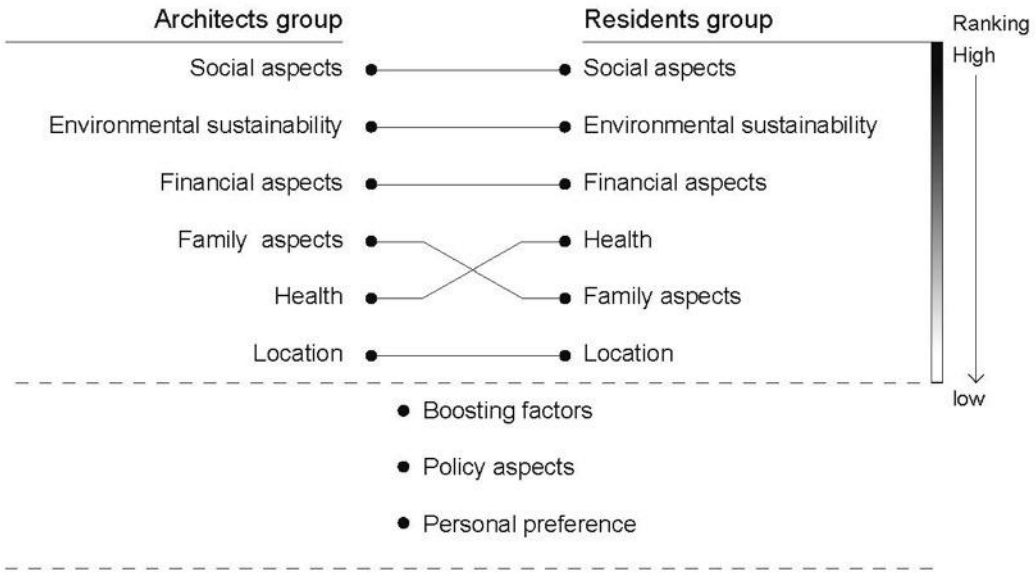



Figure 5-1. Main finding categories

However, small differences can be found showing that residents saw health aspects as slightly more important than family aspects. The results also showed that residents gave more thought to the 'individual-group needs balance' than the architects. Whereas, within environmental sustainability, architects concentrated more on the application of environmental design standards than the residents. Finally, site location emerged as one of the considerations for people to select a cohousing community, with community in the urban area being the focus of the participants.

The research has also paid attention to the older people group. They have become the largest cohousing interest group in the UK. In other words, cohousing can nowadays and in the future be a housing option for older people. The Intergenerational living with mutual support and financial conditions were highlighted as key aspects by many

participants, especially older group members. The interview data towards these two aspects were analysed and explained through content analysis in Section 5.3.

Additionally, some other factors were also mentioned in the interviews. They included: ‘policy’ (e.g., UK housing policy changes, governmental regulations, political changes – Brexit), ‘boosting factors’ (these are trigger aspects rather than determining reasons, as they attracted the attention of people and promoted recognition of the cohousing model. These factors could encourage people to consider cohousing communities as a living option, such as an inspiring book, convincing research, or a TV program introducing the cohousing model; a cohouser friend recommending this living model to others), and ‘personal housing preference’. These aspects were mentioned by very few participants, which suggests that they are not mainstream considerations. However, they still emerged as relevant by the content analysis and they had impacted on group members’ housing choices. (see Table 5-3). Therefore, these aspects were categorised as a secondary set of aspects. Meanwhile, participants also pointed out that these aspects (‘policy’, ‘boosting factors’ and ‘personal housing preference’) can be very random and flexible (e.g. housing preferences could be entirely different depending on the living experience), hard to predict and control (e.g. cannot predict and control policy changes) for them as cohousers.

Table 5-3. Policy, personal preference and boosting factors

| | |
|---|---|
| **Policy** | Policy factors may include:<br>• Government funding<br>• Discount for buying a property/ having affordable properties on site<br>• Released site from city council or local authority<br>• Government political support for social housing or community |
| **Boosting Factors** | Boosting factors can be interpreted as:<br>• Extra resources available (e.g. network, websites, books and newspapers)<br>• Site available or land with reasonable price<br>• Special experience (e.g. trip, Cohousing site visit, previous experience)<br>• Friend recommendation |
| **Personal Preference** | • Prefer to live in a new-built community;<br>• Prefer to live in a community which is already up and running;<br>• Prefer to live in a city not suburbs |

### 5.2.1 Social Aspects

As discussed previously in Chapter 2 (section 2.3.1), social contact and social network can be an important aspect for making a decision on housing. Looking at the characteristics of a social structure in a cohousing community, it was necessary to understand the dominant social aspects in a cohousing group. These driving aspects might have been different from a community's vision and mission. They may also depend on demographic composition, the background of group members and their average income. Within the two interviewee groups, 'living closely with like-minded people' became the most important social reason for people who had decided to join

a cohousing community. This result provides the link between social purposes with housing decisions and highlights the importance of like-minded people with similar values. From their point of view, like-minded people could be a group of friends, people of similar ages or backgrounds, or people who could share similar values, even though,

sometimes, a cohousing project meant a substantial amount of organisational work and intense meetings. Group members reported during the interview:

> "People are trying to do hard things with lots of kindness and gentleness", and "People are working together as a team and looking after each other" (Cohousing Member RO16, Female).

> "I want to live very close with the people who can share my values" (Cohousing Member RF3, Female).

> "It is about social existence, with meaning to it. There was something missing in my life, I needed to create again that kind of social bonding, feeling hopeful and joyful rather than to worry, to be anxious, and depressed about what happening in the world. For me, it is important to do this alongside people to share similar values to me and also challenges around change as well" (Cohousing Member RO15, Female).

Additionally, Figure 5-2 shows that previous living experience played an important role in guiding group members' choices. Some of them shared living spaces with others when they were quite young or shared a house with friends or other families. Some people had lived in a commune or housing co-operative for years, whilst others had no experience sharing with others, but they had visited similar types of social housing often and they had found this kind of living attractive. These experiences had brought them honest and joyful feelings, an ability to trust those people around them, making them aware of the implications of cohousing and its social identity. Residents groups also mentioned that this type of living could help them understand that "this is how people and community should be" (Cohousing Member RF3, Female).

Therefore, members wanted to create this social bonding again, being with other people. Furthermore, multigenerational living makes cohousing more diverse. Mutual

support could be provided from different generations, with different age groups benefiting from this.

> "I absolutely love being around kids, so the idea I can live in a place where there are older people I can learn from, and younger people I can play with" (Cohousing Member RO16, Female).

> "Some people can go and do the shopping and carry the heavy stuff, the older people can be virtual grandparents, then babysit for the kids, they like the kids a lot" (Cohousing Member RK6, Male).

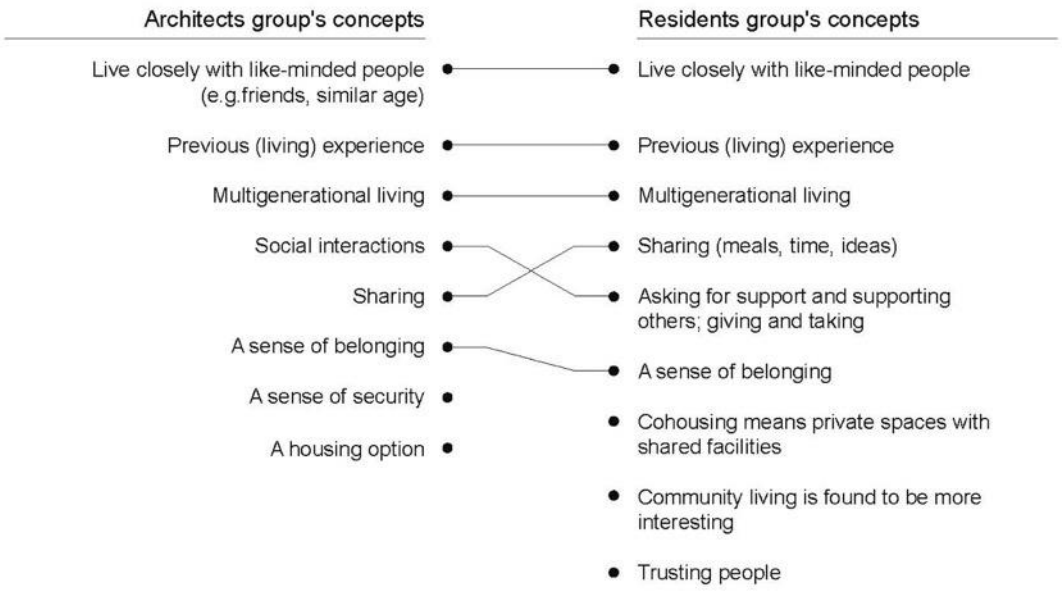



Figure 5-2. Social aspects

Although both participant groups agreed that social benefits are the most influential aspect attracting people to enter cohousing, differences can be found between residents, pre-residents and architects. The difference between residents and pre-residents can be summarised as the differences between 'expected benefits' and 'real benefits' (ex-ante and ex-post the settlement). In other words, this refers to cohousing community living: pre-residents were 'expecting' and 'imagining' it; but the residents were experiencing it. The criteria motivating entrance into a cohousing community

changed following settlement. For example, existing residents began to prioritise their personal needs. Pre-residents concentrated more on the idealism or process of contribution to the community and collaborative actions, while residents emphasised the balance between individual and community needs. Meanwhile, some pre-residents expressed that they felt excited and even a bit nervous regarding the upcoming residential experience in cohousing. They acknowledged that the biggest benefit for this type of living is mutual support. Some existing residents appreciated the support given by the community. However, they placed more value on the equality of expressing opinions and ideas in the entire community and the process of group problem solving.

Even though social aspects were the driving aspect for people joining a cohousing community, there were still some negative comments made by the existing residents, mainly about the decision-making process. The decision-making process could also create frustrated feelings, for example, as a resident reported:

> "It was difficult to make decisions while other people are waiting, got meetings to wait for people to make up their mind-what they want to do, before we could go ahead with things. I found that is a bit frustrating" (Cohousing Member RL11, Female).

Additionally, the biggest difference found between architects was about two types of 'balances'. Group members indicated that the 'give and take balance' and the 'private and public balance' were fundamental social aspects for them (See Figure 5-2, Resident group). Some group members pointed out that being in cohousing was not just about contributing to the community and sharing, it was also about the community allowing them to 'have my own front door' and to 'take something in return' from the interactions of the community. These details have been neglected from the design process by the architects' group.

> “I think you have to be slightly ‘selfish’ to survive in a cooperative situation, you have to make sure you are getting enough of what you need and to be able to cooperate with other people” (Cohousing Member RL10, Male).

> “What we hope will be clear to everyone who joins, is that those who participate the most, give the most, and will get the most in return” (Cohousing Member RK6, Male).

> “I like the combination though in cohousing of having a private space, as we say have you own front door, but then a lot of shared living as well” (Cohousing Member RF3, Female).

Additionally, the ‘sense of belonging’ and the ‘sense of security’ have been addressed by the two groups. These details were well presented through cohousing features. Sense of security is connected to trust. Being part of something and feeling secure could also contribute to good mental health, as some residents mentioned: “You will not feel isolated, here is like an extended family” (Cohousing Member RO18, Male).

> “I feel the main motivation for me was to be part of setting up and living in…” (Cohousing Member RL11, Female).

> “...is to do with looking for sense of home, looking for people to look after and be looked after by, to have a caring community” (Cohousing Member RO16, Female).

### 5.2.2 Environmental Sustainability

Ecological sustainability is a principal aspect of those wanting to join a cohousing community. However, not all group members consider the ecological aspects at the very beginning. Environmental sustainability includes several aspects, such as sustainable living, reduced food purchase, joint travel, sustainable technologies, design standards, construction methods and materials. Environmental concerns are

strongly linked with group financial situations as well. As materials can be very expensive, it also depends on the size of the site and each private unit. Within the two groups, 'low environmental impact and sustainable living' was the most significant environmental motivating concept. The pre-residents group gave more attention to what kind of ecological principles could be applied in a small house and how they could save more energy to reduce their living costs. However, after moving in, residents concentrated more on the details of daily living and environmental behaviours, for example, making vegetarian food for all common meals, and some existing residents described that neighbours' behaviours of carefully sorting household and garden wastes encouraged group members to do more recycling. In contrast, architects thought the concepts of 'reducing car use' and the design of car-parking areas on site were more important (See Figure 5-3). This difference represents the point that pre-residents, existing residents and architects were paying attention to different perspectives of environmental sustainability. Value engineering was mentioned by some group members, as it could significantly help to balance the group's 'ambition' to achieve a greater level of environmental sustainability with a group's financial capabilities before the start of construction.

> "I would say they have some environmental motivating factors. They want to live in a more sustainable way" (Cohousing Architect AK3, Male).
>
> "For environmental reasons, I wanted to live in a new build that is well-insulated and well-built, but a new build is the most expensive option in Cambridge" (Cohousing Member RK6, Male).
>
> "Now we are using as little energy as possible" (Cohousing Member RL11, Female).
>
> "I wanted to be involved in a group constructing new build housing which would be a sustainable, eco-friendly construction, because in order to live in that way, it seemed to me, it would be affordable if I got involved with

other groups of people who are doing it too. I don't want to carry on heating the air- sort of wasting resources on living in a house that wasn't built properly" (Cohousing Member RF5, Female).

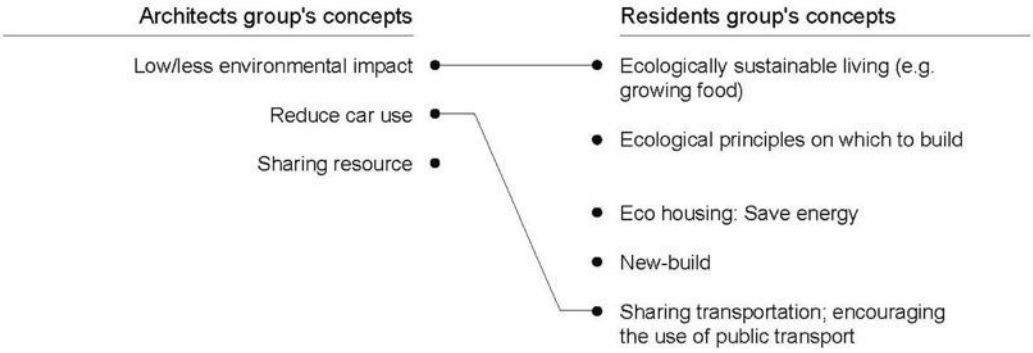



Figure 5-3. Environmental sustainability

Moreover, a car sharing scheme is available in some communities. Residents are encouraged to reduce car use by sharing cars and car-miles. Group members also mentioned that cohousing schemes encouraged them to choose public transport rather than driving a car. This option potentially reduced the environmental footprint of the community and relieved the pressure of traffic jams. Compared with the extant literature, the findings of this study provide a more detailed view of environmental sustainability and interesting arguments based on the responses of the participants.

### 5.2.3 Financial Aspects

Due to the dysfunctional housing market in the UK, mainstream housing is very expensive, especially for new built housing. This provided opportunities for cohousing communities to grow and develop. Some older people have chosen cohousing because they had lower incomes after they retired, their children had left home, and they wanted to downsize to a smaller property (cheaper to maintain). They were still mobile with reasonable health and were seeking retirement properties with 'care', so cohousing was an alternative option for them. For young people or young families

presently, despite some government grants, they face difficulties in accessing any form of housing without savings or a property to sell. If properties need to be sold at the market price, cohousing cannot be cheaper than other types of housing. However, collaborative design (co-design) processes (involving group members into the design process to discuss energy saving strategies, and well-insulated features to reduce living expenses) and sharing schemes (share cars and meals) are typical of cohousing and provide the potential to reduce living costs to the greatest extent. Additionally, a robust financial model in cohousing could make a significant difference to both young and old generations. A typical example can be found in the LILAC Cohousing development (Chatterton, 2014). Additionally, some cohousing groups allow people to rent before committing to buy, or have affordable flats on site (25% less than market price) to make the cohousing scheme more accessible to wider social groups. The UK Prime Minister's election manifesto proposal (BBC, 2017) announced:

> "All care costs, including residential care costs, must be paid for by any individual user whose total assets, including the value of their home is greater than £100,000. At present, in many councils, care users who have more than £23,000 and require residential care must sell their home immediately to fund their care; this has been criticised for making it impossible for the care user to their home".

This is not just a massive mistake but a cruel attack on vulnerable people the length and breadth of this country (BBC, 2017). There is no comparison between cohousing and care home. Additionally, there is no obligation for cohousing members to provide care. However, a cohousing community and its mutual-support scheme have the potential to maintain the independence of older people and support them to stay in their home as long as possible. Social care services can be provided from outside caregivers. This is potentially a good way of keeping property capital value for the cohousing members and also accessing some level of care.

As highlighted in the literature review, finance has been identified as one of the major barriers for people to join a cohousing community at the moment. Due to the very long process of cohousing development (up to seven years), the housing prices can increase, making it even harder for pre-residents. As one of the pre-residents complained:

> "The property price gone up by maybe 20% in six years, so that is 20% more I have to save that, to be able to buy a place at the same size. If I know it would take six years, I would probably have bought somewhere. I probably would also drop out" (Cohousing Member RK6, Male).

This example suggests that it may take a very long time to see the long-term financial benefits of cohousing communities. For example, adopting design standards that aim to assist older residents in the home environment. This saves a lot of money on retrofitting the facilities in the home later when needed.

During the interviews, no significant differences were identified between existing residents and pre-residents towards financial aspects. Both groups were aiming for affordable, manageable and sustainable housing to live in. However, people did express different understandings towards the cohousing model. One current resident argued that "most of cohousing communities are for rich people, because many of them are developed in rural areas rather than in the cities, most British cities have cheaper housing than rural areas" (Resident RL11). However, different opinions existed. A current resident pointed out that cohousing communities could be readily affordable if special financial schemes and energy-saving technology were adopted, and that architects could also save money in the construction process. In the meantime, a small difference between residents and architects was that the architects gave more thought on the affordable and practical approach of reducing living costs, such as using environmental technologies and providing better insulation for the houses (see Figure 5-4). Accordingly, reasonable financial models and financial advice need to be

addressed to increase both the accessibility and standardisation for the cohousing model. Education is also needed from the government level for people to understand and accept the cohousing model as a living option, particularly for young people and vulnerable groups.


Figure 5-4. Financial aspects

### 5.2.4 Family Aspects

Safe and healthy environments for children to grow up in is a driving aspect when families consider this option (Figure 5-5). Indeed, it was a common idea shared between the two groups. The benefits of intergenerational living mean that children ideally could learn from different people in the community and understand the diversity of society. They could find their life role models, learn how to respect people and the importance of taking responsibility. However, this type of living may cause a reduction in terms of private family time with children. Further, there is the potential for older people to contribute to the community via offering support to the younger generations with older people also benefiting from being around children:

"We only have one child, my wife and I thought, this could give her a bit of social background" (Cohousing Member RL9, Male).

"Young couples they were planning to have a family or young couple with young children, they were looking for somewhere where the kids could benefit from living in the community interactions with more people, not being isolated" (Cohousing Architect AK3, Male).

"... a cohousing project, it is an interesting opportunity in terms of child-care". Cohousing architect AO5, Male.

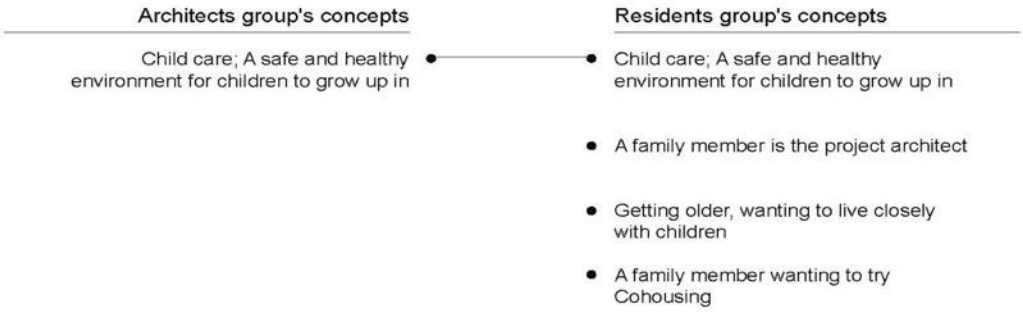



Figure 5-5. Family aspects

### 5.2.5 Health

Some older residents reported that declining health was one of the influential aspects which cannot be neglected from group motivations. That health-related issues affected housing choices can be seen as a common fact between selected cases and participant-groups. The visions related to health needs raised from existing and pre-residents were very similar. Precisely, the explanations of health aspects were given by architects and cohousing group members, indicating that older group members struggled to look after large properties (decline of physical capabilities) and felt isolated and lonely (Figure 5-6). Resident's groups highlighted that feeling isolated was a massive problem which could cause mental health problems, such as depression and anxiety. The unique social settings of a cohousing community offer a useful social platform for people to meet and communicate. At the same time, social benefits

towards mental health can also be interpreted as intergenerational living. People meet for daily tasks, and members also feel needed and valuable by supporting each other.

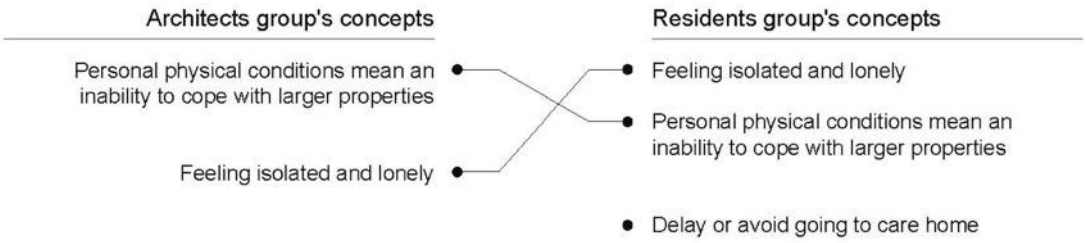



Figure 5-6. Health

This could be a sustainable answer to reducing isolation and maintaining privacy. In terms of physical health, residents mentioned that they had less energy to cope with a big house or young children. For example, their health conditions do not allow them to climb stairs or do massive cleaning, they prefer smaller houses with less maintenance, or special housing features to support them age-in-place. As mentioned in the extant literature, cohousing community living and adding assistive technologies may present some financial challenges for older residents. However, it provides a type of flexibility for residents to express their real needs and manage their houses. This could be an option to delay or avoid going into care home facilities by living in a supportive community with age-friendly housing features.

> *"*We are getting older, we don't have the energy anymore, we are hoping to downsize to something affordable with less maintenance" (Cohousing member RO15, Female).
>
> "I am getting older, having that community around me would be very useful" (Cohousing Member RF3, Female).

> “In the UK, there is such a trend of isolating older people, I am interested in some projects, or a movement in fact, that try to re-integrate older people, and also provide the common life for everybody” (Cohousing Member RF3, Female).

### 5.2.6 Site Location

When talking about choosing a cohousing site location, it is necessary to consider group preferences in choosing a community. The considerations of group members were included in this aspect: i) friends live in the community/ neighbourhood or live in the same city; ii) reduced work miles or if there is a need to drive to work; iii) good infrastructure in the city (See Figure 5-7). “Preferring to live in the city” was the key answer when interviewing the two groups. Some cohousing residents expressed that they had previously lived in different cohousing communities, both in urban and rural areas. They stated that they preferred to live in the city rather than a sub-urban or a rural area.

> “I was particularly interested in living in a city, because most people in the world, have to live in cities, and most of us depend on that for many of the things we want for our everyday needs, lives are made, manufactured by people who live in cities. So, it is part of life, I thought this is good bases for a good group I would like to join” (Cohousing Member RL11, Female).

Referring to the issue of community location, participant-groups are not comparable because not every participant considered this issue. Most of the participants chose the community located in the city they were currently living. They had no intention to move out of the area (due to the cohousing development in the UK, there are few alternatives in the same region). Only three participants mentioned that they chose cohousing communities across the country, deciding to go for an affordable community in an urban area where they had friends nearby.

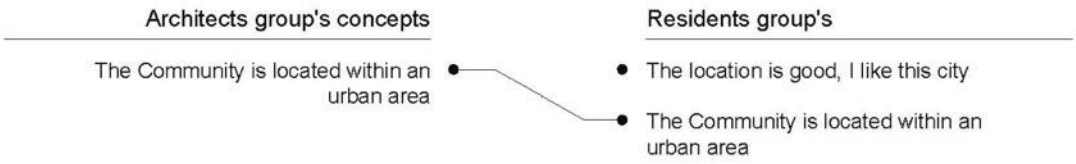



Figure 5-7. Location

## 5.3 Oder People and Cohousing Communities

The sections above summarised the main aspects of housing decisions for people who created or joined a cohousing community. This Section will discuss the relationships between older people and cohousing communities. In this research, the term 'older people' is defined as someone is over the age of 60. Why this research paid close attention to the older people as a very special cohousing audience group? This is cases are intergenerational cohousing), older people became the special and biggest audience group of selected cases in this study. Taking Lancaster Cohousing as an example, even though the community named itself as an intergenerational group, however, a majority of residents are older people. If taking senior cohousing into consideration, older people become the largest audience group of cohousing model in the UK. The interview results showed that all participants (architects, current residents and pre-residents) agreed the concept of "cohousing can be a great housing option for older people". However, the explanations which participants provided for this concept were different. Two aspects were highlighted in the interviews when discussing the housing options for older people: intergenerational living with mutual support, and financial choice. Among these aspects, this study found that intergenerational living and mutual support was the driving aspect for older people to choose a cohousing. The following subsections will introduce how participants perceive the importance of these two aspects when they were making a housing decision.

### 5.3.1 Intergenerational Living with Mutual Support

Intergenerational living and mutual support was the driving aspect when discussing cohousing as a housing option for older people. Almost every participant mentioned this point and highlighted that intergenerational living not only benefit older people but also children and young families. Some participants, especially older group members, compared intergenerational and senior cohousing, valued the following two viewpoints. Firstly, if people choose to live in a senior cohousing, when people are getting older with declined physical capacities, the interactions in the neighbourhood will be reduced, people will also have more health difficulties to look after and support each other (Architect AS6, Resident RF4, Resident RK6). Residents may still rely on the services (e.g. too old to drive, or not able to carry heavy stuff, so considered using food delivery) and care provided from outside of community. Secondly, living in an age-mixed community, the older residents could not only receive the 'peer support', but also benefit from the younger generations, such as, intergenerational learning. In addition, older people could help and feel useful when other families need them, such as, baby-sitting for a short period of time. If the social aspect was the dominant reason for people to choose a cohousing scheme, then the benefits of mixed age groups and mutual support from different generations were the main reasons of older people to choose an intergenerational cohousing. As group members stated:

> "I think it is much better being around young people, not just with older people there is more energy there, there is more that different generations to help each other. You know… ignore everyone is physically frail, some people can go and do the shopping and carry the heavy stuff, the older people can be virtual grandparents, then babysit for the kids, which they like the kids a lot" (Resident RK6).

> "You can contribute and feel useful. And you got something to give as well as you receive a lot help and support. So I think for older people is really helpful.

> I know some cohousing projects are just for older people, I understand why those people want to live just with over 50s. But for me, I prefer multigenerational, I like the mix. It keeps me young, and keeps me busy" (Resident RL13).

### 5.3.2 Financial Choices

As discussed in the Section 5.2.3, cohousing model has the potential to bring financial benefits to the group members by developing a financial scheme or benefiting from community sharing. However, cohousing still has a lot of financial difficulties, for example, the initial costs for developing the community are far too expensive (sharing the costs of communal area and investing some design standards) and lack of financial support from the local authorities and financial organisations. However, the financial situations of living in a cohousing community can be very different when discussing the housing choices for older people. Some older group members highlighted in the interview conversation that they were aiming for an intergenerational group, but young people/ families were having financial difficulties to access cohousing. This makes it almost impossible to diversify the population within the group (many intergenerational cohousing groups have little or no young residents). This means many mixed age cohousing groups were having a pattern of senior cohousing, the multigenerational social interactions were largely reduced. In group members' perspective, because of the developmental procedure of cohousing community (self-funded, collectively buy the land and manage the construction) and they have less flexibilities to select young people as future residents, because the older generations might be the 'only group' who could afford this type of living. This also answered why older people were seen as the largest audience group of the cohousing model.

> "I prefer multigenerational. Lancaster Cohousing is a group already mainly older people, quite a few retire people here, so we are half way being senior already. I think it is nice to have intergenerational, but that makes very difficult,

because it is not the cheap community to buy, it is difficult for young people to come here, you got less space for your money use, still quite expensive to come and live" (Resident, RL9).

"I think our difficulty here as much we would want to have people are wide range of ages. The physical process is turning these houses [very old English houses] into homes, means they are end up being quite expensive homes. Which means somebody like yourself [less than 30 years], really like the idea of cohousing, want to be part of it, unless you got a lot of money, or your parents got a lot of money, or won the lottery. It is very difficult to join." (Resident, RO18).

Some of the cohousing groups (such as, On The Brink cohousing in Sheffield) they kept rental dwellings on site for young people or families to increase the possibilities of involving young people in the group. However, the rental units or flats would not be the final solution to the problem. How to make this type of living more accessible and affordable to wider social group will be the key for the developers, decision-makers and future groups.

## 5.4 Benefits of Cohousing

After discussing various motivations of group members, this section aims to review the numerous benefits of living in a cohousing community. The collected information for this section was identified by the participants during the interviews and then summarised through content analysis. The data were categorised as social benefits, environmental benefits and financial benefits to echo with the motivation categories above. The benefits of living in a cohousing were presented using the following Table 5-4.

Table 5-4. Benefits of cohousing

| Aspects | Benefits |
|---|---|

| | |
|---|---|
| **Social aspects** | • Fostering social interactions, relationships and sense of belongings through community sharing.<br>• Reducing social isolation and loneliness, especially for older people.<br>• Sense of security.<br>• Intergenerational living and mutual support benefits all group members.<br>• Living closer with like-minded people with similar values.<br>• Engaging with the wider community. |
| Environmental aspects | • Having potentials to deliver low-impact community living via design standards, environmental technologies, car-sharing and environmental-friendly building materials.<br>• Saving energy.<br>• Using community spaces and facilities more efficiently.<br>• Having more flexibilities of designing the community spaces (e.g. improve the adaptability of the private dwellings), especially for the new build. |
| Financial aspects | • Having potentials to deliver a low-cost living model via sharing (e.g. sharing cars and facilities), environmental technologies and standards (e.g. solar PV), food growing and special financial systems (shared-ownership model).<br>• Enabling the development of community projects or events to increase community income (e.g. study/ research visits, common businesses, holiday homes renting). |

## 5.5 Potential Issues for Future Cohousing Design

The purpose of this section is to provide information about what the potential issues were in a cohousing community in different development stages. These issues were

indicated by the participants during the interview conversations, and were developed from the living and developmental experience of cohousing group members as well as architects' design experiences (see Table 5-5). These issues showed what the group member's concerns were and explained what aspects may delay or exclude people to join a cohousing community. These difficulties were grouped into categories in line with the research findings discussed above, and included other influencing sub-category aspects, such as political, personal preference, source of support and social care system. This information can be very beneficial for future cohousing groups, potential cohousing members and researchers because, first of all, this information was gathered based on real experiences and it provides a unique perspective to understand the cohousing model; second, future cohousing groups can develop strategies in advance to avoid or solve these problems.

Table 5-5 shows that the group members' concerns concentrated on social, environmental and financial aspects. There is no doubt that cohousing in general advocates a balance between individualism and interdependence. What we are witnessing is that the social aspects were seen as both benefits and challenges for the residents and the public. Therefore, the balance should be highlighted for future cohousing developments. Furthermore, the financial obstacles are a serious challenge particularly to younger generations. Lacking accessibility for young people and people with middle/ low incomes, the understanding and practice gaps between group members and developers were the important issues. Finally, the study summarised that the cohousing model still needs many kinds of assistance (e.g. assistance with knowledge structure and finance) and standardisation from the governmental and organisational level.

Last but not least, the political visions of community-led housing (including cohousing) should be emphasised in this study. The Housing Minister Alok Sharma's speech script

has been added to GOV.UK (2017) towards community-led housing in November 2017. He highlighted the benefits of building community-led housing and also pointed out its current barriers. For the barriers, he identified some aspects, such as lack of access to pre-development grants, loans or mortgages, and a lack of understanding or resources at a local policy level. However, the biggest barrier is culture. As he stated: "it's [community-led housing] seen as a heroic endeavour that is only for the most extraordinary and adventurous of individuals" (GOV.UK, 2017). This means that misunderstanding of this form of habitation is the biggest limitation for the great majority of people. Therefore, a huge amount of work is required from the government level to increase the acceptance of community-led housing and reduce the barriers in many ways, such as providing financial support and design guidelines.

Table 5-5. Potential issues of cohousing

| Aspects | Potential issues |
|---|---|
| **Social aspects** | • Cohousing projects mean huge amounts of organisation (e.g. intense meetings).<br>• Under pressure to contribute to the community (contributing too much or too little).<br>• Having difficulties defining social distance (feeling that privacy has been challenged).<br>• Sharing cars - nobody takes personal responsibility for the maintenance of the car, because no one owns it. |

| | |
|---|---|
| **Environmental sustainability** | • Having to invest more money at the beginning and adhering to environmental standards (e.g. Code for Sustainable Homes).<br>• Sustainable standards may not fit all types of housing in the community.<br>• Having conflicting opinions with developers on using sustainable design standards or technologies. |
| Family considerations | • If a cohousing community starts from a family group, the family factor may become discouraging to people who want to join. |
| **Financial aspects** | • Not able to sell previous property to join a cohousing community.<br>• The developers want to maximise their profits, there are no restrictions on recruiting people, which places the cohousing group at a disadvantage. Developers did not appreciate how important the concepts of cohousing were to the group.<br>• Young people are having financial difficulties accessing cohousing. |
| Health | • Reliance on neighbours or other group members to provide care for older people or children.<br>• People with dementia or other cognitive issues have difficulties joining a cohousing community. |
| Location | • Infrastructure is imperfect.<br>• Medical facilities (NHS service point) are imperfect.<br>• Security issues.<br>• Community located in semi-urban area, which will increase work miles. |

| | |
|---|---|
| Other (political) | • Political situation change (e.g. Brexit).<br>• Dysfunctional housing market in the UK, housing stock is very old. |
| Other (personal) | • Development process is too long, circumstances changed, the property decided to buy in the Cohousing community is not suitable anymore |
| Other (source of support) | • Lack of structural information for people who want to create or join a cohousing community.<br>• Lack of structural information to introduce the limitations and risks of joining a cohousing community.<br>• Lack of support from a local government and organisations. |

## 5.6 Discussion and Conclusion

This study found that cohousing groups are motivated by a number of factors. Social aspects, environmental sustainability, family aspects, financial benefits, health aspects (physical and mental) and site location were all shown to be crucial. Social aspects, environmental sustainability and financial aspects were found to be the three top priorities for people considering joining a cohousing community. Family aspects, health conditions and site location greatly influenced people's decisions.

This section presents a primary study that explored what people found attractive about cohousing communities in the UK. It provides information which aims to support architects, developers, organisations and the cohousing groups themselves to better understand cohousing living and its original philosophies. It is worth noting that understanding these motivating aspects could help new groups avoid making mistakes, and potentially speed up the developmental process of the community. In addition, this study clarified the consistencies and differences between recruited groups. Primarily,

the interview answers of architects and group members showed a similar pattern within the selected cohousing communities. The results of the study did not show a very significant difference between groups. Specifically, in reference to the social aspects, the biggest difference found between architects and residents is the degree of concern towards two balances (give-take balance and private-public balance). Existing and pre-residents paid much more attention to them. For environmental aspects, pre-residents expressed interest in using ecological principles and design standards, whereas existing residents focused more on the daily living and environmental practices, such as growing food and recycling. However, architects gave more thought to reducing car use and parking issues. For financial aspects, pre-residents and current residents paid more attention to the actual initial and living costs but architects concentrated on how to spend money smartly and what was the affordable approach to reduce living costs (e.g. better insulation instead of a complicated heating system). The recruited groups had similar views on family aspects, health aspects and the geographical location of the community.

Cohousing has many positive aspects, highlighted by researchers and professionals. It has been found, however, that research on the motivation driving British cohousing groups is not well-established, suggesting more work is needed in this area. Moreover, there is very limited access in the UK to all types of community-led housing (e.g. cohousing, housing cooperatives, community land trusts) compared with other countries in Western Europe (e.g. Denmark and Germany). The reasons included cultural misunderstandings, lack of access to grants, loans, or mortgages. This also highlighted that guidance and other forms of support are required from the government level and policy makers to educate the public and promote community-led housing as a beneficial living option. The next chapter will explain different aspects of sustainability related to cohousing community living.

# Chapter 6 : SUSTAINABILITY

## 6.1 Introduction

The aim of this chapter is to examine the significance of cohousing schemes for sustainable living in the UK, and to identify approaches and pathways to achieve higher levels of sustainability in communities. The sustainable principles, including environmental, social, and economic sustainable concepts, play a significant role in establishing cohousing communities. As listed on the UK Cohousing website, cohousing groups have various preferences and focuses when forming the group, such as intergenerational living, housing co-operative, and self-build. However, as evidenced on the website, all 19 established cohousing communities in the UK acknowledged 'eco' (ecological sustainable concept) as part of their group identity. Therefore, this study identified 18 primary categories of community sustainable living, illustrating how these can be combined to improve cohousing environments in practice. In addition, the research argues the fact that the social aspect lays the foundation for achieving environmental and economic sustainability in a cohousing initiative because social bonding determines the existence of the community. In spite of this, the social needs of the residents were not a key focus of architects, during the design stage, suggesting that social needs have not been properly addressed or fully supported. Specifically, this study found that the design intention of architects and actual usage of the space were not always aligned, especially when it related to social needs. Only one architect who participated in this research highlighted those social needs and future proof are the key drivers of cohousing design process, while the rest only focused on engineering and construction issues. Therefore, this study suggests that developing a UK cohousing model would not only meet environmental design standards and ensure cost efficiency, but it would also meet the vital social needs. The evaluation of sustainability in this architectural research can be applied to guide future

cohousing design, which can be adapted to residential settings, in the UK and beyond.

This Chapter consists of three parts. It starts from introducing the meaning of sustainability in ecological, social, and economic dimensions. Next, it followed by explaining the interview findings of the study. The findings of the study will be revealed in three hierarchy levels. Finally, the discussion section highlighted the current issues and potentials of sustainable living in cohousing communities.

## 6.2 Sustainable Living

### 6.2.1 Meaning of Sustainability

The term 'sustainable development' was first widely articulated in the 1987 'Brundtland Report' (Brundtland, et al., 1987) from the United Nations. The 'Brundtland definition' of sustainable development was framed as: "… development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations General Assembly, 1987, p.43). It posits that the only truly sustainable form of progress simultaneously addresses the interlinked aspects of economy, environment, and social well-being. Ecological sustainability can be interpreted as "meeting human needs without compromising the health of ecosystems" (Callicott & Mumford, 1997; See also, Morelli, 2011, p. 2). Social sustainability is relevant to social equity (e.g., having access to local services) and sustainability of community (e.g. attachment to the neighbourhood, safety and satisfaction with the home) (Bramley & Power, 2009; Dempsey et al., 2009). At the same time, according to KTH Royal Institute of Technology (2018) and Choi and Sirakaya (2006), economic sustainability is equated with economic growth, which is considered sustainable if the total amount of capital increases. This can be allowed at the expense of a reduction of other assets in the form of natural resources, ecosystem services or welfare.

### 6.2.2 Indicators of Sustainable Buildings

The evaluation of building sustainability starts from the building construction. Asif et al. (2007) suggest a multi-disciplinary approach which covers several building categories such as: energy saving, use of materials, material waste control, and pollution and emission control. At the same time, Seyfang (2009) found a series of sustainable housing initiatives for sustainable consumption, which paid attention to both physical and social aspects of the sustainable consumption during the construction stage. They include construction materials, reducing ecological footprint, 'community-building' process, collective action and new social infrastructure. Furthermore, Akadiri et al. (2012) developed a robust framework of methods for sustainable implementation, which can be adapted to a cohousing project and guide community design and planning. This is fundamental for this study. Akadiri et al. (2012) identified two objectives for implementing sustainability in building construction: resource conservation; and cost efficiency.

#### *6.2.2.1 Resource Conservation and Sustainable Consumption.*

The term 'resource conservation' represents the management of human use of natural resources to maximise the benefit to current generations whilst at the same time keeping capacity to meet the needs for the future (Wilson, 1998). The purpose of energy conservation is to reduce the usage of fossil fuels while increasing the use of renewable energy sources (Akadiri et al., 2012). See Table 6-1.

Table 6-1. Resource conservation and methods

| **Resource Conservation** | **Method Examples** |
|---|---|
| Energy conservation | • Use of passive energy design.<br>• Choice of materials and construction methods.<br>• Developing energy efficient technological processes. |
| Material conservation | • Design for waste.<br>• Specify natural and local materials. |

| | |
|---|---|
| | • Design for pollution prevention. |
| Water conservation | • Collecting rainwater.<br>• Employ re-circulating systems. |
| Land conservation | • Adaptive reuse of existing buildings.<br>• Locate construction project close to existing infrastructure. |

Source: Adapted from Akadiri et al. (2012)

The strategies which contribute to sustainable consumption are also strongly connected to: i) building techniques to reduce the ecological footprint; ii) 'Community-building' processes; and iii) community collective actions (Seyfang, 2009).

*6.2.2.2 Cost Efficiency*

The cost effectiveness of improvements to buildings is of common concern to the owner, the user and society (Akadiri et al., 2012). Building-related costs also become a valuable factor to measure the sustainability level of a construction project. However, many organisations and developers making decisions about building-related investment based on estimates of the initial costs, do not pay enough attention to the operation and maintenance costs throughout the life of the building (Woodward, 1997). In recent years, dramatically increasing energy prices serve to highlight the opportunities for savings which can be achieved by employing more energy-efficient solutions from the beginning of the building construction (Akadiri et al., 2012).

Akadiri (2012) identified three principal life cycle costs to be considered for sustainable buildings. First, the initial cost may be reduced by using locally sourced materials, local cost saving technologies and construction techniques, and readily available and recycled materials (Akadiri et al., 2012; Seyfang, 2009). Second, running costs relate to space heating and cooling, cleaning, minimum-maintenance materials, protecting materials from destructive elements such as rain and wind, sun and temperature, and easy-to-use building control systems (Akadiri et al., 2012). Finally, recovery cost is rarely considered; the cost of demolition and recovery (Emmitt & Yeomans, 2008).

Akadiri (2012) recommended that recycling potential and ease of demolition should be considered during the design stage. At the same time, the reuse of building materials and components is also helpful and can be considered as a method of minimising the production of architectural waste.

During the literature searching, the study found that the ecological and economic sustainability is widely recognised and established in the sustainable research field. However, very few researchers connect social sustainability directly with community physical settings. The results of the study also proved this point and provide the community design suggestions accordingly.

## 6.3 Interview Findings

The results of this study were explored on three levels: 1) main categories of defining sustainability in cohousing communities, 2) relationship between main categories across architect and resident groups, and 3) comparison of views (similarities and differences) of the two participant groups. This study argues that the cohousing model plays a vital role for achieving the sustainability goals on three claims of the advantages compared with other types of housing:

1. More sustainable technologies could be built into houses (see Chapter 9, sections 9.3.2.1, 9.3.3.1 and 9.4.3.2);
2. Smaller and more compact living (see chapter 9, section 9.4.1); and
3. Pro-environment behaviour of residents (see Chapter 8, section 8.2.3.1).

### 6.3.1 Main Categories

The interview data were divided into 18 categories under environmental, social, and economic sustainability dimensions (Table 6-2). When interviewees mentioned the term ‘sustainable living’, more than half thought about environmental sustainability over other types. However, many respondents, especially in the resident sample group,

stated that environmental sustainability actively contributed to economic sustainability (e.g. reduced living costs), rather than directly considering global climate change and resource depletion. Though only a few respondents addressed the social benefits of sustainability through community living, 'sharing' emerged as a common category that contributed to environmental, social, and economic sustainability. These 18 categories are closely connected and work together harmoniously. They could be combined to help residents achieve higher sustainability levels and improved energy efficiency.

### 6.3.2 Relationship Between Categories

Figure 6-1 shows the interrelationship between categories. The top half represents the architects' views, and the lower half the opinions of residents. Numbers 1–18 in the boxes indicate the 18 categories summarised in the first cycle of coding analysis (Table 6- 2). Following the first-round coding analysis, the categories related to 'Energy' (e.g. energy-saving techniques, energy source, and renewability), 'Sharing', and 'Heating' were identified as categories with a significant impact on the community's sustainable living. These three categories work in harmony: In the resident group, the strongest connection is between energy and heating systems. Comparing these categories, Figure 6-1 (Appendix 11) shows that water usage and the water system (category 6) are not recognised as major contributors to sustainable living. Reasons could be as follows. First, the selected sample sites are not located in water-stressed areas (south-eastern England); second, the estimated billing in the UK means that many people are unaware of their precise water usage; and third, many people are not motivated to reduce their water use, since it does not directly affect the water bill when estimated billing is used.

Table 6-2. Main categories to define sustainability in cohousing communities

| **Dimensions of Sustainability** | **Main Categories of Findings (18)** |
|---|---|
| Environmental sustainability | • Energy (saving, source, and renewability). |

| | |
|---|---|
| | • Design/ sustainable standards, building regulations.<br>• Sharing.<br>• Heating system.<br>• Insulation and ventilation.<br>• Water system (drinking water, grey water, rainwater).<br>• Number or size of properties.<br>• Building types (new-build developments).<br>• Environmental technologies.<br>• Food supply.<br>• Historical site/ listed buildings.<br>• Transport. |
| Social sustainability | • Sharing.<br>• Group visions and aims.<br>• Group awareness and problem solving.<br>• Multigenerational living.<br>• Mutual support.<br>• Work relationships in the community. |
| Economic sustainability | • Sharing.<br>• Cost efficiency. |

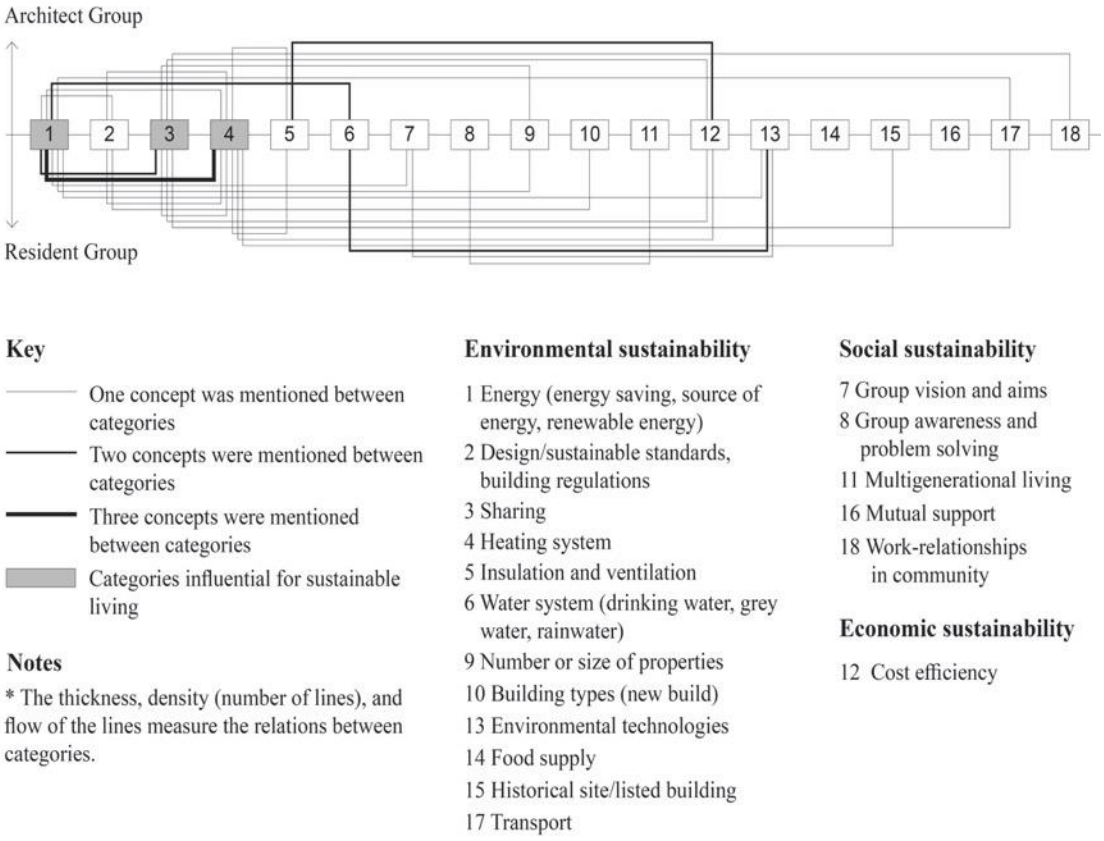



Figure 6-1. Links between core themes within the two participant groups

Figure 6-1 (Appendix 11) shows that residents paid more attention to social aspects of community living than the architect group (categories 7, 8, 11). Some residents emphasised a sustainable vision as part of their group identity from the initial stage. They noted that being sustainable is not always related to the building, but is also about group awareness and how residents deal with problems and conflicts, pass sustainable concepts to the next generation, and their relationship with nature. Cohousing residents contributed to sustainable living by co-designing with the architects in the first stage of the project.

The cost efficiency category refers to the initial cost and cost in use. This represents the cost of land, living costs for each household, and community maintenance. The architects and residents highlighted that sharing can contribute to cost efficiency and reduce living cost, for example, by sharing trips to the supermarket and common meals.

Figure 6-1 further shows that heating and insulation (categories 4 and 5) affect living costs. Having an efficient heating system (e.g. a MVHR system) and using better insulation techniques (e.g. double/ triple glazing) enables residents to significantly reduce gas or electricity bills.

#### *6.3.2.1. Horizontal and Vertical Data Analysis*

Vertical analysis embodies the relationships between categories of two participant groups (see Figure 6-2). In the vertical analysis, the differences between the two groups are found by distinguishing the different colours used in the two columns. For example, Figure 6-2 shows that residents paid significantly more attention than architects to the social aspects of sustainable living. Furthermore, residents recognised that sharing has an ecological impact by contributing to energy saving and efficiency. Architects responded based on their working experience and tended to answer the questions in a general and technical manner. However, residents based their comments on their experience living in a cohousing community, and their responses were more detailed and practical.

A horizontal analysis (taking one axis and identifying answers from two groups) shows the span of category combinations as sustainable options of community living, illustrating the various possibilities of category connections. For example, all themes (hexagons) around the 'energy' axis represent possibilities to minimise energy consumption in a cohousing community, such as by employing an energy efficient heating system, a re-circulating water system, rainwater collection, applying sustainable design standards and technologies, choosing to live in a smaller property, and using public transport more often and sharing cars (Figure 6-3). The architects and group members can adopt all or some of these strategies depending on the group's willingness and affordability. Thus, Figure 6-3 can be used as a checklist for

cohousing group members to support their design process and expand the possibilities to achieve greater sustainability.

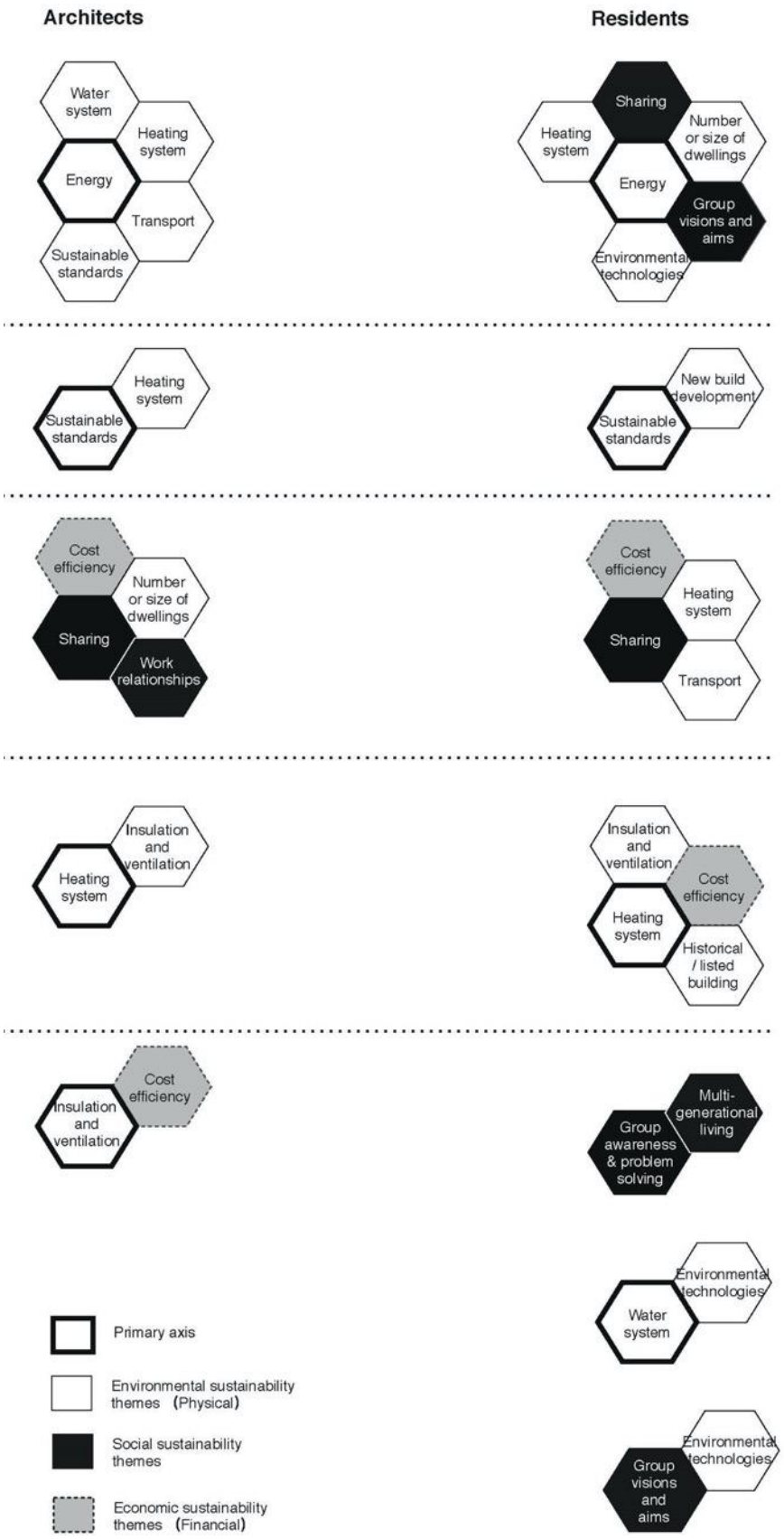



Figure 6-2. Relationship between categories

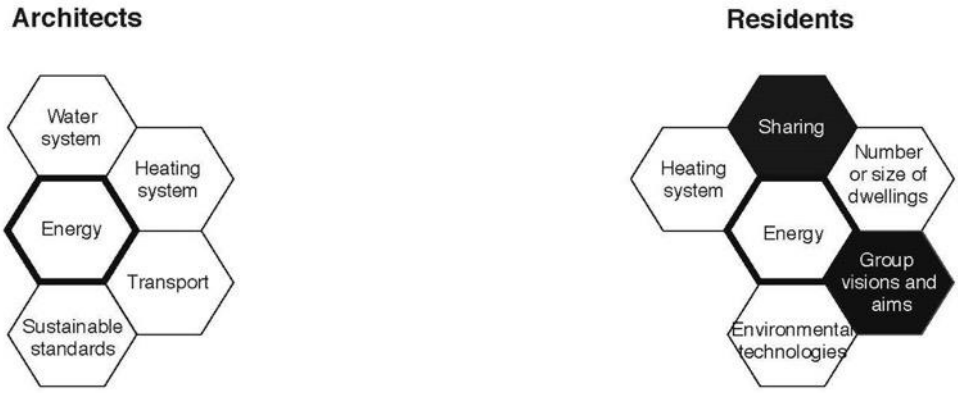



Figure 6-3. Horizontal analysis example

### 6.3.3 Similarities and Differences

Figures 6-4 and 6-5 (Appendix 10) compare all participants' opinions regarding each category. The number of similarities and differences are highlighted on the top of the figure. This data display technique enables readers to quickly trace common group interests for each category and shows the differences for certain themes.


Figure 6-4. Classified interview answers from architects and residents within themes

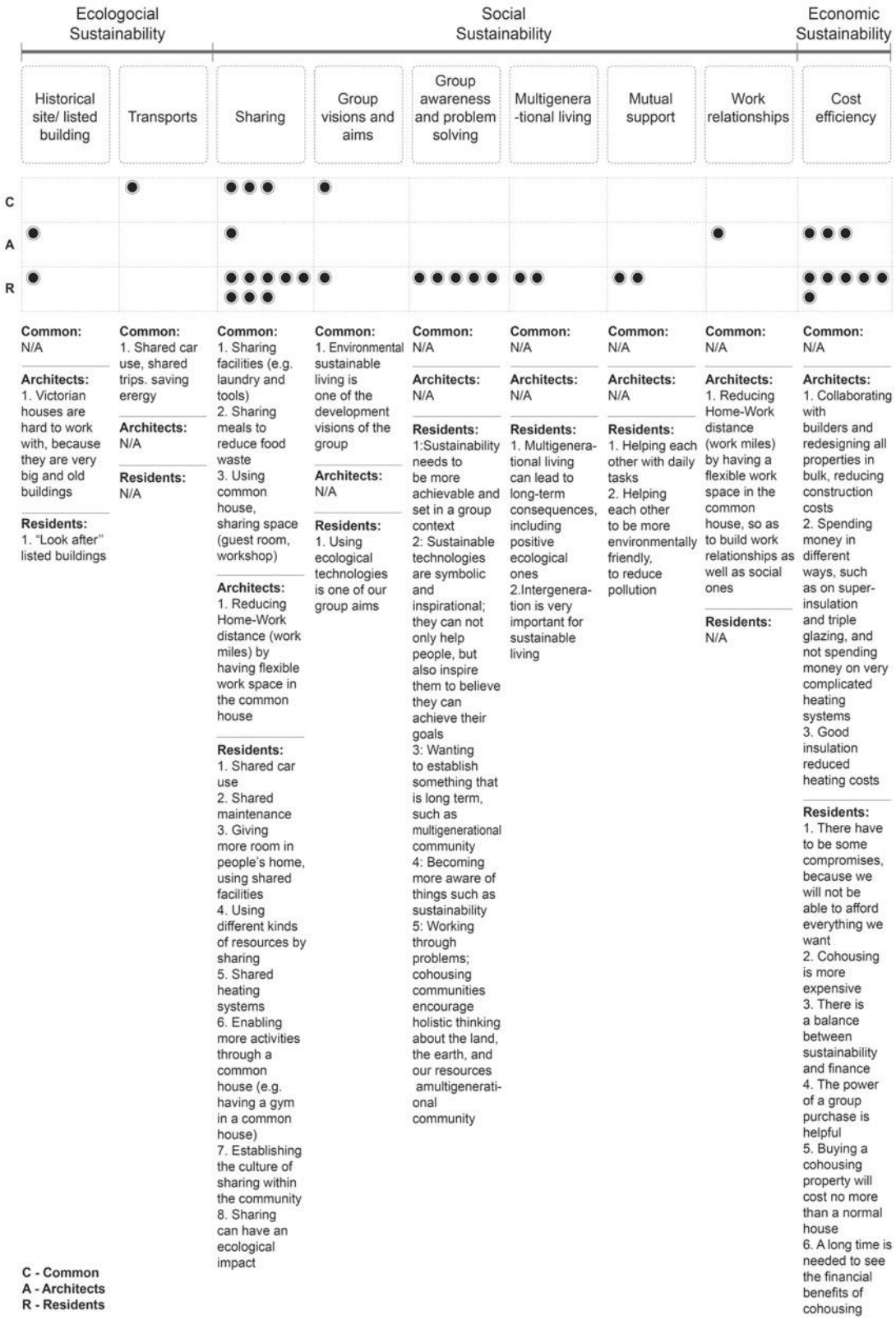



Figure 6-5. Classified interview answers from architects and residents within themes (cont.)

#### *6.3.3.1 Energy*

There are two sub-groups under the energy category: ‘source of energy’ and ‘energy saving’. For energy use, the two groups had in common the use of a ground source and reduced car use. The architects’ views were more technical than those of residents, as they paid more attention to the source of energy and its use in the design to improve the architecture; for example choosing renewable energy sources such as wind and solar power for the community and considering passive ways to save energy through PH. The resident group explained their opinions based on their living experiences, providing more practical comments. For example, they suggested using a shared heating system, living in smaller properties, and sharing their food and space with others.

#### *6.3.3.2 Design Standards*

The most popular design standards mentioned in the interviews relevant for cohousing communities were Passive House and Lifetime Homes (Part M). The architects mentioned other standards and building regulations including the CSH, the Association for Environment Conscious Building’s (AECB) Silver Standard, and BREEAM assessment. Both groups acknowledged that applying design standards significantly contributes to sustainable living. Specifically, the PH aims to passively reduce heating demands and thus, reduce electricity and gas bills. However, there are limitations for using these standards. For example, the application of Lifetime Homes requires added circulation space for wheelchair access or other devices (e.g. ceiling hoist). Furthermore, financial concerns remain the biggest restriction for both groups, and the structure of the building is not always suitable for the respective design standards, which might require complicated building retrofitting. While the cohousing groups aimed for some design standards, since retrofitting is expensive—especially for old buildings—they had to settle for applying only part of the standard. Some group members chose to adopt the full standard for some apartments, not for the whole community.

#### *6.3.3.3 Environmental Technologies and Water System*

In cohousing communities, selecting environmental technologies can be part of the group vision in establishing a community. However, some cohousing groups adopted partial terms, not the whole standard. This decision depends on group scale, affordability, construction type, and other factors. The most widely used environmental technology is solar energy, although a garden rainwater harvesting system was also mentioned. In this technology, clean rainwater is not collected for domestic use, but for watering the garden, car washing, and other outdoor uses. Regarding the water system, both groups considered using renewable energy for water heating. The solar panels collect heat from the sun and use it to heat water, which is then heated further by a boiler to reach a certain temperature. This technique greatly reduces the energy consumption of water heating. Residents also considered how to recycle water in daily practice at the community level, mentioning the use of a sustainable drainage system. However, sustainable drainage systems are not yet fully applied in cohousing communities.

#### *6.3.3.4 Heating and Insulation*

Heating is the biggest energy consumer in a building. The heating and insulation systems in a building work together, and all participants strongly agreed that these factors drive sustainable living. Efficient heating systems significantly contribute to the economic sustainability of the cohousing community. Regarding the heating and insulation of individual houses, the architects acknowledged that they were aiming to reduce their clients' living costs through the use of MVHR design and airtight construction technologies. The architects suggested that conscious and selective spending should be considered, and they minimised heat loss by using double/ triple glazing, not complicated heat systems. Residents considered the heating challenges in historical buildings. While all individual houses or flats can benefit from comprehensive design, including historical buildings such as Victorian houses, the design and construction processes are time-consuming and expensive compared to

conventional housing. Some cohousing communities used shared heating systems – for example, a biomass system in a Lancaster Cohousing development – while others chose individual boilers in each house. These choices depend on the site location, building conditions, and income level of the cohousing group.

#### *6.3.3.5 Number or Size of Dwelling*

The results showed that cohousing members live in a more 'compact' way (high density) in a community setting, and their properties are smaller than those of conventional, mainstream housing. The results for both groups showed that the majority of residents were happy with their current house/ flat in the cohousing community and had fewer empty rooms in the house because of their use of shared space (e.g. lounge and guest room) and common facilities (e.g. laundry) in the common house. Furthermore, all participants agreed that smaller dwellings are more sustainable since they are easier to heat, clean, and manage, particularly for older residents. However, the long cohousing development process meant that some group members' personal circumstances changed during this period: the house became too small for their needs as their households grew to include partners or children. Some residents noted the lack of diversity in housing types in the community. A limited selection of housing types fails to meet the living needs of wider social groups and may exclude some people from joining a cohousing community.

#### *6.3.3.6 New-Build and Historical Buildings*

Some groups sought new-build developments rather than older building conversions when looking for a cohousing site for many reasons including avoiding complicated building retrofitting, maximising construction possibilities, and employing advanced building technologies and sustainable standards into their communities. From architects' viewpoint, working with large Victorian houses, old stone buildings, farmhouses, and non-residential buildings – through alteration and listed building retrofitting or refurbishment – is common in British cohousing communities, but

challenging, time-consuming, and expensive. A few groups combined new build with historical buildings on the site in a unique sustainability approach. One cohousing member stated:

> "I don't feel that we own the property or these old buildings in a sense. They have been here for so long, so substantial, they have a character of their own, and we can look after them. They will provide housing for people for many years to come" (Cohousing Member RO18).

The groups using this approach recognised the historical building as part of the site's legacy, both of the building and of the people living in and around it.

#### *6.3.3.7 Food Supply*

Food is a major concern in community living. Apart from weekly common meals, the food supply process can be more sustainable. Both architects and residents agreed that cohousing communities provide added space for growing food. Some communities had areas designated for growing food, significantly reducing food miles (e.g. food delivery) and labour costs. However, residents acknowledged that growing food is not viable for everyone. Thus, being self-sufficient in food supply is a challenge for cohousing groups. Furthermore, the capability to grow your own food is closely related to the location of the site (urban or rural area), group members' willingness, and community management.

#### *6.3.3.8 Sharing*

Sharing is an important part of a cohousing community's identity. The two groups agreed that sharing contributes to sustainable living across ecological, social, and economic dimensions. This study identified three factors of sharing: shared facilities, shared meals, and use of the common house. In a cohousing community, people own less (tools, devices, properties) and thus, share more with each other. Communal living also results in less individual cooking and more shared meals, which can reduce food

waste and create strong social bonds within the group. Furthermore, in a cohousing community, a common atmosphere encourages people to recycle more and rethink waste management. While intangible, this shared atmosphere is very powerful. Finally, the use of the common house is at the core of sustainable living. Many activities take place in the common house, including intergenerational learning and charitable workshops. A resident stated:

> "We don't need to go to the gym outside. We can use the fitness facilities in the common house. This inspires and enables us to do more activities in the community" (Cohousing Member, RK6).

Architects reduced the home–work distance by creating a shared flexible workplace in the common house. The resident group thought this was a good idea and added to the conversation of sharing, suggesting the sharing of cars. Theoretically, there are many advantages of sharing cars in cohousing, but it can be seen as controversial. A cohousing member stated:

> "The carpooling club is not running efficiently. Actually, [it] sometimes costs you more to join a car club than to have your own car. Many people don't drive. Nobody really looks after the cars. Also, you don't drive the same car all the time. So there [are] more bumps, scratches […], people don't clean it, children leave rubbish on the floor, dogs leave [the cars] dirty and smelly. I don't really agree [with] just purely private ownership, [but] I don't agree with this sort of 'nobody owns it' either" (Cohousing Member, RL9).

These divided opinions on sharing demonstrate many things. The cohousing model brings a culture of sharing to the community, which contributes towards sustainable living. However, 'healthy' community living strongly relies on that group developing a communal understanding of what is and is not 'honourable'. This is part of the group's shared visions and community management.

*6.3.3.9 Group Visions, Awareness, and Problem Solving*

A group vision shared by architects and residents is connected to the principles employed to establish a cohousing group. From the design stage, most UK housing groups aimed to be sustainable, although their levels of sustainable achievement differed. Different groups have a different focus, from affordable cohousing to religious groups. From residents' viewpoint, sustainable living is easier to achieve in a group context. A cohousing member mentioned:

> "I am becoming aware of things, because I was not that aware of sustainability" (Cohousing Member, RT19).

The findings of this study show that practicing sustainability in daily life involves more than encouraging like-minded people to live closely. It is also symbolic, inspiring the wider neighbourhood and other social groups to strive for greater sustainability. Moreover, problem solving strategy presents a unique angle by which to measure social sustainability. While difficult to establish rules guiding people on how to behave when facing problems, consensus decision making is a helpful tool. Working through problems together allows members to rethink their desire to live together. As seen in the citations below, by learning to be more patient, tolerant, and understanding, group members experience a sense of belonging to a group that is 'bigger' than themselves:

> "The group accepts and believes [that] over time you will contribute enough. If you can't do the commitments now, the community accepts it will happen over time" (Cohousing Member, RL10).

> "I think having extra adults around makes life more interesting. But also gives your children a chance to realise [that] all adults are different. You can fall out with your mum and dad, and maybe there is somebody else you can talk to. It may give you different thoughts and ideas" (Cohousing Member, RO18).

*6.3.3.10 Multigenerational Living and Mutual Support*

Views on multigenerational living and mutual support differed between the two groups. From residents' viewpoint, multigenerational living and mutual support can contribute

to sustainable living in the social and ecological dimensions. First, multigenerational living offers opportunities to pass sustainable principles on to younger generations. Thus, younger generations inherit the spirit of environmental protection in the community, fostering lasting, long-term results. Second, different generations can look after (e.g., older people care and babysitting) and learn from each other (e.g. older people teach young people how to read and young people teach older people how to use technologies). This makes community living more rewarding and joyful. Furthermore, it provides an opportunity to save money by avoiding childcare costs and stress, for example, as good childcare is difficult to find and often inflexible to parents' working patterns. In addition, mutual support, emotional or practical, can be provided by family members, neighbours, or other community members. This study found the most common form of mutual support to be 'helping each other with daily tasks'. The tasks can be very small, such as helping someone change a light bulb, collecting a parcel, or speaking or listening to someone. However, these 'small tasks' significantly promote community attachment and satisfaction in the home, leading to a more vibrant community life where residents can 'live closer to what [they] believe is right' (Meltzer, 2005, p.141). Finally, the support has an ecological impact, for example, through helping each other sort waste and recycle. Resident RO16 explained:

> "Cohousing offers significant support to an easier more sustainable lifestyle. We can help each other to be more environmentally friendly to reduce pollution".

#### *6.3.3.11 Cost Efficiency*

Cost efficiency is an increasingly important part of sustainable development. This study showed that architects and residents have different ideas of cost efficiency. First, architects focus on how to design cost efficient properties while achieving a higher level of sustainability. They paid attention to reducing the initial and living costs from a technical perspective. Some architects mentioned that they spent money selectively,

for instance, by using value engineering and spending money on better insulation (triple-glazing) rather than employing complicated heating systems. Considering universal design principles, architects work with builders to design the building components in bulk to reduce construction costs. In comparison, the residents addressed the struggle of achieving cost efficiency and a high level of sustainability. Most cohousing members aimed to buy a well-built and well-insulated property that cost no more than an ordinary new house on the market; however, as one resident stated:

> "[There] have to be some compromises between what we want and what we are able to afford" (Cohousing Member, RO16).

Therefore, the balance between sustainability and affordability cannot be ignored. Even though group members acknowledged the power of group purchase (buying in bulk) in dealing with high initial costs (because of the sustainable technologies or design standards applied), it still takes time before residents see the tangible sustainable and financial benefits of the cohousing model. These concerns address the present barriers to achieving cost efficiency and a high level of sustainability in a cohousing community. However, it is difficult to balance and achieve both environmental sustainability and affordability, especially at the beginning of the development stage.

## 6.4 Discussion

Social sustainability is one of the fundamental pillars of sustainable development. While the relationship between community design and social activities has been well covered in recent years (Wood et al., 2010); there has been limited research conducted on whether social sustainability, within communities, can be improved according to neighbourhood design. Arguably, the social aspect is the most important and unique feature to distinguish cohousing from other types of communities. However, this

research found that the sustainable contribution of social factors (e.g. work relationships in the community and group problem solving) did not attract enough attention from architects during the design stage. Apart from the community sharing aspects, few shared opinions can be found between architects and residents regarding social sustainability. Thus, the social needs of residents may not be adequately addressed or fully supported in the neighbourhood design decisions. This study suggests that social factors should be increasingly considered when designing sustainable features of cohousing communities. Architects should prioritise understanding the sustainable visions and aims of cohousing groups by co-designing with the residents. Further, they should seek to explore ways to design and build cohousing projects that, not only achieve their environmental design standards and cost efficiency requirements, but also meet the future residents' social needs. For example, they might consider whether the private living unit is flexible enough to adapt to demographic change within the family.

This study suggests social factors to be central to achieving the goals of greater sustainability. In other words, social aspects can be incentives for establishing environmental and economic sustainability in a cohousing community; the reasons for this can be summarised as follows. First, the group members congregate and begin to be motivated by the cohousing 'concept' long before walls have been built and legal papers signed. Thus, the degree of environmental and economic sustainability is strongly based on how group members set their common intentions and their feelings of belonging to the group. Second, sharing can be considered the core of social sustainability in a cohousing, while also having a significant ecological and financial impact on the community. This study shows that different levels of sharing make up the 'flow' which connects the three aspects of sustainable development. Finally, environmental sustainability can be efficiently achieved if the group is harmonious and well-organised. If so, environmental 'peer influence' can be circulated in the group,

which could influence members' thinking and behaviour towards a 'greener' and healthier lifestyle. The findings of this study are fundamental in obtaining a deeper understanding of sustainability in cohousing contexts across the UK.

An essential part of community-led housing development, the research on the sustainable perspectives of cohousing models is not adequately established in the UK, implying a need for further work in this area. Furthermore, there is extremely limited access and progress in the UK for all types of community-led housing (e.g. cohousing, housing cooperatives, community land trusts) compared to the US and other European countries (e.g. Denmark and Germany). Based on the results of this study, I suggest an approach that can practically integrate all aspects of sustainability (ecological, social, and economic) as a whole, and find a balance between those aspects. The results of this study can be transferred to and, thus, contribute to other types of community-led housing and residential eco developments. The practical barriers can be reduced by considering the main categories, participants' understanding, as well as similarities and differences presented in this study.

## 6.5 Conclusion

To conclude, this Chapter evaluated multiple sustainable aspects of cohousing model and provided various suggestions and approaches to assist cohousing groups to achieve higher sustainable level. The research paid special attention to the social aspects of sustainability and identified that the social needs have not been fully addressed and supported through the neighbourhood design from the architects. Therefore, this Chapter also raised the awareness of the importance of social needs in the design procedure. The findings of this study have the potential to guide future neighbourhood design of cohousing communities to achieve greater levels of sustainability. The development of cohousing communities reveals an important social trend of people's living demands and preferences, along with a dynamic change to

society and the culture of shared living. At the same time, cohousing presents an alternative living option which can offer the benefits of close social bonding and a sustainable lifestyle. Future research should seek to focus on how to balance the three sustainability dimensions to make cohousing increasingly liveable and affordable. Specifically, financial barriers present notable obstacles to cohousing investment and community living, particularly for young people. Therefore, exploring ways to make this type of living model more accessible to more diverse social groups, is a long-term question which calls for further attention. The next chapter will reveal the definition of social proximity and identify what factors can affect the social and physical proximities in a cohousing community.

# Chapter 7 : SOCIAL PROXIMITY IN COHOUSING COMMUNITIES

## 7.1 Introduction

The cohousing design include both built environment in a cohousing community and its social infrastructure. Therefore, this thesis aims to discuss the social interactions in a cohousing setting in Chapter 7 and 8. The design of built environment of cohousing will be discussed subsequently in Chapter 9. This Chapter aims to explore various social factors in cohousing community regarding social proximity and discover how these factors can influence group members' community life. The following theories strongly influenced my personal understanding of social patterns and interactions in this cohousing study. Further, this guided the design of the data collection and analysis processes: 'Life between buildings' from Jan Gehl; Environmental Psychology theories (Steg and de Groot, 2019, Bell, et al., 1984), Ethnography, and 'The Human Aspects of Urban Form' from Amos Rapoport. In addition, Dempsey's (2011, 2012) papers on social sustainability were also fundamental to this research. They shaped my perception of social sustainability and provided a solid knowledge foundation to understand cohousing residents' social activities, collaborative behaviours, community leadership and sustainable living. This study argues that social proximity in a cohousing is different from other types of residential models. This is because of the unique social dynamics that are strongly influenced by the common activities (e.g. sharing meal), group participation (e.g. group tasks) and spatial organisation. Data analysed in this chapter supported this claim and were further supported by the site observations and interviews, and also reflected on relevant cohousing literature and theories. Six architects and 16 group members participated in this study, from seven cohousing communities located in Sheffield, Lancaster, Leeds, and Cambridge. An interview question was mainly used for the data collection: "How do you define the social distance and proximity in a cohousing community, and do you have any examples?"

In this study, the data collected from the interviews were analysed in different participant groups: architects; existing cohousing residents; and pre-residents. This aimed to compare to differences *ex-ante* and *ex-post*, and explain the cognitive similarities and differences between the various development stages of a community among groups. This chapter consists of three parts. The first part describes the definitions of social proximity in a cohousing context. It is closely related to different types of sharing and reasons of sharing behaviour. The second part outlines the relationship between social proximity and physical territory in the community. The third part focuses on how social proximity can be affected by community participation. The examples and quotations are given to show how can community collaborative living and physical environment influence people's thinking, eating and social habits, and lifestyle.

## 7.2 Social Proximity

The term 'proximity' in an urban context is "made possible by common resources such as public spaces, hospitals, libraries universities, and public transport. It is about being closer to where decisions and discoveries are made, where knowledge grows, where fashion is created, trends started, and culture happens" (Sim, 2019, p.12). The term 'social proximity' derives from social psychology, and the proximity principle is used to show the tendency for individuals to form the interpersonal relations and contacts with those who are close by (Hall, 1966). In the context of business selling, social proximity is a relationship-based approach to measuring how connected each person is in a sales team (Jill Rowley, cited from Hisaka, 2016). There is an interesting debate towards social proximity. Hisaka (2016) challenged conventional cognition: "social proximity is about who you know, not who is nearby". The study argues that the social proximity of a cohousing model is the combination of 'who you know' **and** 'who is nearby'. Because people define 'basic needs' differently and give them different

priorities, they define space, comfort and ideal environments differently and give different meaning to concepts such as privacy (Rapoport, 1977). Therefore, it is very important and interesting to explore the ways in which people define their social proximity (e.g. people feel not isolated and also not 'too close') in a collaborative community environment. Based on the unique development procedure of the cohousing community, the foundation of all social activities and community living in cohousing is sharing. People start their collaborations to share values and ideas when they gather and design their community at the very beginning stage. Therefore, understanding 'what is shared?', 'how is it shared?' and 'why is it shared?' are fundamental to studying social proximity in a cohousing community.

### 7.2.1 Sharing

The widely cited definition of sharing comes from Belk (2007, p.126): "The act and process of distributing what is ours to others for their use and/ or the act and process of receiving or taking something from others for our use". According to Price (1975), sharing has a long history and is a fundamental part of human nature. Humans shared food and materials with family members from hunting and collecting in early history (Belk, 2014). In the contemporary period, the scope of sharing has expended significantly. People share not only food and goods with family and close friends, but also values, ideas, experiences, and knowledge with strangers, for example through the internet (Ryu et al., 2019). Sharing activity can cover a diversity of themes, including goods, services, space, time, and transport (Boyko et al., 2017). In a cohousing community, sharing can be achieved in both tangible and intangible ways (e.g. sharing ideas and tools), and it also involves formal and informal manners (e.g. car clubs and sharing a common garden). Sharing brings people together, and it can also have the potential to reduce energy consumption, enhance social interactions and contribute to cost-efficiency. The degree of sharing challenges the boundary of ownership, and it can become a crucial criterion to measure social proximity and

distance in a cohousing context. This research argues that the cohousing model enhances and enriches the sharing culture, and the types of sharing are also expanded and become more diverse.

#### *7.2.1.1 Different Types of Sharing*

Ahrentzen (1996) identified three types of sharing in a community setting, very helpful to understand the myriad sharing practices and test out the socio-spatial dynamics involved in a cohousing community. Co-presence is the first type of sharing. This emphasises that shared physical spaces (within common buildings and between private dwellings) offers opportunities for neighbours to share a variety of goods and knowledge to establish closer social relationships. Affiliation is the second type of sharing, which is evident in the way each group has a core set of values, common visions, or mission statement. This represents a tacit if not explicit ethic of care (Jarvis, 2015). The third type of sharing is endeavour. This is explained in the manifestation of the way co-presence and affiliation are performed and experienced. In other words, it can be interpreted that daily tasks (e.g. food preparation for the common meal, gardening and building maintenance) are transformed by the sociality of work as a ritual (Jarvis, 2015). In fact, these types of sharing are intertwined and interact in a process of evolution; the physical proximity and social structure for reciprocity and exchange are subject not only to personal growth but also highly reflexive deliberations and changing group dynamics (Jarvis, 2015).

Sharing can be viewed in a slightly different way. Some researchers focus on the economic benefits of sharing, proposing multiple terms like ‘sharing economy’, ‘collaborative consumption’ and ‘access economy’. Typical examples are Uber and Airbnb (Ballus-Armet, 2014; Botsman & Rogers, 2010). However, sharing can be interpreted more than simply the commercialisation of assets: the ‘item’ that is shared can be both tangible and intangible in both formal and informal ways. For example,

sharing washing machines and a workplace with neighbours, and sharing experiences and knowledge with colleagues. In this section, the attention has been focused on 'what is shared?', 'how is it shared?', 'why is it shared', and 'how can sharing activates change social proximity in a cohousing community?'. Based on the site observations and interview findings of this study, 'shared community facilities and spaces' were seen as the most influential category affecting social proximity. Attentions has also been paid to shared transport and common tasks in the community (e.g. clean the common house). This study found that the following 'items' are generally shared (can be shared) in a cohousing community (Table 7-1 & 7-2):

**Tangible:**

Table 7-1. Tangible 'shared items' collected from case studies

| **Categories** | **Sharing Examples** |
|---|---|
| Spaces | Common house, garden, meeting area, guest rooms, working spaces, space for growing food, car parking space, space for children to play, overlapped paths, common food storage. |
| Tools | Gardening tools, cooking tools, repairing tools. |
| Facilities | Washing machines, dryers, bike shed, TV in the common house, cooking and washing devices in the common house, gardening devices, toys for children, letter box, bench, library in the common house. |
| Meal | Food and drinks. |
| Energy | Resources, central heating, solar panels, water systems. |
| Vehicle | Cars, bikes, petrol. |
| Shared tasks | Common house maintenance, open day event, site tour, maintenance of the natural landscape. |

**Intangible:**

Table 7-2. Intangible 'shared items' collected from case studies

| **Categories** | **Sharing Examples** |
|---|---|
| Time | Meetings, common activities, time for eat together, companionship. |
| Care | Elderly care, children's care, pets care. |
| Knowledge and ideas | Inter-generational learning, skills, decision-making process, goals, experiences, advice and support, expertise, community design and management. |
| Information and view (information board or online) | Ongoing events, event planning, guest room booking, common space usage, parcel collection, common garden view. |
| Scheme | Financial system. |
| Relationship | Friendship, networks. |
| Journey | Car journeys and trips. |

#### *7.2.1.2 How and Why*

Sharing in a cohousing can be achieved formally and informally, such as renting, gifting, lending, volunteering and co-ownership (Byu et al., 2019). For formal sharing, the community car club can be a good example. Residents agree the rules and costs of using the cars. Another example of formal sharing is the shared financial system, where a cohousing group creates a company, residents buy shares from the company and pay a monthly mortgage. For informal sharing, they can happen anywhere and anytime. The sharing behaviours can be captured just like two people are sitting in the common area and sharing the garden view. Belk (2007, p.127) supported this idea by saying: "Two or more people may enjoy the benefits (or costs) that flow from possessing a thing. Rather than distinguishing what is *mine* and *yours*, sharing defines something as *ours".* This research found that sharing can involve just two people or a big group. Different scales of sharing occur in the community depending on the real

needs. As Arnould (2016) and Boyko (2017) reported, sharing has a community-based orientation as well as a macro-scale orientation in the form of sharing the commons. During the interviews with group members, they often made comparisons between cohousing and communes (a group of people living together and sharing possessions and responsibilities; fully communal) to show the degree of sharing they desired. Residents strongly expressed that personal privacy is extremely important for them, so that they could not accept fully communal like people live in a commune. There are many purposes encouraging group members to share in a community, and this study shows that many group members participated in sharing for the companionship and mutual support, while some people in cohousing focus on the financial benefit (e.g. lower living costs through shared advanced technologies) rather than environmental concerns or social caring. Some people expressed that sharing allowed a more effective use of resources, and as a result placed less pressure on the environment.

A very interesting trend towards sharing behaviour was found during the data analysis to explain the change of thinking from *ex-ante* to *ex-post*. In this study, the pre-residents were more interested in the details of sharing: what to share? any benefits? and how to share? However, after moving in, the current residents also emphasised 'when' and highlighted the 'give and take balance'. They expressed the point that the premise of sharing with others is because the personal needs are already met, as one of the residents (from Lancaster Cohousing) expressed during the interview conversation: "I think you have to be slightly selfish to survive in a cooperative situation, you have to make sure you are getting enough of what you need to get, to be able to cooperate with other people" (Resident RL10). The difference between pre-residents and existing residents indicated that people's understanding of personal needs changes over time. Existing residents pay more attention to the satisfaction of individual needs. In addition, another example can be found from these two groups about sharing. The interview answers showed that while focusing on the details of how to share in the community, the existing residents also pointed out the acceptance of

each group member's community contribution. For example, if a resident cannot do the commitment in a certain period of time for some reasons (e.g. family reasons, personal reasons), the community accepts that "it will happen overtime" rather than judging and criticising. This could be another level of 'sharing', which is 'community shared understanding and acceptance'. This is the core that makes people feel more relaxed and less stressful and keeps the community functioning.

This research argues that the degree of sharing can be used as one of the fundamental indicators of assessing social proximity in a cohousing community. First of all, sharing brings a kind of openness and closeness. It means allowing other people to be 'entering' and 'involving' in someone's life. Second, sharing requires connection. It can be physical, spiritual or financial. Sharing is not necessarily a challenge to ownership and privacy as something can be owned by someone but still be shared. However, it is certain that sharing provides a platform of contact for all the sharers particularly in a collaborative community. It does not mean 'the more we shared, the higher proximity level we have', but this can be interpreted as the more 'stuff' is shared in a community, the wider the platform and the more opportunities exist to be connected with others.

When reviewing Table 7-1 and 7-2, all of the tangible and intangible sharing examples revealed an interesting feature of social proximity: most of them depend on physical assets in the cohousing community. Some of the sharing examples are achieved via conversations and words, often informally without economic exchange. In addition, very few examples were dependent on digital platforms (such as WhatsApp or Facebook groups) to enable sharing activities to take place. A common example that can be found in cohousing is to share information of ongoing events, room bookings, or updating construction processes between group members through a blog or group chat. The sharing phenomenon, then, emphasises the importance of the physical environment. The next session will introduce the relationship between physical cohousing environment and social proximity.

### 7.2.2 Social Proximity by Physical Territory

The degree of social proximity and closeness greatly depends on how the space is divided and used. The spatial system is an expression of a behavioural system (Rapoport, 1977), and gaining knowledge of community spatial division can improve the understanding of social behaviour. Many methods can be found in the literature in regards to urban spatial divisions (Brower, 1965; Lyman & Scott, 1970). The most detailed one is from Chermayeff and Alexander (1965, cited by Rapoport, 1977, pp.288-289). They defined a six-fold urban typology division:

- Urban public – open to all.
- Urban semi – public places for public use but with some limitations of purpose, special use.
- Group public – the meeting ground between the public and private realms managed by the community.
- Group private – community gardens or storage areas managed by some group.
- Family private – the dwelling and garden under control of the family.
- Individual private – the innermost sanctum of the individual.

With the development of modern civilization, urban spatial division and land use have changed. They mainly refer to what takes up the physical space of a town or city rather than using ‘private’ or ‘public’. Urban land use can be summarised as: residential; industrial; commercial and administrative; infrastructure (including transport); and open space (including planned open space like parks and derelict space) (Geography Case Study, 2018).

A cohousing community is a very interesting and creative mix of residential, group public, group private, family private and individual private. During the field work, the data gathered from the case studies regarding social and physical proximity shows the

correlation to the boundary following community areas: private area (private dwellings); semi-private areas; shared community areas; and areas shared with wider neighbourhood. According to Rapoport (1977), in term of establishing boundaries, urban space is divided in to domains distinguished by rules and symbols. The aim of this is to ensure desired levels of interaction and privacy and to provide the appropriate defences between them. This concept can be fully adapted into cohousing research. From my personal perspective, the interrelationship between social proximity and territory can be interpreted as the impact of degree of sharing on community spatial division (Figure 7-1).

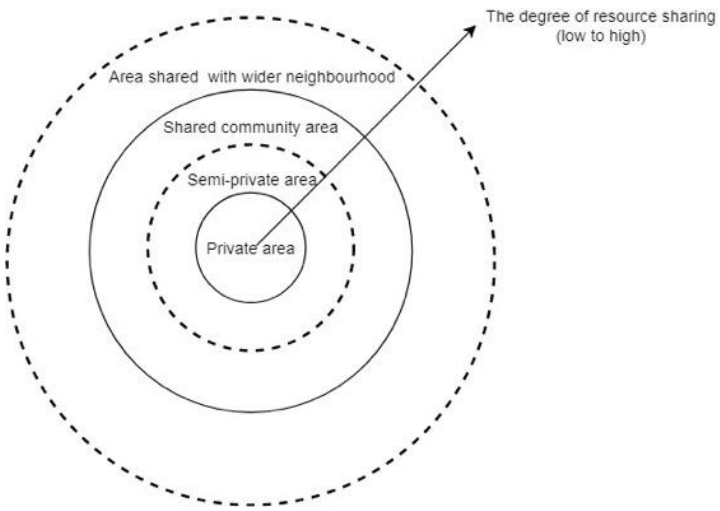



Figure 7-1. Sharing levels with territory

*7.2.2.1 Private Area*

Within the realm of social psychology, privacy means “avoiding unwanted interaction or controlling unwanted information flows” (Rapoport, 1977, p.290). In other words, privacy can be understood as preferences about the control of access of others. In a cohousing community, privacy can be fully protected by having private units. During the data analysis, the following features about private areas were identified as influential factors related to social proximity. First, the size of private dwelling is important. The scale of private dwelling gives the flexibility and options to manage both personal interests and social life. For example, whether the individual dwelling is big

enough to entertain a visiting friend for dinner if the cohousing resident does not want to use the shared dining area. The fundamental difference is about ‘choose to use’ or ‘have to use’ the common spaces. Another example is as follows: if one resident does not want to share the washing machine with others for some reason, does he/ she have enough space for his/ her own washing in the private unit? Such examples show that the scale of the individual dwelling enables the various decisions which may affect the social proximity.

Second, “Having front door to protect privacy, also using common area as an extension of private dwellings” (stated by Residents RO15, RO16 from Sheffield cohousing group, RL11 from LILAC Cohousing, RF5 from Five Rivers cohousing, RC1 from Colchester cohousing). This is the concept that has been heavily mentioned and valued by all of the participants. This also presents the balance between private and public life in a cohousing setting. The ‘front door’ has strong psychological meanings because it establishes boundaries between ‘mine’ and ‘others’, and also acts as a symbol of people’s emotional states representing openness and/ or closeness. In the private area, unwanted interactions can be controlled through ‘physical devices’, such as walls, doors and curtains.

Third, the distance from private unit to common house is also relevant. There is no clear restriction to describe the distance between private dwellings and common house in a cohousing community. However, it is a factor that can affect how cohousing members interact with each other. In most instances, the common house is placed centrally in the community, although it also depends on local conditions (e.g. sloped land or private flats and common house in a same building). However, during the case study, some residents mentioned that the distance can result in feelings of isolation or exclusion for those residents who live far from the common house. Such distance can also make them feel lazy to go and socialise because of the distance. This also makes

the residents who live very close to the common house feel overwhelmed and crowded. They may be affected by noise coming from the common house. These examples represent a concept from Rapoport (1977), where built environments (physical elements and social-cultural devices) can be seen as selective filters to allow information to be communicated or transmitted. The distance (paths and road) can be the connection between private dwellings and common house. It interprets either linkages or barriers and influences the social interaction and proximity among group members. Last but not least, the ratio of private to common areas attracted attention. Simply calculating the size of common and private areas is controversial because this fails to mention how many people will share the space, and the common area may not be efficiently used. However, as reported from architects and cohousing group members, even if the public area is three or four times larger than private area, for communities with a large population base, there might still not be enough space in the public area for social use. This ratio can directly affect physical proximity. It also shapes social activity and proximity indirectly.

#### *7.2.2.2 Semi-private Area*

Similar to the idea of soft edges, in an urban context, 'soft edge' means the area where indoor life meets outdoor life, such as the pavement between buildings and roads (Gehl, 2011). In a city, the semi-private area can be interpreted as the place in between common and private areas. The shape of the semi-private area in a cohousing is not like urban edges which are almost always linear. It is also rarely mentioned in the literature or by the cohousing groups. Based on the observation experience of the case studies, the semi-private area as an intermediate layer between private and public lives may not be realised and established by the residents in some cohousing projects, depending on the site and the way of the neighbourhood design. During the interview, the participants also did not name certain areas as semi-private areas. However, they pointed out that the following elements or points possess a 'dual- nature' (private and

public). The examples can be found in Figure 7-2. This could be just an outdoor sitting point, doorsteps, or a low-fenced/ open garden, or a small open area in front of the house, or the open planed balcony, or a private growing area in a big common garden (Figure 7-2). The reason why these areas are grouped into the semi-private area is because these places or staying points are either privately owned but located in the common area or they are private but enable certain levels of social interactions (e.g. see and hear, standing, talking) for the residents. Residents' private and common lives can 'meet' in this area.

Figure 7-2. Examples of semi-private area

**Key**

***First line (left to right):***

*1: A small open area in front of the house (transit zone), Springhill cohousing*

*2: Private outdoor sittings in front of the house (staying zone), Lancaster Cohousing*

*3: Liner open green area in front of the house (transit zone), LILAC Cohousing*

***Second line (left to right):***

*1: An open green area in front of the house including sittings (transit and staying zone), LILAC Cohousing*

*2: Outdoor front porch with sitting points and plants (staying zone), no barriers between households. Lancaster Cohousing*

***Third line (left to right):***
*1: A small open area and doorsteps (transit zone), Springhill cohousing*
*2: A small open area with washing lines in front of the dwelling block (transit zone), LILAC Cohousing*
*3: Liner grow area on the side of the common path (transit zone), Lancaster Cohousing*

***Fourth line (left to right):***
*1: An open green area in front of the house including sittings (transit and staying zone), Springhill cohousing*
*2: Open-planned balcony (staying zone), Springhill cohousing*
*3 up: Sitting area on both sides of the shaded corridor (transit and staying zone), Lancaster Cohousing*
*3 down: Outdoor sitting area in front of the house (staying zone), Springhill cohousing*

The geographical boundary between the semi-private area and common area in a cohousing is sometimes blurry. The semi-private area is often classified as private area, with the result that the social functions are overlooked by the residents. Based on the design experience shared by the cohousing architects, and drawing from Gehl (2011), this study argues that the semi-private area has the following features for influencing social proximity (Figure 7-2): first, semi-private area as an exchange / transit zone, in which doors and exchange points (e.g. open plan balcony) between inside and outside are located to show a degree of transparency of personal life. The activities inside the house can move into the common space in the community, such as drying clothes in the sunlight. Additionally, as people are passing by and/ or going back and forth between private and common areas, the semi-private area presents opportunities 'entering and leaving' the private and common lives, helps intensify the walking experience, and offers people the chance to see, meet and talk. Second, the semi-private area as a staying zone, offers opportunities for sitting and standing. If the semi-private area has sitting points and ground-floor attractive elements (e.g. plants,

building façade decorations, see Figure 7-2), there is a noticeable tendency for residents to slow down and turn their heads towards the façade, to walk more slowly, and make more stops. This provides more opportunity for residents to develop their social contacts, and directly influences the social and living pattern in the cohousing community.

*'Soft' or 'Hard' Semi-private Area*

Under the city context, the street with a soft edge can be described as "a street with shops lined up, transparent facades, larges windows, many openings and goods on display" (Gehl, 2011, p.79). In other words, on the street there is much to see and touch, offering many interesting reasons to slow down or stop. This directly represents the connections between soft edges and lively city life. Additionally, as well-explained in his book '*Soft City',* Sim (2019) provided multiple meanings of the term 'soft' in urban contexts. The most relevant ones to this research are: "Soft is something to do with sharing: sociable, common, mutual reciprocal, participatory, public"; and "Soft is something to do with invitation: welcoming, accessible, permeable, open" (Sim, 2019, copyright page). Similarly, in a cohousing community, the semi-private area can be seen as the edge where private and public life meet. The edge zone makes a vital contribution to spatial experience and to an understanding of the unique social pattern in the cohousing model.

The cohousing community with a soft semi-private area means there is a soft and smooth transition area between private and common life. The importance of this transition area can be easily understood when thinking whether there are is a front garden and sidewalks between the front door and the main road. This not only gives more life details to the community and connects every part of the community as a whole, it also provides a certain degree of psychological distance before entering the public sphere, and has a significant influence on the activity patterns and attractiveness of the community space. Just like the architect Ralph Erskine stated (cited in Gehl,

2011, p.82): “If the complex is interesting and exciting at eye level, the whole area will be interesting. Therefore, try to make the edge zone inviting and rich in good detail, and save your efforts on the upper floors, which have far less important both functionally and visually”. Based on the observation experience, the semi-private area is a very active outdoor area in the community, and many active (e.g. talking and greeting) and passive (e.g. see and hear others) contacts can be made between residents. Further, it is flexible in terms that it can be used as a private or common area depending on users’ preferences and needs. The difference can be easily recognised between a well-designed (soft) semi-private area and a ‘hard edge’ (Figure 7-3). Apparently, the left-hand picture is more lively, rich and interactive, while the right-hand picture, in contrast, shows that the doors of individual units face each other, with the doors adjoining the common corridor. This implies that residents step into the common area when they open the door without any transit space in between.

Figure 7-3. Well-designed soft edge (Springhill cohousing) vs a hard edge (Lancaster Cohousing)

Although the site condition and neighbourhood design for each cohousing community are different, during the conversation with cohousing residents and architects, the design and functions of the semi-private area are completely overlooked by these two participant groups when discussing social proximity in the community. Considering that most of the cohousing groups are aiming for a car-free community, which encourages

the residents to get around the area by foot. The walking traffic is safe and slow, amplifying the need for a detailed, meaningful and interesting edge zone. It also highlights the social advantages of people to stop and meet. In his book 'A Pattern Language', Alexander (1977) also succinctly summarised the importance of the edge zone: "If the edge fails, then the space never becomes lively". Therefore, why do residents and architects neglect the function of the semi-private area? First of all, generally, the cohousing community is simply divided into private and common areas, and most of the participants are unaware of the existence of an area in between. Only one architect mentioned the semi-private area during the interview when asked about residents' social proximity. Second, the site physical limitations. Residents may not be able to have their own front garden or balconies depending on land and financial conditions. The design of the neighbourhood is a group decision and very time-consuming. Third, even if there is a common area in the community, a cohousing community is still a community-owned or privately owned property, and many residents use the common area as an 'extension' of their private units rather than being 'real public'. So, it is difficult to recognise the importance of the semi-private area. Finally, because of the long process of cohousing development, many residents developed friendships with other group members, or they were friends before they decide to join a cohousing group. After moving in, their social interactions become very natural. The influence of the community physical environment to their social contacts and activities cannot be fully acknowledged.

The recommendation should be made for the architects and future cohousing groups by indicating the importance and social impacts of the semi-private area in a cohousing community. The elements involved in the semi-private area vary, however, they can have a vital influence on residents' social activities and living patterns. When the community's edge zones work, they reinforce community life. Activities can

supplement each other, the wealth of living experience increases, and walking becomes more enjoyable and safer.

#### *7.2.2.3 Common Area*

Similar with the urban context, the common area can be seen as the 'public area' in the cohousing community. According to the Joseph Rowntree Foundation (n. d., p.2), "The success of particular public space is not solely in the hands of the architect, urban designer or town planner, it relies also on people adopting, using and managing the place – people make places, more than places make people". From the residents' perspective, the common area distinguishes a cohousing community from other types of living models and it is the core of a cohousing community. It plays a significant role towards social proximity. The common area provides not only the platform of hosting residents to meet, sit, talk and eat, but also they are seen as the extension of private dwellings and also as a producer of co-living meanings (Horelli, 2013). During the interview, the following features (Table 7-3) are identified by the participants regarding the shared community area which has great impact on social proximity. These common features are grouped into four categories: scale/ size; location/ distance; balance; and amenity.

Table 7-3. Features of community common area towards social proximity based on interviews

| **Types** | **Community Features** |
|---|---|
| Scale/ Size | • Size of the common area.<br>• Scale of the entire community (having enough space). |
| Location/ Distance | • Common house placed centrally in the community.<br>• Location of bins is important (convenient and creates the opportunity for people to meet)b |
| Balance | • Having your own door, having private space and also having common space. |
| Amenity | • Amenity of the space. |

*Size and Scale*

The size of the common area and the scale of the entire community attracted attention and directly influence the social activity in the community. In other words, the form of contacts and activities are most directly influenced by the community planning. Invitation largely determines whether the community has enough space for residents to meet, host events and relax. There are two scale-extremes of the common area, too big or too small. If it is too big, the social pattern is incoherent and loose. People may feel isolated or disconnected. At other extreme, people may feel overwhelmed and exhausted through responding to unwanted social interactions. The participants expressed that the appropriate size of the common area means it is big enough to host a common event which can accommodate all group members. Based on the observation in the community and conversation with the residents, another question related to the size of the common area was raised by the Lancaster Cohousing group. There are many small groups and activity layers in between an individual and the whole group, such as the Vegan group (6 people) and the reading group (10 people), however, it is lacking the intermedium-level common (indoor) spaces to support activities for sub-groups. This means that residents have to use the big common house all the time when they want to meet, or they have to meet in someone's home. If two groups (e.g. Vegan group and non-Vegan group) have to share a big common area, this inconvenience might lead people to decide to stay home and not join the common activities. Thus, the social activities become limited and the proximity level is changed because of the design and size of the common area.

*Location and Distance*

There are distinct rhythms, patterns and temporalities to the use of the common area, depending on the time of the day and day of the week. Some places were especially important for particular groups within the community, such as the productive garden for landscaping team. Therefore, the location of the common facilities and the distance

between each place become fundamental for the social activities and social proximity, because they are the boosting factors for the community's walking traffic and 'private-public life exchange' for the residents. This exchange creates the social pattern for the whole community. In terms of physical proximity, both architects and residents responded that placing the common house centrally in the community is ideal. This makes the distance between private dwelling and common area similar for the residents, and also develops a sense of security within the community. Additionally, an architect pointed out the considerations of the bin area (how many bin areas and where should we put them) took a long time when designing the community – it needs to be convenient, practicable for the residents and also create an intersection in the walking routes for people to meet. Considering the relationship between users and their living environment, rather than defining the common area in spatial terms, this study argues the common area is 'co-produced'. This means the common space is alive and activated by the presence of people according to dynamic, changing patterns and timetables. Only the location and distance are meaningful when people are using the space. The common spaces also encourage people to play a role in the daily activities and to help shape these places to create unique social rhythms in the community.

*Balance and Amenity*

As mentioned earlier in the 'private area' section, maintaining a balance between private and public life is the most heavily repeated concept which attracts attention. The residents confirmed this as the most fundamental factor that makes cohousing living healthy and attractive. Common places can provide opportunities for social interaction, social mixing and social inclusion; the residents also have the choice to be 'alone' in their personal space. These two parts are closely connected, one does not work without the other. The transformations of private and public lives, and combination of the physical and social environments creates the overall amenity of the place. During the interview, two residents and an architect expressed the importance

of the amenity of the space when discussing the social proximity in the community. The amenity of the area is a broad concept; it is defined as the elements that contribute to the overall character or enjoyment of an area. In brief, the term amenity means what the space can provide to its users. Because every community has different stories, the meaning of space amenity can be interpreted in different ways. One resident expressed that she enjoyed very much growing vegetables in the community garden. Another very interesting example can be found to explain the relationship between social proximity and amenity of the place. The construction process can shape people's social focus and gives different meanings of community amenity. In one cohousing project in Sheffield, group members built their houses one by one. As construction was an ongoing process, therefore, there was a certain amount of social interaction around building. Once the community was built, social interaction took on a different focus. People were more relaxed to meet in the common area and enjoy their life rather than focus on how the building is built. Social pattern and proximity are completely changed because the environment and space amenity change. Similar research conducted by Sapawi and Said (2013) identified how physical attributes shaped the way in which respondents perceived the environment in the urban neighbourhood area. The researchers identified five-dimension level of needs: feasibility; accessibility; safety; comfort; and pleasurability. These five dimensions are closely related to the amenity of the space, and indirectly influence social distance and proximity via daily activities.

### 7.2.3 Social Proximity by group Participation

When discussing the social environment and its characteristics in the cohousing communities with interview participants, the following themes were identified that could affect social proximity through community participation. The main themes included: group participation and involvement; needs and supports; food issues; concerns and attitudes of problem solving. These will be discussed below.

#### *7.2.3.1 Group Participation and Involvement*

Participation starts with people who join the cohousing group to discover and invent expectations, rules as they speak with each other about their values, hopes, needs, likes, fears and many more. These conversations happen formally or informally in organising group meetings, design discussions and other numerous tasks that keep the project going forward. During the interview, several residents and one architect identified that their involvement and social proximity were influenced firstly by where the group meeting takes place before the common house (room) is built. As stated by an architect: “Before the common house was built, if group regular meetings always take place in someone’s house that could be very difficult” (Architect AO5). This arrangement may give pressure to the person who hosts the meeting (e.g. arranging meetings, offering space or challenging privacy) and also to the other group members (e.g. need to travel, not feel relaxed in someone’s house). Therefore, the group hierarchy and community governance might be developed in a unbalanced way in the long term, because someone always takes responsibility to arrange things (potential leader) and someone must always be the ‘guest’ or the ‘follower’. such unbalanced governance is not aligned with the philosophy of cohousing (everyone is equal and everyone should take responsibilities), and also directly influences social proximity and the way people feel and interact. Some residents suggested having the group meeting in a local café, quiet pub or having online group meetings before the common house was built.

The research also found that the following ideas were heavily repeated by the participants when discussing social proximity by group participation:

- No pressure for group members to do things (repeated 6 times);
- Size of the group (group scale) is important (repeated 5 times);

- How and how often people use their common space will influence social proximity (repeated twice);
- Using strategies to encourage people to do things (e.g. service charge); (repeated twice); and
- Distributive responsibility and flexibility of duties (repeated twice).

As the most frequently repeated principle, “no pressure for group members to do things” attracted lots of attention. No matter what development stage the community is in, this becomes the common principle agreed by **all** group members. The only difference recognised between pre-residents and existing residents towards this principle is about ‘fully voluntary’ or ‘fully voluntary with encouragement strategy’. As mentioned by a pre-resident from Colchester: “you don't have to do if you don’t want to do it. It is all about the willing.” This idea was also repeated by a Cambridge cohousing member: “The important thing is, you don’t want to make people ‘*have to do*’ it, you want to make people ‘*want to do*’ it, and how we manage this we don’t know”. However, some existing residents mentioned this principle with an encouragement plan, for example, the community reduces service charge or provides vouchers as a strategy to encourage residents to contribute to the community. In the LILAC Cohousing community, residents were exploring a self-evaluation scheme (a ‘star’ shaped evaluation system) to let group members understand themselves better and also what they can do for the whole community. Therefore, this study argues that this ‘no pressure’ principle ensures group stability and enables the community to move forward with strong cohesion. In a cohousing community, nobody wants to treat their community as one of their jobs with a ‘to do list’; rather, residents can ‘carry on’ staying in the community because they feel comfortable and relaxed. This principle is extremely important because this is the *life* for everybody.

‘Size of the group (how many people in the group)’ is also an interesting point related to social proximity because this directly determines group density and perceived density. As highlighted by a Lancaster Cohousing member: “I think the problem here is not really the social proximity and the boundary, the problem is more about the group scale and granularity” (RL10). Group size determines how and how often people use the common spaces and also the decision-making process. If the group is too big but lacks sufficient common space, the possibilities could be that residents either spend most of their time at home and try to avoid unwanted social interactions or the common house becomes too crowded. This research found that appropriate group size (generally, 15-30 households) with appropriate and well-arranged common space, can result in capturing the clear and healthy ‘temporary sequence’ of using common space. As confirmed during the observation, not all residents used the common space at the same time, for example, some older residents liked to sit in the common house to read newspapers or play jigsaw puzzles in the morning, and some young residents stayed in the common house while waiting for their washing from the common laundry in the afternoon. Somebody may show up randomly to collect their post in the letter box. Therefore, the size of the group and perceptions of community density were strongly influenced when and how people meet and how people interact with others in a specific time period. Additionally, one of the architects from Cambridge cohousing gave another thought about the scale of the community: “In a large community, you are able to ‘disappear’ a bit” (Architect, AK6). In other words, if someone is less active in joining things and doing things together, this is fine and inconspicuous. This relieves social pressure. However, it can be very different and judgmental under equivalent conditions but in a small group.

Finally, the idea of ‘distributive responsibility and flexibility of duties’ was highlighted twice by the current residents. They provided some examples to explain how distributive responsibility and flexibility duties are important. During the observation

and interviews, this study found that distributive responsibility can be achieved by distributing the community work to small teams (e.g. financial team and landscape team), and the resultant benefits can be found as follows. First, group members can contribute to the community by joining the team and doing what they like, are good at or familiar with, based on their life and working experience. People feel valued, passionate and comfortable working with others. Second, nobody has to take huge responsibility to make decisions to satisfy the entire community, also, it will not be a situation where the problem appears but nobody cares. Things can also be done with parallel teams, and this is much more efficient. Last but not least, distributive responsibility has the potential to make group decision making faster and easier. For example, it is not necessary to have all group members attending every meeting, as decisions can be made in small groups and presented to the whole community to ask for advice. Alternatively, someone representing the small team can attend the meeting and pass the information on to other team members. Flexibility of duties is the point, thus reflecting the philosophy of mutual support. Group members can swap duties if someone has difficulties or something comes up and needs urgent attention. All of these examples can fundamentally change how people feel and interact by living in a socially cohesive community, and also provide new understandings of social proximity: this is about who you know and also who is nearby.

#### *7.2.3.2 Needs and Support*

Needs and support always come in pairs. When discussing social proximity by needs and support in a cohousing community, the focus of caring shifts from the individual (and family) to unrelated others and from material to social and community needs (Meltzer, 2005). The most popular principle related to needs and support is about the balance between self needs and community (group) needs. As highlighted in the 'Motivation' chapter (Chapter 5), the balances between 'give and take' and also 'individual and community needs' are two fundamental principles which keep the social

environment healthy and going forward. A similar understanding regarding individual and community needs was also proposed in research on the sense of community by Mannarini and Fedi (2009, p.217), highlighted by one of their interviewee's quotations to prove the importance of individuality and community identification: "A too strong identification with the community means losing one's own individuality, but community is an interaction between individuals and community: individuals must not overcome community, nor be overwhelmed, and vice versa". This is a typical example to show the relationship and appropriate level of interaction between each individual group member and the community. When people start living in a community, there is no doubt that the community needs have been amplified. It is also necessary to notice that the needs and fulfilment towards individual and community should be analysed based on the local culture and context. Understandings vary in different cultural backgrounds, such as between Eastern and Western culture. However, based on English culture, this study argues that the community needs can be met on the basis of the individual needs being fulfilled. At the same time, the community/ group should accept and support the group members to pursue their personal satisfaction and pleasure, just as it was stated by participants (from LILAC and Lancaster Cohousing):

> "Sometimes, I get to end of the day and I am tired, I think today I have done too much to the community, tomorrow I need to do something for me. Get the balance back. I have to make sure I have time to see my friends. Sometimes I just stay in my flat, be on my own, in this community I can do that" (Resident, RL13).

> "You have to make sure you are getting enough *what you need to get, to be able to cooperate with other people.* Otherwise, you come to resent it I think, you come to resent the fact – 'everybody gets what they want, I don't get what I want.' So I think you have to be slightly selfish, and think about do I really want to do this [join and live in a cohousing community]" (Resident, RL10).

Regarding social proximity, another point was acknowledged by the participants – mutual care and mutual support are able to influence the extent of social proximity. Specially, mutual care is a two-way street as it includes care giving and receiving. For example, time spent listening and discussing joint needs and difficulties to explore shared understanding of boundaries and enthusiasm for working together on new ideas (from LILAC Cohousing). This process can help to develop the relationship of trust between group members, individuals and their communities, and then enhance the interpersonal connections. However, a very interesting point related to wellbeing care was reported by a group member of Lancaster Cohousing. The emotional needs have always been overlooked especially for an introverted or quiet person. Similar research has been done by Glass (2009, p.295), highlighted by a question recorded in her research: "If you needed help with your home and personal care due to a health problem, how likely would you be to ask any Cohousing community members to help you?". This research found that not everyone felt comfortable asking for help, especially when it came to personal issues:

> "It assumes emotional needs which are met with in your household, but that is not actually the way works. Some people are in single-parents' family, some people are single. If somebody says, 'I need help!' somebody will usually come to help. But the difficulty is, whatever you got a quiet person, he/ she doesn't say. It is not really going to be helped" (Residents, RL10).

Therefore, a gap regarding community mutual support can be found in the cohousing model. Even though everyone is different, support cannot be provided due to a lack of awareness that the help is needed. How to make people feel a sense of community, a sense of belonging and trust (be trusted), and search for help from others, should be considered and addressed in the community management and support system for the wellbeing of all group members.

#### *7.2.3.3 Food Issues*

Growing food and sharing meals are the well-known common activities that symbolise group participation in a cohousing community. It is significant to community life and also has great impact on the environment, social sustainability and social proximity because it closely relates to the source of the ingredients, food miles, how people prepare food together and wash up, what people eat in the shared meal and why people want to eat together. Having food (e.g. fruits and vegetables) grown in the community (local food) can significantly reduce 'food miles' (food transportation and food buying) and shorten supply chains. This not only provides the platform for group members to work together, but also helps preserve the environment (Blake & Crane, 2008). As highlighted by cohousing members, eating can be understood as a very private or public activity depending on the culture, local context and occasion. The way of people working together to prepare food and eat (e.g. how people put and set the dining table, the distance between people's seats) can be a very interesting indicator to show the level of social proximity in the cohousing communities.

During the interviews, group members paid specific attention to the questions that considered the frequency of shared meals per week. The reason why residents concentrated on this frequency is because they potentially agreed that this factor can be used to measure the degree of collaboration in the group. In other words, it means how often people are 'formally' gathered to eat in the common house. The answers regarding frequency were very different within various cohousing groups. A cohousing group from Cornwall answered "everyday", participants from LILAC Cohousing reported that they had common meals twice a week, participants from Lancaster Cohousing highlighted that they eat together 3-5 times per week, and some pre-residents from Colchester and Cambridge cohousing groups explained: "There are no specific requirements on the number of common meals per week, people just arrange it when they want to". This study argues that the frequency of common meals may not

be accurate enough to measure the degree of collaboration between group members because there are different forms of cooperation and communication that exist in the community. However, this frequency can show the intension of willingness of group members to share dining times and food with each other. The behaviour of meal sharing is fundamental to increase social proximity because it brings group members together, as they work closely (prepare, cook, or washing up) and focus on the same goal (a delicious meal!).

In addition, the interview results showed that most of the cohousing groups that participated in this study have voluntary-based common meals. This means group members volunteered to participate, prepare food, cook and wash up. An example can be found in LILAC Cohousing where a resident reported that their weekly common meals in the community were entirely voluntary based. Residents signed up to help the common meal, three residents volunteered as a team, two for cooking and food preparation, and one for washing up. If only two people signed up for the common meal, residents who joined the common meal then helped to wash up together. In the process of observation, this study realised that voluntary-based participation made collaboration easier and happier. People were willing to help, and they worked closely without any pressure. They discussed the menu, laughed, and shared stories with lots of joy. This voluntary-based common meal not only influences the degree of social proximity between group members, it also brings good company for older residents because they have tasks to do, and they feel needed and valued by the community.

This research found only one issue related to food and the community common meal that could reduce social proximity: the ‘food rules’. Some residents disagreed that the community planned to have vegetarian/ vegan food all the time. Non-vegetarian residents said that they were willing to participate in the common meal, but they were concerned about the food:

> "… because we only have one common house here, some people are very meat-sensitive figures. So the baseline we have vegetarian and vegan all the time, but for people who really like meat and fishes, it is a bit tricky. The people are founders, they really wanted vegan community, there are not enough vegan to go around, so that does cause tensions" (Resident, RL10).

As a researcher, I would like to argue that the tension caused by this food arrangement can affect residents' enthusiasm and passion to participate in community activities, especially regarding the common meal. If the community is developed as a non-vegetarian community, the group should accept and respect the food preference diversity in the community and also reflect on the management of the common spaces to avoid any inconvenience between vegetarian and non-vegetarian members.

#### *7.2.3.4 Concerns and Attitudes of Problem Solving*

Before discussing the attitude of problem solving, it is necessary to understand the common concerns and difficulties the group members expressed, because these social issues may delay/ stop people from joining a cohousing community, or make existing residents feel that this type of collaborative community living is not suitable for them. During the conversation with the pre-residents and existing residents, this study recognised a slight difference in focus between these two groups of participants. Their concerns are listed below:

**Pre-resident:**

- A problem-solving plan is needed (how to deal with 'difficult people'?)
- How to deal with people's different expectations?
- Worries about privacy.
- Pet problems.

**Existing Residents:**

- A problem-solving plan is needed (how to manage conflicts in the community?)

- Difficulty dealing with people in the community who feel isolated and paranoid with mainstream society.
- After moving in and running the community, re-organising and improving the community through community governance is necessary, but people are very busy in their own lives, nobody pays attention to thinking about how to run a community better.
- The first step of solving a problem is to define the problem.

The common and heavily repeated concerns defined by these two groups above concerned the capabilities and strategies of coping with conflicts and 'difficult people' in the community. As written in many group's 'mission statements', the process of making group-decisions was clearly explained by using 'consensus'. However, the plan and system of dealing with conflicts was not really carefully considered and sometimes not mentioned in some groups. Regarding the issues and concerns expressed above, the research findings here are not able to provide general answers to all of them because each cohousing community has different tenure forms and management styles. Many residents (e.g., Residents RL10, RO18 and RF5 from Lancaster and Sheffield cohousing groups) also acknowledged the complexity of living closely with a group of people. Problems and issues were measured in terms of people's backgrounds, experiences and connections, possible changes and other variables.

> "You know people are complex, a group of people is very complex. You need to deal with a group of people here" (Residents RO18, RL10).

Even though having a problem-solving system for some cohousing groups was never fully considered, the attitudes of residents to deal with conflicts and different opinions can be clearly perceived in the conversation:

> "…I think what I learnt from my mum was she respects everybody as a starting point. I think when I cope with a group of people, I recognised that is not just a good strategy, but it is way should be. You should allow people to show you what they are like. But I mean, the thing which is certain about this project is, everybody has an opinion, you should respect that" (A funder member, existing resident from Sheffield, RO18).

> "I don't know what is going to come from this project, you may find some people would annoyed you after you moved in, but I don't want to see that as a negative thing, it might be difficult at the time, I want to see that as a challenge in order to find out about yourself to other people how to manage that" (Pre-resident, funder member from Sheffield, RF5).

> "I can imagine there could be tensions around different stuff, about people's different expectations, about what people can manage. In our group, there is lot of work to do, some of them are retired, but also very busy, doing different projects, or [looking after] grandchildren, some of them are working, doing some research, so everyone has very different shape of lives. Not everyone has the time to attend the group meeting, but we know the desire is there, towards the same goal" (Pre-resident, new member, Sheffield, RO16).

These example shows that no matter whether they are pre-residents or existing residents, they respected and acknowledged the complexity and imperfections of other group members, and also had a positive attitude towards disagreements and conflicts. This research found that when discussing the difficulties and conflicts, most group members focused more on how to deal with them as a group rather than as independent individuals, being supportive rather than judgmental. The problem solving journey was seen as a process when people explored the baseline of running a community, what they can manage and what they cannot. Based on these principles and shared understandings, conflicts could be solved faster and easier.

## 7.3 Conclusion and Discussion

Reviewing the definition of social proximity in a cohousing context, sharing significantly changes the social pattern and social proximity in community living because sharing behaviour shapes the way people connect and interact. However, this research argues that the purpose of sharing is slightly different in a cohousing model as it can be summarised as 'mutual benefit' (social, financial and sustainable benefits). As an interpersonal process (Belk, 2007), sharing should be analysed by culture. The tangible and intangible items listed above were the research findings summarised from British cohousing case studies, and they can be very different when reviewed in different contexts.

In addition, social proximity was strongly associated with the community build environment and neighbourhood planning. First, the private units maintained residents' privacy and also provided space for personal interests and social life. The doors, windows and curtains of the private units not only provided physical boundaries, but also could be seen as sensitive indicators to show people's sociable statues (available, busy or not available). Second, the semi-private area represented the transition area between private and common areas, yet was always overlooked by the architect and residents. However, this area offers psychological space before entering the common space and activates the whole area for residents to slow down, stop and meet. Finally, the size of the common area, location of the community facilities, the distance between private and common areas and the private and public life balance form the amenity of the entire community. This study found that the common space was co-produced, and was alive and meaningful when people used it. The community physical environment influences the residents' social patterns and social proximity, and at the same time, residents are invited to play a key role to shape the community via their walking traffic, movements and daily activities. The process is multi-layered, long term and detailed. This study captured the living details to explain the interaction between social proximity

and physical environment at the micro scale. The examples should be analysed and understood within the local context.

Participation and community management formed another layer of understanding social proximity in a cohousing community. The discussion of group participation included where people meet, how group members used the common spaces, how to organise things in the community and how to encourage people to complete group work in the community. The needs and supports were emphasised in pairs by the participants, and they also highlighted that the satisfaction of individuals formed the basis of meeting group needs. Attention has also been paid to the arrangement of the common meal. The considerations of various cohousing groups towards the common meal were focused on whether the group should prepare vegetarian food all of the time for the common meal and whether communities should adopt purely voluntary mechanisms to arrange the common meal. When problems emerged, the problem-solving attitudes of group members could largely affect social proximity by changing how people felt and reacted.

Both pre-residents and existing residents expressed the difficulties of coping with 'difficult people' in the community. Even though cohousing communities attract like-minded' people, the complexity of a group of people living closely should be acknowledged. This research found that most group members focused more on how to deal with problems as a group rather than as independent individuals, being supportive rather than judgmental. This attitude distinguishes a cohousing community from other residential living models, because cohousing communities are managed by the residents and everyone is the 'owner' of the community. Finally, this study wishes to highlight the following aspects which may **reduce** the level of social proximity and **weaken** social bonding in a community (Table 7-4).

Table 7-4. Social bonding and proximity barriers

| Themes | Concepts |
|---|---|
| Group Participation and Involvement | Completing community tasks with big pressure. |
| Needs and support | Focusing on community needs and ignoring personal fulfilment. The emotional needs are always overlooked, especially for an introverted or quiet person. |
| Food issues | Lack of dietary diversity of the common meal (vegetarian food only). |
| Concerns and attitudes of problem solving | Having difficulties to cope with 'difficult people' in the community. |
| Ownership and responsibility | Shared facilities and transport – nobody takes responsibility to look after cars (or other shared facilities). |

The next chapter will explore how living in a cohousing community affects thinking and daily practice of its residents.

# Chapter 8 : ATTITUDE AND PRACTICE CHANGES

## 8.1 Introduction

After discussing social proximity in the previous chapter, based on the concepts of environmental psychology and ethnography, this study argues that residents' ideological and behavioural changes could be found after joining a cohousing group. Meanwhile, this chapter paid special attention to the habitus and daily practice. As influenced by the concept of habitus from Bourdieu (1977, 1990), habitus has a large role in what people do in their daily lives, or their practice, practice involves more than habitus. Therefore, the aim of this chapter is to establish the correlations between group members' attitudes and daily practices (e.g., environmental and social practices). Within four main types of capital (economic, cultural, social, and symbolic) defined by Bourdieu (1990, 1996), social capital accrues from networks of relationships, such as family and neighbourhood. This offers great foundation of explaining people's attitude and behaviour change, such as eating and recycling behaviours. The explorations of attitude and practice changes of cohousing group members were important to the study because first, this is a key aspect of understanding the cohousing environment and its context. Through observation and interviews, the study aims to identify what has changed (or is going to change) after joining in and to understand the expectations of different group members. Second, reflecting on the main research question, this study provides a micro-scale lens to show 'sustainable impacts' (e.g. environmental and economic practices) of cohousing models and how people interact with each other and are affected by their living environment from attitude to action. From the user's perspective, understanding their way of thinking and daily practices plays a significant role in analysing the advantages and disadvantages of this type of living. The findings of this study can be a key factor to reveal the reasons why there is a lack of progress towards sustainable lifestyles in the UK. Third, the reasons and barriers underlying changing attitudes and the ways of conducting practice can provide useful resources

for designing or improving cohousing physical infrastructure and its social environment in the future.

In this chapter, data analysis and the explorations of social meaning towards group members' practices were influenced by SOC theory (McMillan & Chavis, 1986). By taking the theoretical model of SOC generated by McMillan and Chavis (1986) into consideration, this study also applied the four dimensions of SOC (membership, influence, integration and fulfilment of needs, and shared emotional connection) to guide analysis of the changed attitudes and practices. The empirical data of this chapter was collected from cohousing site observations in the UK and interviews with three participant-groups: cohousing architects; current residents (people who were currently living in cohousing communities at the time of the study); and future residents (people who joined a cohousing group, group members who were designing their future community, or were waiting for the construction to be finished). The aim of this chapter was to answer one of the research sub-questions (sub-question No.4 shown in section 3.1.1): How do cohousing residents interact with each other and how does cohousing design affect their daily lives? The interview questions used in data collection are: Do you think cohousing design and community living can change your thinking and behaviour? Why and How?

This chapter has three parts. The first part describes the attitude changes of cohousing group members after they join the group. Attitude changes can be found in the following aspects: individuals within group dynamics; individuals interacting with physical infrastructure; and individuals interacting with individuals. The second part shows how the corresponding practices were conducted and influenced by changing attitudes. The third part establishes the reasons, boosting factors and 'action-barriers' of conducting practice among group members. The chapter structure is shown in

Figure 8-1 (Appendix 12). The figure should be read from left to right. The red arrows indicate examples of causal relationships between categories.

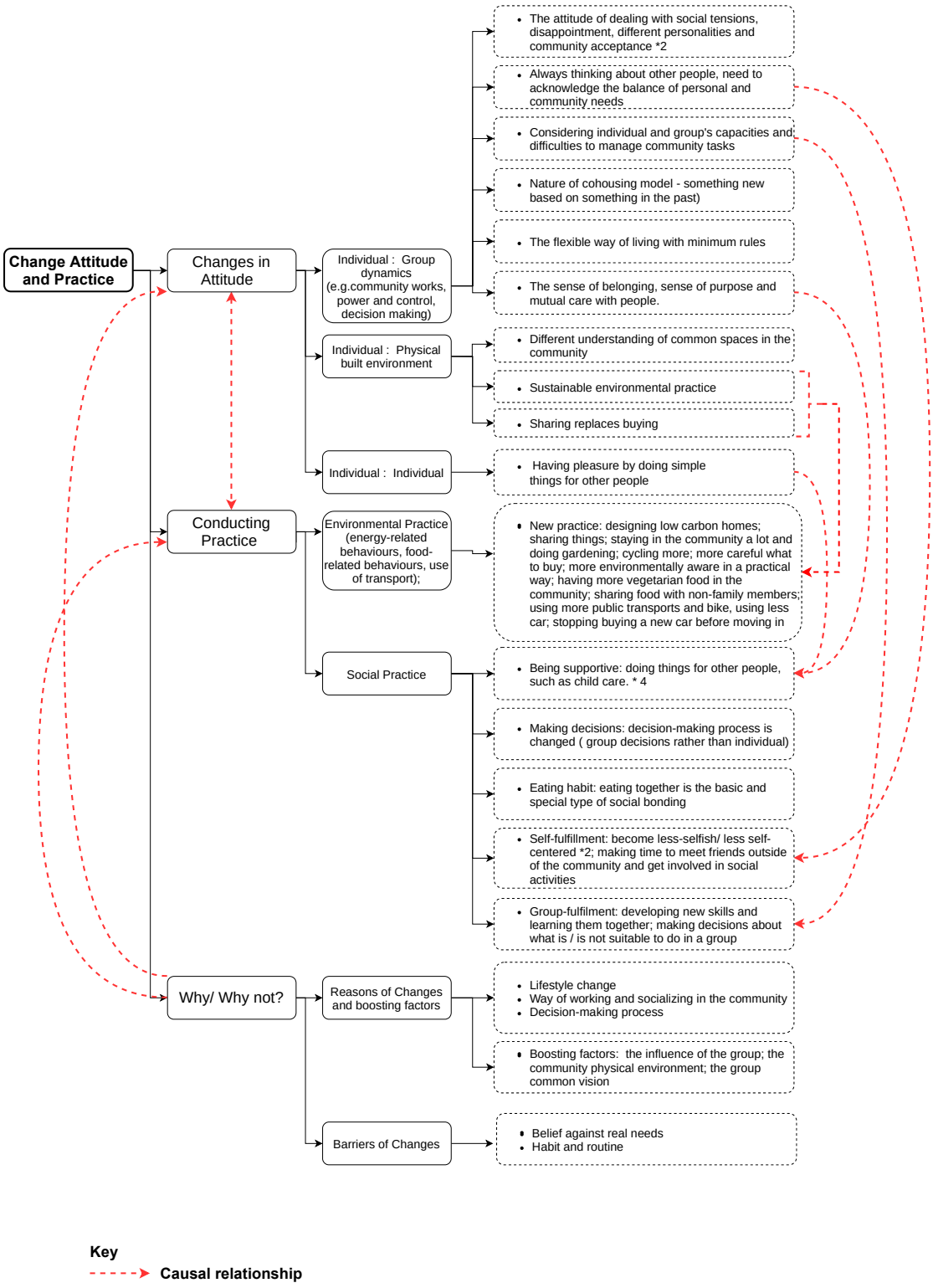



Figure 8-1. Structure of the Chapter

## 8.2 Attitude and Practice Changes

### 8.2.1 Understandings of Attitudes and Practice Changes

The interview question used for all participants was: 'Do you think this type of collaborative community living can change your thinking and behaviour? Why and how?'. For architects, this question aimed to explore how well they understood their clients and their social practices. During the interview, group members acknowledged that all decisions they made about how they live, work and what they choose to do affected their way of thinking and practices. Six architects, nine current residents and nine future residents participated in this study. Two architects answered "yes" to the interview question, explaining how their design and community environment affected group members' daily lives. One architect answered "no" (this architect worked for an older people's group where group members knew each other very well. Further, he did not think group members' attitudes and practices would change after moving in because he thought that the personal values and lifestyle of these elderly group members evidenced fixed patterns over the years and could only be adapted but not changed). The remaining three architects answered "I am not sure" to the question.

Within the current resident group, all participants answered "yes" to the question based on their living experience in cohousing communities. They gave examples to explain what changed after they moved in and why these changes happened. They also identified the difference between active and passive changes to 'cooperate' or 'survive' in the community. Within the future resident group, seven group members said "yes" based on their participative experience in the group and co-design process with architects and other group members. The rest stated that "they don't know yet". It was found that future residents expected changes and believed their attitudes and practices would be influenced by the collaborative community living. However, this study argues that the degrees of 'being changed' of the group members were different. A resident

questioned the word ‘change’ in the interview question, stating: “I am sure I will be **influenced** by the environment, but I doubt I will **be fundamentally changed** because the views of life and your values are unchanged” (Resident RC1). In the meantime, reflecting on TPB by Ajzen (1985), this study acknowledges that attitudes and practices are strongly connected and influence each other. The attitude and practice changes may occur simultaneously or happen in a causal sequence. Therefore, this study developed the attitude-action link (Figure 8-2) to analyse how people changed their practice by changing attitude. The following sections will discuss how group members’ attitudes affected their environmental and social practices.

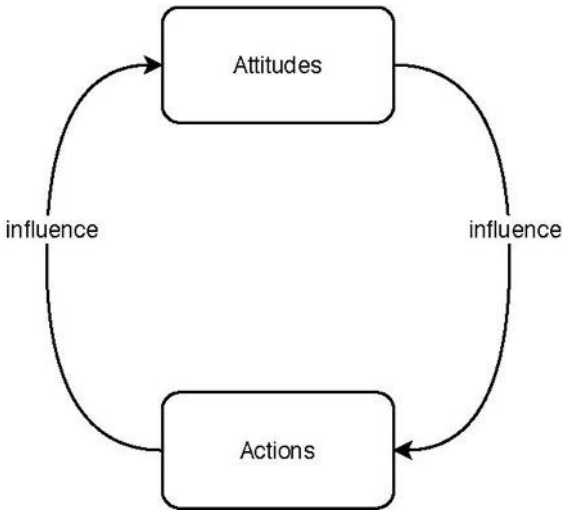


Figure 8-2. Attitude and action loop

### 8.2.2 Change in Attitudes

The interview data was analysed through content analysis using thematic coding methods. The data coding process was to generalise the main themes. This research found that participants emphasised three relationships among individuals, community-built environments and group dynamics. Therefore, the following research findings were classified into three broad categories: 1) individuals within group dynamics; 2) individuals interacting with physical built environments; and 3) individuals interacting with individuals (Figure 8-3).

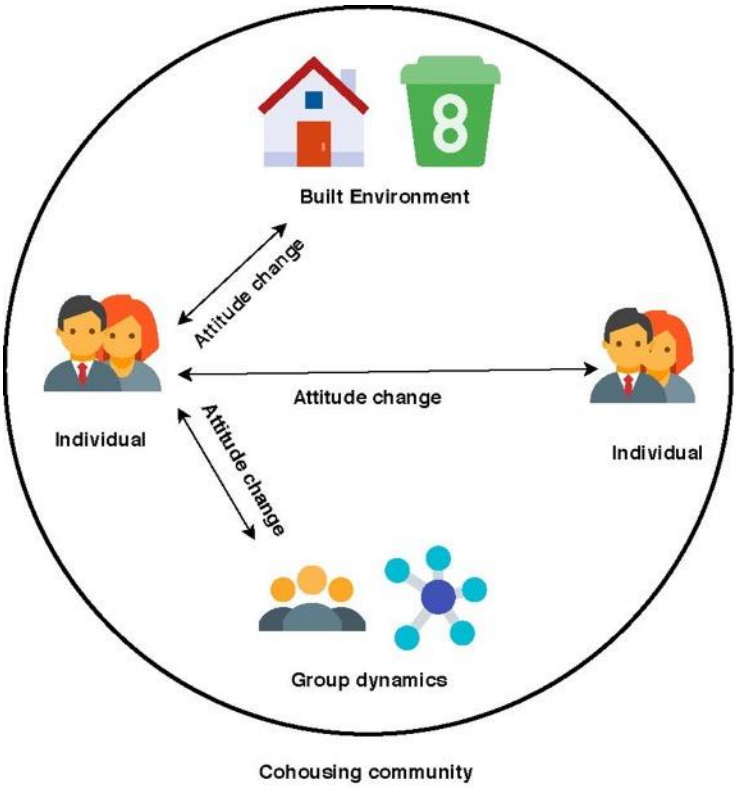



Figure 8-3. Attitude change by different factors in cohousing communities

*8.2.2.1 Individuals within Group Dynamics*

Cartwright and Zander (1968, p.7) defined group dynamics as “the nature of groups, the laws of their development, and their interrelations with individuals, other groups, and larger institutions”. In the cohousing context, group dynamics include, for example, evaluation of community works and distribution, power and control, community-led decision making and community governance. The interview results showed that there had been a big shift in people’s attitudes concerning the relationship between individual and group dynamics. At first, the attitude change was realised through changed understandings of the nature of cohousing communities. People’s understanding towards the cohousing model changed from “new and creative living model” to “it is not purely new; it is something new based on the past” (Group Member RF3). Reflecting on the history of cohousing in Chapter 3 (Literature Review), the cohousing model challenges the current status (e.g. individualism, people are isolated) and creates an atmosphere in which people are connected and live closely in present times.

A group member agreed with this idea. She stated: “This way of living brings us **back** to the way our society should be, and our privacy is also protected” (Resident RF3). Within both current residents and future residents group, the commonly agreed idea towards attitude change was “the different ways of dealing with social tensions, disappointment, different personalities and community acceptance.” Some participants explained that their attitudes changed especially from ‘ignoring social tensions, feeling disappointed and angry, and avoiding difficult people’ to ‘treating social tensions as part of their living and social experience’, ‘acknowledging and respecting the differences between people’, ‘solving problems as a team’ and ‘considering the individual and group’s capabilities and difficulties to manage community tasks’. Relating to SOC theory, sense of community is relevant to various factors, and one of them is the individual ability to use problem-focused coping strategies (Bachrach & Zautra, 1985; Sarason, 1974). This explained that a positively changed attitude of coping with problems can affect and increases the sense of community. Current residents also emphasised that the “cohousing model may not suitable for everyone, there will be people don’t do what people ask them to and leave, but there will be people come here to do far more” (Residents RL9, RL10). In the meantime, when discussing individual and group capabilities, a very interesting comment was provided by a current resident. From his perspective, many cohousing groups were very ambitious to achieve different community tasks. After moving in, people were also motivated or being encouraged to accomplish various tasks for the group. In other words, some group members did not feel ‘enough’ or ‘grateful’ for what they achieved. as he highlighted:

> “We have achieved far more than I thought, and yes, there are things we did not get right, there are difficulties, but I like talking to people because you get to see other people’s eyes. People are just amazed. I would like to say we tried too hard here, we want to do so many things, why don’t we just relax a bit, take a bit more time, you know the founding generations, they are pioneers,

there is a particular mind-set and sprits who set things up, I aware there is a danger… I mean, one of the co-founders here, I think he moved on, because he is looking for another project to set up, because he likes setting things up, not necessarily got the attitude to make things work and keep them going. That is a different personality. When we achieve what we want to achieve, some people will go, 'wow, this is it, we done it', but other people say, 'no, no, no, we could do far more!'" (Resident RL10).

This example has shown that some residents realised and shifted their attention from 'what they have to do in the community' to 'what they have done', and also realised the importance of individual and group capabilities but also the difficulties. Further, they appreciated what they had achieved, and enjoyed their community life. At the same time, some positive subsequent practices can also be found by this shift, for example, some group members started to develop new skills (e.g. managing a website) and decided to learn these skills together, also making decisions about what is/ is not suitable to do in a group by considering the capabilities of the group (more information was presented in Section 2.3.2). However, it is necessary to highlight the cognitive distinction towards community works between founder members and the rest of the group. Due to personal experience and personality differences, this distinction may cause social tensions, social exclusion and uncomfortable living. This study argues that effective communication is required, and that the balance between group capacities and community work should also be considered. Flexible working and an appropriate relaxation period could also offer the group a degree of autonomy, and autonomy is a vital ingredient for self-fulfilment and a sense of community.

Defining the balance between individual and community needs is another example of attitude change. Compared with the future residents' group, the interview results showed that current residents were more aware of the importance of satisfying

personal needs. Some of the residents believed that the fulfilment of personal needs formed a prerequisite for the achievement of group needs. This understanding not only has an impact on social proximity (see Chapter 7, Section 7.2.3.2), but can also greatly affect the subsequent practice. As one of the current residents responded: “There is always work to be done in the community, but when I feel low, I always make sure I got enough time to see my friends or stay in my apartment to relax, ‘pause’ the community work and hung out with friends, when I feel refresh and active again, I will come back to community work” (Resident RL13). This is a very typical example demonstrating the importance of personal needs. Additionally, this continuous response from attitude to action also acknowledges the role of attitudes in changing practices. This example will be discussed in detail in Section 8.2.3.2. Finally, both future residents and current residents agreed that building the sense of community, belonging and attachment affected their perceptions towards community living. Apart from the four dimensions of SOC, Mannarini and Fedi (2009, p.224) stated: “what makes a difference between active and inactive citizens is not simply their SOC, but the main frame underlying their representation of the community”. Current residents substantiated this idea and expressed that the sense of belonging and attachment could encourage certain practices to happen, such as talking about collective responsibilities, supporting older people and childcare. In addition, an architect highlighted that the membership forming, and the construction process shifted group members’ social focus (Architect AO5). Additionally, the sense of belonging increased when they moved into the community because residents felt proud to live in the community that they designed for themselves; they also felt connected and belonged to a group rather than always being ‘self-centred’.

#### *8.2.2.2 Individuals Interacting with Physical Built Environments*

The attitude change of group members was also related to their understandings of community common spaces and sustainable practice. The first feature of this type of

change was that people treated the common spaces in the community as an extension of their home space. As a current resident from Lancaster Cohousing expressed: “This provides deeper understanding of community common spaces. Is it an extension of our home or is it a community centre for one street. The answer is ‘It is both” (Resident RL10). Related to TPB, this study argues that the subsequent practice of group members can also be affected and predicted by changing attitudes towards the common area. This also provides the new identity of common spaces – community centre and extension of homes – and creates a strong sense of attachment and belonging. At the same time, another type of attitude change relevant to the community built environment was that of the increased awareness of sustainable environmental practices. In other words, group members noticed that the ‘action barriers’ had been reduced under the influence of the entire group and thus felt it was ‘easier’ to take a step forward towards environmental sustainable practices, because as they described: “Under the influence of a group, now I cycle more, more careful what I am buying, more environmentally awareness… in a more practical way. It is about I **can do** it, not just a theory” (Resident RL13). This ‘can do’ attitude can affect “how hard people are willing to try, and how much of an effort they are planning to exert” (Ajzen, 1991, p.181).

Finally, the last significant feature of attitude change focused on ‘sharing replaces buying’. Based on the sharing culture of the cohousing model, people dramatically increased opportunities to consider ‘sharing’ on a daily basis compared with living in other residential models. One of the impacts of this sharing concept is to reduce consumption and its impact on the built environment. As a future resident stated: “For the environmental way, we want to share garden, we want to share cars, share laundry facilities, want to share equipment rather than buy it, we would be consuming less” (Resident RF5). Group members have this shared vision before they move in. This type of attitude change could directly influence the design of community layout to foster certain sharing practices to take place and influence how people behave after they

move in. Group members could also promote their convenience of sharing practices through neighbourhood design. For example, group members suggested that the common house should be placed centrally in the community, ensuring a similar distance between each household to the main common area. This type of neighbourhood design will activate more balanced sharing and social practices and form a virtuous circle between attitude and behaviour. In the meantime, the increased awareness of sustainable environmental practices and the concept 'sharing replaces buying' played a significant role in encouraging more environmental practices to happen in the community. The practice changes were shown in both current and future residents groups. The current residents group responded: "We are cycling more, more careful what we are buying, having more vegetarian food in the community" (Residents RL8, RL9, RL10, and RL13). At the same time, the future residents group reported that: "Before moving in, I convinced myself not to buy a new car, because I think I might not need it when I start to live in a cohousing; and also, I hope to use more public transports and bike if I can. I realised I have already changed even if I have not move in yet" (Resident RF4). The practical changes were realised and demonstrated in group member's daily lives. More detail concerning the process of changing environmental practices will be provided in Section 8.2.3.1.

#### *8.2.2.3 Individuals Interacting with Individuals*

An interesting attitude change among group members was reported as "being supportive and enjoy helping others". During the conversation with group members, this study found that the feature of this attitude change was 'defining happiness in a different way'. Group members emphasised that they were having pleasure by just being supportive and doing simple things for other people, especially the older residents, as they were willing to help. As a very important feature of attitude change, group members felt valued, cheerful, motivated and engaged with the entire group

through care giving and care receiving. A very common example can be found in cohousing communities that represent the philosophy of mutual care in cohousing:

> "We often say, 'I am just going to Morrisons, anybody like anything?' so we save quite a lot of time by doing smaller jobs for each other, and also help each other out a lot with childcare. Taking each other's children, which is the big benefit for the parents, and for children. There are quite a few of the old people who are in their 60s, who enjoyed a lot helping out, taking care of some of the children for a few hours" (Resident, RL8).

A cohousing resident agreed with this point. He stated: "People will regularly experience happiness because they are doing things for other people" (Resident RO18). This study argues that this phenomenon may not be easy to find in other types/ forms of residential models. This attitude change is one of the significant positive impacts of living in cohousing. Additionally, in this case, it is difficult to identify whether the actions influence attitude change or the attitude leads to changes in behaviours. However, this example shows a completed 'attitude-action link' and a virtuous cycle of conducting practice. These attitude and practice changes happened simultaneously and by thinking about and supporting other people. More information on the conducting practice will be provided in Section 8.2.3.2.

The next section will discuss what corresponding practices are conducted by changing attitudes, and exploring 'action barriers' and difficulties in the cohousing context that impede people from changing their practices.

### 8.2.3 Changes in Conducting Practice

Studying how people's attitudes influence their actions has previously been discussed in section 8.2.2, including people's ways of thinking and codes of conduct. According to Stern (2000, p.57), the Value-Belief-Norm Theory can be explained as "individual action may depend on the belief or value set that receives attention in a given context".

Therefore, understanding the connections between attitudes and practices is crucial. This section identifies which practices have been affected by changing attitudes and what the implications of these changes are in the cohousing context. The interview and observation results showed that the primary practical changes were manifested at the environmental and social levels. This result also echoed the findings in Chapter 5 that social and environmental purposes are the two dominant factors that motivate people to join a cohousing community. Based on the data analysis, the practice changes can be grouped into four levels: 1) new practice: practice that never happened before/ rarely happens until moving into a cohousing community; 2) changing the frequencies/ extent of doing something (doing more or less); 3) changing the way of doing something (e.g. doing things with others); and 4) stopping doing something after joining the group. This classification method was inspired from Fogg's Behaviours Grid (2009, 2010). He used meaningful colour codes (Green – do new behaviour; blue – do familiar behaviour; purple – increase behaviour intensity; grey – decrease behaviour intensity and black – stop existing behaviour); and behaviour duration measure (dot, span and path) to define people's behavioural change.

#### *8.2.3.1 Environmental Practices*

Based on the interview findings, Table 8-1 shows the environmental practical changes of cohousing group members after they joined the group. The influential practices were classified into four categories: energy-related practices; landscape and food-related

Table 8-1. Environmental practical changes of cohousing group members

| | **Energy-related practice** | **Landscape, food-related practice** | **Use of transport** | **Shopping habits** |
|---|---|---|---|---|
| **Level 1 (rarely happen before)** | Co-designing low carbon homes or communities for future living. | Growing food in the community. | / | / |
| **Level 2 (more or less)** | Sharing spaces and facilities.<br><br>More | Staying in the community a lot and doing more gardening. | Cycling more.<br><br>Using more public transport. | More careful what to buy. |

| | | | | |
|---|---|---|---|---|
| | environmentally aware in a practical way. | Having more vegetarian food in the community. | Using less private car. | |
| **Level 3 (ways of doing things)** | / | Sharing food with other group members (non-family members) | / | / |
| **Level 4 (stopping doing something)** | Stopping buying a new car after joining the group, drive less. | / | / | / |

practices; usage of transports; and shopping habits. This method of classification was data-oriented, and the research data was mainly classified according to the meanings of interview answers.

Table 8-1 shows that most of the practical changes occurred at the second level – changing the frequencies/ extent of doing something (doing more or less). This means that, rather than inspiring many 'new' practices and environmental-related actions to happen, this cohousing approach potentially promoted sustainability by changing the frequency, extent (behaviour intensity) or collaboration-manners of existing environmental-related practices. Specifically, compared with the previous residence, group members reported that they were using **fewer** private cars, and replacing them by using bikes and public transports **more**. They also spent **more** time (or doing **more often**) sharing and maintaining common facilities, doing gardening and having vegetarian food in the community. Additionally, the study found that only two practices were considered as 'never or rarely happen before' (level 1). They were 'co-designing low carbon homes for future living' and 'growing food in the community'. At the community level, co-designing low carbon homes is one of the typical environmental practices in a cohousing community. It is hard to find another community living model where the residents are deeply involved in the community design process like cohousing. There is no denying that this participatory co-design practice could

enhance our understanding of achieving environmental sustainability. This is due to the design process which provides opportunities for group members to understand how community works in a material level and reduce environmental impact in a practical way. Guided by the voice of environmental protection, this study found that many residents had already made the changes towards low-impact living, but living in a cohousing enhanced and deepened these practices further. One current cohousing resident highlighted:

> "I will say they are different types of cohousing, they don't have the same design criteria, it is also depending on a new build or a retrofit, but I feel excited to design, manage and live in an ecologically sustainable, low-carbon community since I joined the group, I will say this is working for me, but we have achieved far more than I thought" (Resident, RL10).

Growing food in the community is an emergent movement in environmental practice. In the traditional English high-rise residential buildings and detached or terraced houses, the lack of space and unsuitable housing conditions (e.g. absence of sunlight) make it very difficult to grow food, and most of the food must be bought from supermarkets or other shops and outlets. However, in a cohousing community, the residents-led community planning system and bigger common outdoor space created increased possibilities to grow food for the community members. This is why food growing can be seen as one of the 'new' practices in a cohousing community. Based on the site observations, the most commonly grown fruits and vegetables in the cohousing communities were: herbs (mint, rosemary, coriander); berries; apples; tomatoes; potatoes; spring onions; and chilli peppers. The observations of this research proved that the food planting space can be planned and maintained (e.g. watering and weeding) by group members. Harvesting food (such as fruit picking) can also promote group interactions (group collaboration, work distribution, and the sharing experience of planting) and sense of community. In addition, as mentioned in the last chapter, growing food in the community can largely reduce food miles, thus

contributing to environmental sustainability. This was despite some group members stating: “100 percent food self-sufficiency is extremely difficult to any types of cohousing, this is the common understanding” (Residents RO17, RL11). However, this study argues that the cohousing model can still provide group members certain levels of flexibilities and the space to ‘interact’ with the land by reducing consumption and the environmental footprint. The practice of growing food in a cohousing community has multiple symbolic impacts that can further contribute to both environmental and social sustainability.

‘Stopping buying new cars, using fewer private cars’ was an important practical change and a complicated decision made by cohousing group members. The reason why group members stopped buying new cars was mainly because of the sharing-transport scheme (car club) in the cohousing communities (in the car club, each car was shared usually between two to three households). This changed action is related to complicated decision-making process: the action influenced by the awareness of environmental protection, commitment level of the cohousing concept and personal commuting habits. In other words, this shows how hard group members want to try to reduce environmental impacts by using fewer private cars and how group members are committed to the community common vision. It is well known that when choosing public transportation, people may spend more time waiting for a bus, be limited by the changeable weather conditions, or may need to carry heavy bags after shopping, so driving private cars might provide solutions and feel easier, more flexible and more convenient. However, by deciding to drive fewer private cars, the group members showed their personal will, beliefs and commitment to the cohousing concept ‘against’ their real needs and personal habits. When this value-action conflict appears, the group mission statement and group influences play a positive role in keeping people focused and moving forwards towards their environmental goal. This research found that group members concentrated more on the environmental impacts rather than

'personal habit and convenience'. As mentioned in Section 8.2.2.2 (see group influence), and TPB, the study proved that the personal attitude plus group common beliefs have a stronger and greater impact on group members' practices, even though the real conditions made it more difficult to take actions (similar to the example of using public transportation mentioned above).

#### *8.2.3.2 Social Practices*

According to Mogren (2011), the term social practice is defined as a relation between the continuous flow of human activity and its order across time and space. In particular, Haslanger (2018, p.247) explained social practice as "…the one I've offered, illuminates how individual behaviour, culture, and other economic and physical determinants of social life are interdependent in ways that explain their stability, but also indicate sites and opportunities for change". These definitions highlight the importance of the interrelationship among human activities, behaviour, culture and physical environments. During the interviews and observations, the practical changes at the social level were realised and identified by the participants. Reflecting on the 'social practice' definitions, the collected interview data represented five categories: being supportive; making decisions; eating habits; self-fulfilment; and group-fulfilment (Table 8-2).

Table 8-2. Socio-practical changes

| | **Being supportive** | **Making decisions** | **Eating habit** | **Self-fulfilment** | **Group-fulfilment** |
|---|---|---|---|---|---|
| **Level 1 (rarely happen before)** | Often doing simple things for other people, such as, childcare and elderly care *4 | Consensus group decision-making replaces individual decisions | | Personal needs: Making time to meet friends outside of the community and getting involved with other social activities | Making decisions about what is/ is not suitable to do in a group |
| **Level 2 (more or less)** | / | / | / | Becoming less-selfish, less self-centred *3 | / |

| | | | | | |
|---|---|---|---|---|---|
| **Level 3 (ways of doing things)** | / | / | Eating with other group members provides basic and special type of social bonding with the group | / | Developing new skills and learn them together |
| **Level 4 (stopping doing somethin g)** | / | / | / | / | / |

Different from environmental practices, Table 8-2 shows that most of the socio-practical changes happened in the first level (new practice: never or rarely happen before). In other words, the community environment enhanced several new social practices to occur. Due to changes in the social and residential environments in cohousing communities, group members started taking on different and new tasks (sharing, living closely with non-family members) with new behaviours, at the same time making group decisions and reconsidering the individual needs and the relationships between individual and the entire group. The repeated statements in the interviews demonstrated the importance participants attached to such practical changes. Therefore, this study found that ‘frequently doing simple things for other people’ and ‘becoming less selfish and less self-centred’ were the widely agreed and the most immediate socio-practical changes of group members (highlighted in grey in Table 8-2). Additionally, Table 8-2 also shows that two practices were categorised in level 3. This means that group members were managing the same daily tasks but in different ways. Group members changed their practices by turning individual work into group work, including sharing meals and learning new skills in a group. One of the group members described his feelings after group working: “I would say that, for me doing a lot of activities together is much more fun than doing them alone” (Resident RK6). At the same time, people also considered what activities were not suitable for group participation, for example, community work allocated to different small teams. Not all tasks required full group mobilisation. In sum, referring to socio-practical

changes, many new practices emerged in the community. The interview results showed that group members also changed methods of managing community tasks, changed eating habits and ways of group learning, and these aspects tremendously changed the group dynamic in a community. Based on this evidence, reflected on the concept of social capital from Bourdieu (1986), social capital resides in the individual and is linked to social connections that a person can utilise for advancement. However, the source of social capital stems from social, economic, and cultural structures which create power and status. Therefore, social capital in a cohousing is not just about having large social network but having social position that creates the potential for every resident's social network. In other works, cohousing living potentially changed the social context for each resident, - they feel valued in the group, taking responsibility to the group tasks, having closer ties to the social connections. As a result, the behaviour change happens gradually.

Such examples of socio-practical change mentioned in Sections 8.2.2.1 and 8.2.2.3, have proved the significant role of attitude in action. Figure 8-4 highlights some 'completed' links of attitude-actions discovered in this study, in which the study traced the whole changing process from attitude to practice. This study also found that the attitude and practice changes may occur simultaneously, happen in a causal sequence

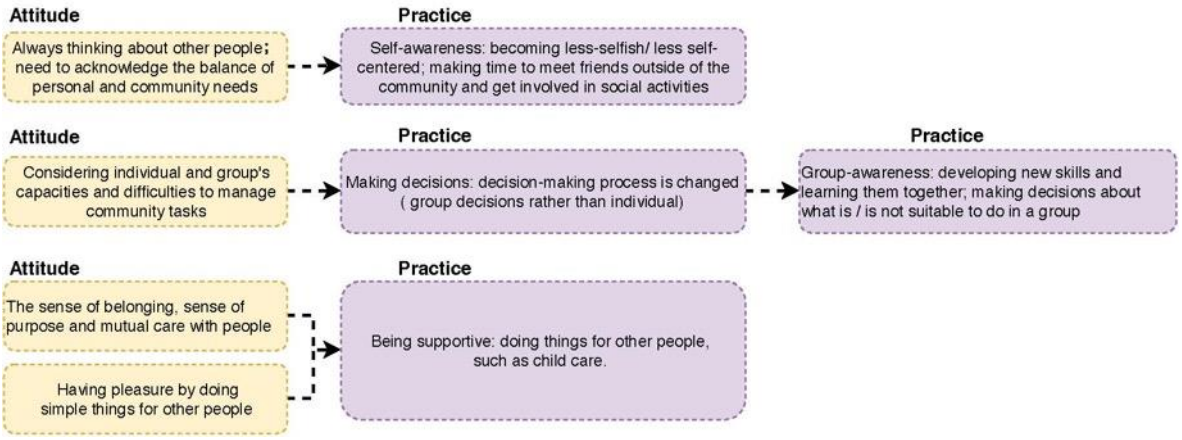



Figure 8-4. Socio-practical changes

or occur repeatedly to trigger other practices. However, it is worth mentioning that some of the 'attitude-action' links cannot be fully captured during the data collection, for example, only attitude changes appeared without matching practical changes, or vice versa. The following section will analyse the reasons and boosting factors for attitude and practical changes; further, what factors limit group members' attitude and practical changes are discussed below.

## 8.3 Why and why not?

### 8.3.1 Reason for Changes

What leads these attitudinal and practice changes to occur in cohousing communities? Literature exists about 'attitude toward behaviour' (Ajzen, 1991), 'expectations and intentions' (Ajzen, 1991), and 'community attachment and belongings' (McMillan & Chavis, 1986; Nash & Christie, 2003) in geography, architecture and sociology research. However, this study found knowledge gaps between what is known to work to encourage thinking and behaviour change, and what is currently being applied in cohousing practice. This makes the exploration of reasons behind the attitude changes become very important. This study summarised the following reasons which greatly influenced group members' attitudes and thinking: lifestyle change; way of working and socialising with others; and the decision-making process.

The lifestyle starts to change when people come together to design and build their future communities. An architect responded that, "The built environment which is designed for the particular practices by particular ideas or concepts – growing own food or share meals – then that may encourage these things to happen" (Architect AK3). Lifestyle change can have a significant impact on group members' attitudes towards community living, such as an increasing awareness of environmental footprints, sustainable ways to build and eat, and making conscious choices about

what to buy, and to use more public transport. In the meantime, some current residents also highlighted that the way of working and socialising with other group members influenced their thinking: “When you are not only socializing but also working with a group of people in daily life, you will change the way of thinking, for example, the workshop provided by community, this is a positive approach to enhance the group business” (Residents RL9, RL10). However, another resident reported: “…but when I work with others, I found some people did not do as much work as we would like them to, so for a long period time, I have to say, it didn’t really suit me” (Resident RL11). These examples explained the positive and negative attitude changes and identified that working with other people could have different effects due to various personal understandings, acceptance and community situations. Finally, the decision-making process is fundamentally changed after moving into a cohousing. This will definitely affect how people feel and think. In cohousing communities, the ‘consensus’ method is used to make group decisions. If the group decision is unanimous, a vote will take place, but this is not very common. Additionally, not every decision in the community requires full participation. If the community takes a group approach to managing the community work, some decisions may require only the consent of a small group. The process may take longer, but group members take collective responsibility and make decisions as a team. Group members expressed that they felt valued and belonged to a group rather than being self-centred (Residents RO18, RF5). At the same time, the decision-making process could also create frustrated feelings, for example, as a resident reported: “It was difficult to make decisions while other people are waiting, got meetings to wait for people to make up their mind-what they want to do, before we could go ahead with things. I found that is a bit frustrating” (Resident, RL11).

### 8.3.2 Boosting Factors for Practical Change

During the interviews, the following aspects were reported by participants that could encourage certain practices, both environmental and social, to happen. These

included: the group common vision written in the group mission statement; the influence of the group; and the design of community material infrastructure. The groups' common visions and group influences are connected. As such. they were grouped into the intangible social domain. However, the design of physical environment and material infrastructure was grouped to the scope of the community's built environment.

It is necessary to highlight the role of group influence and group visions in daily practices. Theoretically, cohousing group members share a set of norms and values, and also share common needs and goals. This common agreement and recognition towards same goals can trigger more similar practices to occur. In this process, the group mission statement has symbolic meanings to keep group members focused. In some cases, group meetings started with reviewing or reading the group mission statement to 'remind' each individual member of the common goals and original aspirations. The group 'missions' are also published on the website and become part of the spiritual identity of the group. When it comes to the daily practices, the observation showed that individual practice could be shifted to group practice, such as garbage sorting and recycling. In this research, the group influence on individuals was more easily found in terms of environmental practices than social practices. Participants realised that an individual conducted more sustainable practices because 'others are doing it, so I should do it', including 'washing the glass bottles before putting them into the bin'. Even if this action lengthened the recycling process and made it more tedious, group members were still doing it because of personal environmental awareness (morally obliged to act, active change), group influence (active change) or the moral judgement of others (passive change). This can also be distinguished by active and passive changes. Additionally, this study argues that the individual's actions can also affect group practices. This type of influence can be a mutual process to both parties and be very subtle, such as personal decisions to refurbish the private unit, childcare and personal visions in community governance. Group members may follow

by responding with the same type of practice or be potentially affected by it. Moreover, community physical environment and infrastructure had a great impact on group members' practices. As mentioned in the case studies, the material infrastructures (e.g. community spaces, shared facilities) and the layout of the entire community were co-designed by group members and architects. The placement and orientation of community buildings and the connecting paths with shared facilities, such as the recycling bins, directly influenced the group members' daily lives. The material infrastructure can be seen as a significant foundation to encourage both environmental (e.g. recycling, growing food) and social (e.g. it is earlier for people to meet and interact, having social activities) practices. It can also form the 'social infrastructure' and community-related services, such as maintenance of common facilities, childcare and group learning.

### 8.3.3 Obstacles to Conducting Sustainable Practice

Having analysed the boosting factors of practical changes, this section will discuss cohousing group members' obstacles and difficulties of conducting sustainable practice. According to Barr (2006) and Lane and Potter (2007), 'environmental values', 'situational variables' (e.g. behaviour context, age, gender, income level, occupation and knowledge) and 'physiological variables' (e.g. moral obligation to act, rights and responsibilities) are the influential factors that could strongly affect group members' environmental and social practices. Based on the interviews and 'the mission statements' of selected cohousing communities, each community expressed the desire of building environmentally-friendly, socially sustainable communities. The cohousing members from these groups can be seen as individuals with strong environmental values. However, people joined a cohousing community for a variety of reasons and also held different understandings and habits towards environmental and social practices. Every cohousing community is diverse with different priorities (e.g. affordability, eco-friendly or mutual support) and financial situations. There is no

comprehensive practical mechanism and evaluation criteria to guide community residents for certain practices. This leads group members to focus on different aspects and behave differently based on their values, beliefs, knowledge, lifestyles and personal histories.

For example, a cohousing group member argued that solutions to environmental problems were found by working with nature rather than developing technical remedies (Resident, RF2). Second, as a living option, the cohousing community model has not been standardised in the UK housing market. Indeed, many people have not heard about the term ‘cohousing’. The environmental and social benefits and weaknesses of the cohousing model cannot be easily found from a wide range of knowledge sources such as TV, magazines, books, council information leaflets and housing associations. Accordingly, some group members questioned how things could be done. Further, they were concerned about how much they could achieve to reduce environmental impact and expand social influence by living in a cohousing. But some residents felt that they had already ‘tried too hard’ (Section 8.2.2.1). Finally, several group members reported that financial challenges were an important factor limiting community practices. This included both environmental and social practices. Many future residents from the Sheffield cohousing groups expressed that they were considering employing environmental and design technologies and techniques in the design stage, such as PH, LH and Solar PV panels. However, group members had to give up some of the design standards because they were unaffordable, or the buildings were unsuitable for applying certain standards (e.g. the staircases were two narrow to install a stair lift). Taking ‘lifetime Home Design Standards’ as an example, undoubtedly, the application of this design standard can bring great flexibility and convenience to residents, especially for older residents. As reported from the LILAC Cohousing project, instead of applying this design principle, older residents were left with the option of swapping

houses with other residents when their health circumstances changed. However, this may cause a lot of inconvenience.

## 8.4 Conclusion

This research found that group members' attitudes and practices can be significantly affected by living in or joining a cohousing community. The key theories (SOC and TPB) mentioned in the beginning of this chapter guided the study to reveal when group members' attitudes and practices changed, and also how practices were subsequently influenced by changing attitudes in a community context. The core aspects in the SOC theory (e.g. influence and fulfilment of needs) provided clear research directions and inspired this study to understand the group dynamics and group members' relationships at a deeper level. Attitude change can be categorised into three groups: individuals within community dynamics; individual interacting with physical built environments; and individuals interacting with individuals. The interview results showed that, within these three data groups, the greatest change in people's attitudes could be found in the relationship between individual and community dynamics. Group members are increasingly aware of the differences of understanding the cohousing model itself, different ways of treating social tensions, disappointment and effect of various personalities, and the importance of group and individual capabilities. Additionally, the effects of attitude change on community practices were illustrated through attitude-action links (Section 3). Noteworthy practical changes were grouped into two categories: environmental; and social practices. The data of group members' practical changes were also evaluated at four practical levels: 1) new practice: practice that never happened before/ rarely happens until moving into a cohousing community; 2) changing the frequencies/ extent of doing something (doing more or less); 3) changing the way of doing something (e.g. doing things with others) and, 4) stopping doing something after joining the group. The research found that, referring to environmental practices, most of the practical changes occurred at the second level –

changing the frequencies/ extent of doing something (doing more or less), but in terms of social practice, most of the socio-practical changes happened in the first level – (new practice: never or rarely happen before).

This finding could provide useful data that seeks to expand people's understanding of cohousing community practices at the broadest of levels. At the end of this chapter, the reasons, boosting factors and obstacles were outlined. Lifestyle change, ways of working and socialising with others, and the decision-making process were the influential factors of changing practices in cohousing communities. Overall, the findings of this study have potential to assist people in the development of an understanding of cohousing members' attitudes and practical changes and the possibilities that they offer. Given the increasing scale of environmental and social consciousness throughout society, and the fact that taking environmental actions is gaining in social acceptability, it will become increasingly important for cohousing stakeholders (e.g. architects, planners, residents, future residents) to have a better understanding of the cohousing context. The next chapter will examine the fundamental principles of neighbourhood design in cohousing communities.

# Chapter 9 : UK COHOUSING DESIGN PRINCIPLES AND CHALLENGES

## 9.1 Introduction

The design of a UK cohousing community is a collaborative process that can be time-consuming and complicated. Many significant factors related to UK cohousing design and construction need to be considered, including density, scale, circulation route, building materials, indoor and outdoor space, mobility and flexibility of the houses. The UK cohousing design procedure is flexible and unique for each community, and it is difficult to find another example like cohousing community that is designed and maintained by its residents. The cohousing design can be understood as part of the group identity and community image. The design strategies can also represent group response to current environmental problems, global sustainable concepts and related social foci. As discussed in Chapter 2, in the UK context, cohousing group members are involved in the cohousing design at the very early stage and work with project architects to co-design their future community (UK cohousing network website, 2021; Durrett, 2009; Fromm, 1991). The term '~~neighbourhood~~ cohousing design' in this chapter is mainly concerned with the built environment and design of community physical infrastructure, for example spaces, facilities, distance, and locations. This study argues that the social infrastructures are strongly influenced by the physical design in a cohousing community. The social design of the cohousing model has been addressed in previous chapters (Chapters 7 and 8).

Twenty-two participants (including six architects) from seven cohousing projects located in Lancaster, Leeds, Sheffield and Cambridge (all UK based) took part in this study. To increase the legitimacy of the research data, the findings of this chapter are combined and triangulated with the results from the interviews, observations and

secondary data collected from the site (e.g., book publication of the project, design group meeting minutes, cohousing client briefs, and architects' reports).

All design details and principles presented in this chapter are in the UK cohousing context. This chapter consists of three parts. The first part describes the design principles and co-design process summarised from selected UK cohousing projects in this study. The second part introduces detailed design elements, such as design standards, building technologies and inclusive design considerations in the UK context. These design elements are informed by the design principles. They are the significant design items extracted from each design principle. The third part identifies the design challenges for UK cohousing groups. These challenges were raised by architects and group members based on their living and designing experience. The chapter structure is graphically illustrated in Figure 9-1.

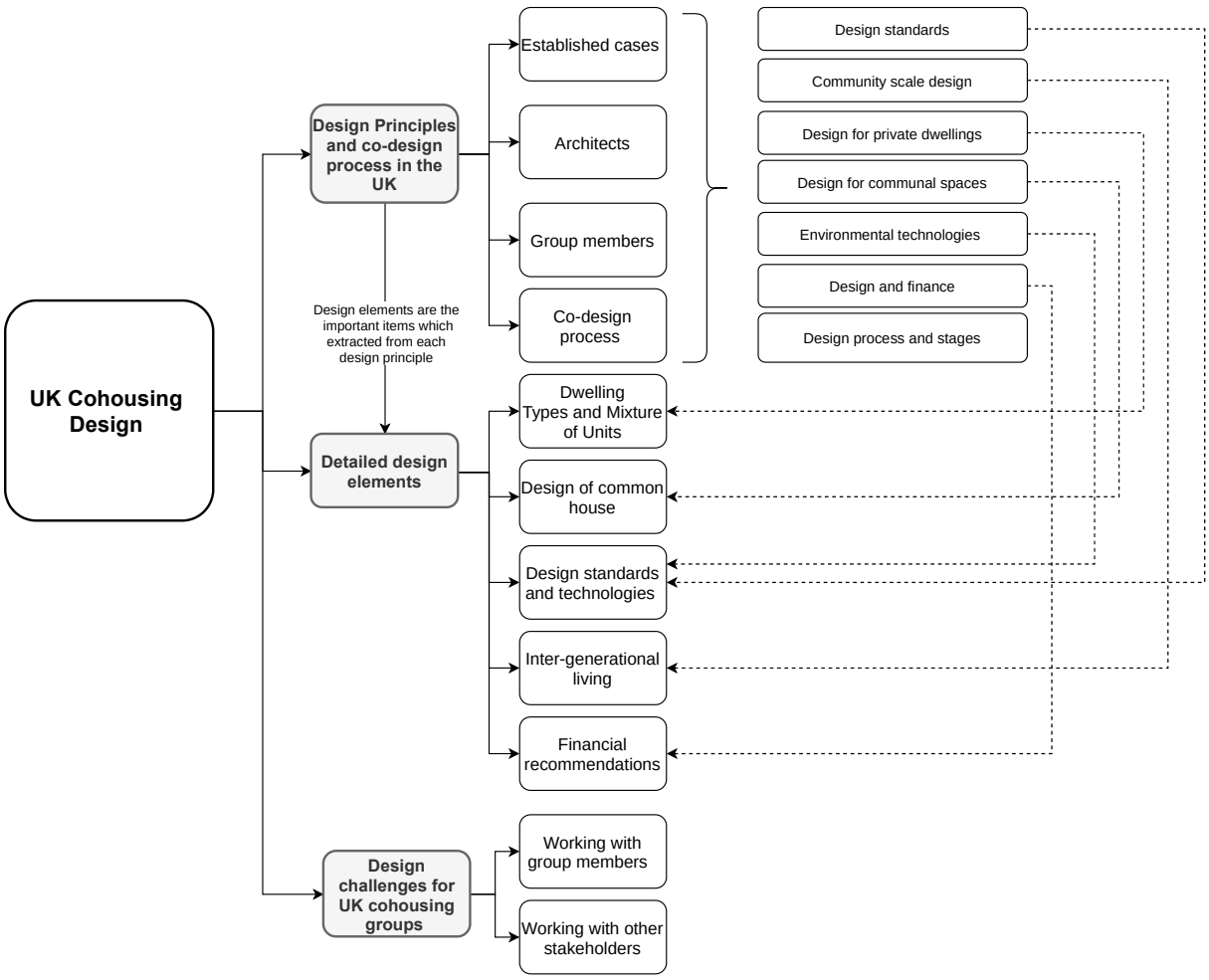



Figure 9-1. Chapter Structure

## 9.2 Aims

This chapter aimed to identify the design principles, priorities, co-design experiences and challenges of cohousing design from the perspectives of both designers and occupants. In order to achieve the research aims, this study used the following interview questions:

- How would you evaluate the community co-design process?
- Which design standards and principles guided the ~~neighbourhood~~ cohousing design process?
- What are the main challenges during the group formation, neighbourhood planning and construction processes?

This Chapter is important for this study because it answers the research sub-questions (what are the drivers and barriers of cohousing design in the UK?) and also discusses how community spaces (private and common spaces) are designed and used. Additionally, this Chapter echoes with the previous chapters to explain why many environmental and social practices were conducted in this special context. When comparing the design experiences and foci between architects and cohousing group members, the gap between design expectation and practical applications can be revealed. The principles and elements identified in this chapter towards cohousing design will contribute to the final cohousing developmental framework in Chapter 10.

## 9.3 Design Principles and Co-design Process

As discussed in Chapter 2, a cohousing community is a group product. Usually, the group members play a leading role (called 'member-led') in the cohousing design process and collaborate with the professionals, such as architects, housing developers and builders. Before showing the interview and observation findings towards cohousing design of this research, it is helpful to review the design aspects and principles that attracted attention from the established cases.

### 9.3.1 Design Principles from Established Cases and Literature

Fromm (1991), Durrett and McCamant (2011), and Chatterton (2014) provided detailed information of the neighbourhood cohousing design process. In detail, as the pioneer of cohousing model in the US, Durrett and McCamant pointed out that Cohousing communities were designed with the specific goal of providing a sustainable model of living with a focus on interpersonal relationships (Durrett and McCamant, 2011). Moreover, they highlighted the main characteristics of cohousing which makes this living model different from other co-living models. At the same time, as a cohousing expert in the UK, Paul Chatterton and other LILAC cohousing members invented UK's

first low-energy straw-bale development of 20 homes and a shared community house in Leeds. Their unique shared-ownership financial model has great potential to make cohousing living more affordable and it becomes the milestone of developing cohousing projects in the UK.

These research represents the influential literature on this area, and the insights from these books showed the focus and priorities of different cohousing residents when they developed their own cohousing communities. This information guided the data analysis process for this study and the choice of different angles to interpret the research findings.

Three typical cohousing projects were reviewed to identify the key design aspects of cohousing communities (Table 9-1). In this step, the study particularly looked for what design principles were adopted by cohousing groups. The design principles included both community communal and private areas. The information in Table 9-1 was extracted from existing cohousing projects and literature, including project publications, cohousing research books, and client briefing studies (provided by cohousing groups or architects).

According to the secondary data in Table 9-1, the design aspects and principles can be classified into five groups: 1) the community-scale design (general requirement); 2) the design of common areas and facilities; 3) the design of private areas and facilities; 4) regulations, design standards, technologies and techniques; and 5) special issues. This method of classification was based on the meaning of the data. Due to the year of project development and local situations of the site, cohousing groups developed different foci and priorities when they designed their communities. For example, the K1 cohousing group paid more attention to community-scale design and less attention to common facilities. In contrast, LILAC Cohousing members provided very detailed evidence on the design of community common spaces and shared facilities. In the

1990s, little evidence can be regarding environmental technologies and design standards in the cohousing community design process. However, this situation has changed in recent years, and nowadays group members aim towards adopting various design standards, building technologies and materials to increase liveability and reduce environmental impacts. Additionally, in recent years, the car parking issue has been raised as a common difficulty among cohousing groups (e.g. planning difficulties due to the different interests of group members and developers, big disagreements about car parking due to the size and location of parking lots). In addition, some unique design considerations were identified, such as biodiversity of the community, standardisation, flexibilities and adaptabilities of individual dwellings and universal design principles applied in the design of senior cohousing. The following sections will analyse, respectively, the design principles that the architects and group members focused on.

Table 9-1. Case review: principles of design

| **Project Name/ Recourses** | **Type** | **Principles of the Design** |
|---|---|---|
| LILAC Cohousing - completed in May 2013 (Chatterton, 2015) | New build, intergenerational cohousing. | **The community scale design (general requirements):**<br>site layout; boundaries and zoning; accessibility; aesthetics; site levels; site safety; communal composting system.<br><br>**The design of common areas and facilities:**<br>gardens and landscaping; play area; common house placement and internal design; outside gathering spaces (for eating and sitting); common laundry; guestroom; workshop space and tool storage; shared common storage space; toilets; office space; vegetable growing area and boot sink; post room.<br><br>**The design of private areas and facilities:**<br>Privacy; housing block layouts and internal design; balconies; orientations; private gardens, private housing types (e.g. 2-bed, 3-bed, 4-bed).<br><br>**Regulations, design standards, technologies and techniques:**<br>high-performance natural building materials; building regulation and construction techniques (straw-bale); MVHR units; gas heating; solar thermal; multi-fuel stoves.<br><br>**Special issues:** |

| | | |
|---|---|---|
| | | cars and car parking. |
| Collaborative communities (Fromm, 1991) | NA | **The community scale design (general requirements):**<br>entrance of the community; size of the community; density and scale; amount in common and private; site plan; the public edge; circulation; sun, light and wind; heating and nature resources; surrounding neighbours.<br><br>**The design of common areas and facilities:**<br>location of the common house; rooms in the common house; outdoor meeting areas; children's play areas; common garden; Parking area.<br><br>**The design of private areas and facilities:**<br>standardisation and flexibility of private residences; special needs (e.g. handicapped people).<br><br>**Regulations, design standards, technologies and techniques:**<br>**/**<br>**Special issues:**<br>/ |
| K1 Cambridge cohousing (K1 cohousing client briefing study, 2014) | New build, intergenerational cohousing | **The community scale design (general requirements):**<br>Common ground and requirements; transportations and traffic status around the site; site accessibility; health issues (water, acoustic requirements); ~~site management~~ (look after the site and common garden, pets control); activity, security and privacy; environmental design (wind, daylight, energy/ resource, biodiversity and materials).<br><br>**The design of common areas and facilities:**<br>the design of common house, facilities and requirements; gym.<br><br>**The design of private areas and facilities:**<br>individual dwellings; dwelling mix; flexibility and adaptability.<br><br>**Regulations, design standards, technologies and techniques:**<br>aiming Passivhaus, Lifetime Homes, Code for Sustainable Homes level 4, Secured by Design.<br><br>**Special issues:**<br>parking. |

### 9.3.2 Design principles: Architects

The data categories shown above guided the following analysis, on which these categories have been deepened and detailed. Therefore, based on the findings of

interviews and secondary data collection with cohousing project architects, this research identified eight categories related to cohousing design (Table 9-2). In this section, close attention has been paid mainly to the top three categories, and more information about category four to eight will be provided on the co-design process (Section 9.3.4), and specialised design details (Section 9.4).

Table 9-2. Design categories and principles in the UK (Architects)

| Category of Design | Principle of Design | |
|---|---|---|
| 1. Design standards | Passivhaus Standard (PH); Lifetime Homes Standard (LH); Code for Sustainable Homes (CSH) level 4/6; AECB silver standard; Disability Discrimination Act (DDA act); Secured by Design (SBD). | Preferentially considered categories represented that these categories were heavily repeated and highly valued by the participants. |
| 2. Design at the community scale | Space usage strategy; design purposes; food and transport; team working; boundaries; design for special audience; maintenance cost; energy use; design changes lifestyle. | |
| 3. Design of private dwellings | Special needs, adaptability, housing size, renewable energy, running cost. | |
| 4. Finance and design | Finance limits design; financial advice. | |
| 5. Environmental technologies | Ground source and district heating system. | |
| 6. Design process and stages | Design process shapes life focuses. | |
| 7. Common space and facilities | Common house with shared guest rooms and bigger kitchen. | |
| 8. Additional recommendations | Architectural language; business and pleasure; design alternatives. | |

Comparing with the findings from the secondary data analysis above, the interviews results showed that ‘finance and design’, ‘design process and stages’ and ‘additional recommendations’ become the new data categories adding to the study main findings. At the same time, the interview results showed that, in the process of designing the neighbourhood, architects paid more attention to design standards application, community-scale design and the design of private dwellings. However, it is worth noting that the category ‘common space and facilities’ did not received particular attention compared to categories 2 and 3; only one design aspect was identified regarding common facilities in the common house (including shared guest rooms and

bigger common kitchen). In the following sections, the study will focus on the important and unique design principles (principles with common concern or typical principles for certain cases) of each category. The detailed explanations and participants' quotations will also be provided.

#### *9.3.2.1 Design Standards*

From the architects' perspectives, the application of the design standards in a cohousing community can be seen as one of the iconic features in the ~~neighbourhood~~ cohousing design, because this could directly contribute to reduction of carbon-footprint, heat demand and energy consumption, and also increase the flexibility and adaptability of private dwellings. During the interviews, PH (standard in energy efficient construction), LH (16 design criteria intended to make homes more easily adaptable for lifetime use) and CSH (environmental assessment method) were preferentially considered by cohousing groups and applied to the cohousing design procedure.

In addition, the AECB silver performance standard, Secured by Design (SBD) and the Disability Discrimination Act (DDA act) were also mentioned and applied to some of the selected cases. In Sheffield, the local sustainable design strategies were also considered by some cohousing groups, such as the 'Supplementary Planning Document and Practice Guide - Policy CS64' (climate change, resources and sustainable design of developments). Even though CSH was withdrawn in 2015 and replaced by new national technical standard, and LH has been replaced by Part M, these standards are still important for this study. The reasons are summarised as follows:

- Regarding some typical cohousing communities selected in this study that were built over the years, the architects co-designed with group members and focused on applying these design standards during the design phases at that time. These design standards were well known to the residents and

public.

- Additionally, the application of these standards still has a profound impact on existing group members' community lives. For example, older residents have enough circulation space to use wheelchairs by following the Lifetime Homes design guidance.
- Even though some design standards have been abolished, some have continued to be used, and in recent years, many new cohousing groups still consider these standards and use them to design their neighbourhood. As reported by the architects, due to financial or spatial limitations, some cohousing groups decided to choose some relevant terms rather than going for the full standard (Architect, AK2). The detailed analysis (including advantages and disadvantages) of the listed design standards can be found in Section 9.4.3.

#### *9.3.2.2 Design at the Community Scale*

Design at the community scale means the design principles could affect the whole neighbourhood rather than just concentrating on common areas or private dwellings. In other words, it describes a larger design vision for the whole community and manages community design tasks as a whole. The interview results showed that community-scale design could include space usage plans, maintenance costs, food and transport and community energy use. In some cohousing cases, the collective design process was divided into several tasks, and 'design for the whole site' was usually separated from the design of private homes and the common house. As Chatterton (2015, p.87) (a current resident, living in LILAC Cohousing) highlighted: "We divided the cohousing design into four segments, focusing on the whole site, internal layout of the homes, the Common House and the energy strategy".

During the interviews, among many principles mentioned at the community-design level, the study found that architects talked more about design purposes and design impacts (e.g. design changes lifestyle) rather than the detailed design procedure. The design purpose is a very important design principle as highlighted by two architects. They described that understanding the design purpose and the living purposes of cohousing groups was the first and most important step in conducting their design. It is also relevant to many other design principles such as design for special audience, boundaries and community energy use. Design purpose directly determines the cohousing layout and the placement of all common facilities. The study confirmed that from the architects' perspectives, the main design (physical design) purpose for the cohousing model is to promote social interaction and engagement, which echoes with the findings of the 'group motivation' Chapter (Chapter 5) that social purposes are the dominant reason for people to join a cohousing community. An architect strongly agreed with this idea:

> "Community housing or cohousing is all designed around social interaction, it can also establish a sense of security. It means people, interact much more regularly with their neighbours, because we designed certain aspects into the construction" (Architect, AL4).

Additionally, group members expected that sensible cohousing design could eventually provide them with a healthier sustainable lifestyle and affordable community. This can be seen as a strong evidence of the design impacts. As one architect reported: "People expected cohousing design could help them to reduce car use and food wastage, live in better insulated houses and reduce bills" (Architect, AS6).

Space usage strategy was another focus of the community-scale design. Spatial design varies greatly due to the different field conditions of the respective communities. Most of the selected cohousing cases in this study started the ~~neighbourhood~~

cohousing design from the private dwellings (e.g. taking the Open House Project as an example, the project started to design and build one house; after the family moved in, construction began on a second house, and so on. The common house was the final building to be constructed. This was the process that occurred for the LILAC Cohousing project). The architect co-designed with group members to primarily discuss the location of the private housing blocks, the floor area and the types of units (e.g. 2-bed, 3-bed), and then designed the common area according to the group's future living scene and priorities. Some architects started their design until they received the client brief:

> "They [group members] worked out by themselves the minimum space they needed was, and also shared space, all of these information was written in the client brief. The group were happy to put money in common space then everyone could use or they have a small kitchen in their own house and have a bigger kitchen in the common house" (Architect, AK3).

As mentioned in Chapter 2, the community layout can be linear, courtyard scheme or a mix. This study found a good example (located in Sheffield) that used the courtyard plan through secondary data collection. Figure 9-2 shows that the group made a decision to put their private dwelling blocks at the edge of the community. The outdoor common space enclosed by private dwelling blocks is a useful and relevant habitation form in urban context (Sim, 2019). The main advantage of this design is that the inner space is clearly defined and recognisable. Further, social activities are protected and controllable by the group members in the surrounding buildings.

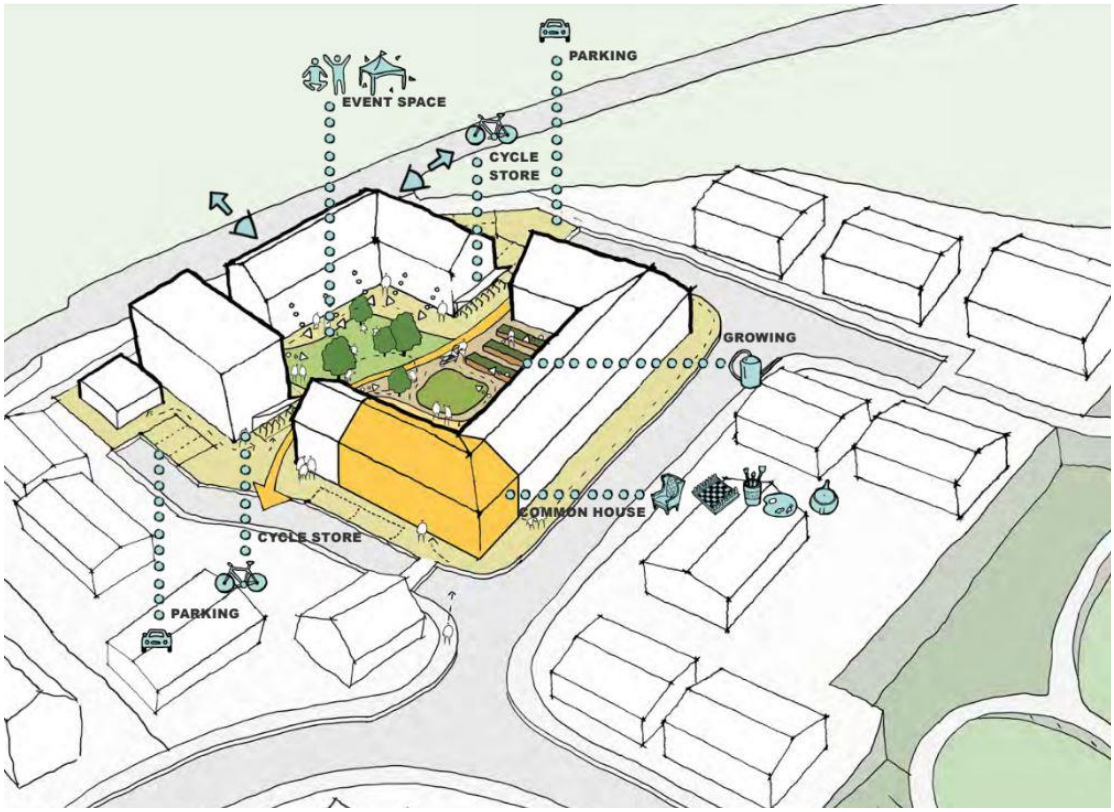



Figure 9-2. Example of space usage
Source: Five Rivers Cohousing Live Project

Design for a special audience group was a very unique point raised by an architect. The ‘special audience’ in this study means that the architects designed the cohousing community for themselves and their family. This design procedure at the community level directly influenced the decision-making and construction process. It is also indirectly linked to the material infrastructure of the cohousing design. The design experience of architects can be very different when working with family members and very close friends. This design process is a double-edged sword with both advantages and disadvantages. This study found that, due to strong familiarity with family members and friends, consensus decision-making with collective knowledge can be made easier and quicker. However, non-family members may face a biased view or not have the same voice as family members. Additionally, it is difficult for architects to maintain a professional distance, as stated by an architect during the interview:

> "I think, obviously, the familiarity, is quite important. In many situations it is very useful to have the knowledge to understanding each other. But I think in certain times, because is quite familiar, I think the professional vs the personal becomes very difficult. You can't maintain a professional distance. That is difficult" (Architect, AO5).

#### *9.3.2.3 Design of Private Dwellings*

The results of the architect interviews and secondary data analysis indicated that the following design principles received attention in the dwelling design process: design for people with special needs (e.g. wheelchair users); flexibility and adaptability of private dwellings; housing size; renewable energy usage; and maintenance costs. Additionally, reviewing the secondary data provided by the selected communities, the following principles were considered for the design of private dwellings: natural lighting level; storage space; orientation (south facing); dedicated area of private outdoor space; and good acoustic separation. Among these principles, 'housing size' was frequently mentioned as the most important design principle.

Reflecting on density and housing size discussed in Chapter 2, the housing-size change can be a very significant shift for cohousing group members compared with their previous living environments. Generally, based on the interviews and observation experiences, the houses (or flats) in a cohousing community are much smaller compared to previous residences. This is mainly because the biggest audience group for cohousing in the UK is older people (60+), including both senior and intergenerational cohousing groups. First, this study found that older residents were willing to have smaller houses due to decreasing physical capabilities and their children having left home. This means that they are looking for smaller houses to invest, manage and live. Second, in order to standardise the cohousing dwellings and make it easier to work with developers and city councils, some architects reported in this

study that they tried to simplify the housing types and design only small and medium-sized houses (Architects AK1, AL4). Finally, due to the sharing culture in cohousing communities, group members shared spaces in the common house, such as guest rooms and common lounge. Therefore, they do not require very big houses to live. However, small houses can be problematic for single occupancy and young families, especially if their partner, family members or care provider move in or when they have children (Residents RL9, RL10, RL13). To manage the housing size issue, an architect suggested a very valuable and practical approach which could help both architects and group members to understand their housing and spatial needs. He stated:

> "The decision about the housing size is based on… we did an exercise with the group, we ask them to put down their age, activities in the house, in five years, in ten years, in fifteen years. Some young people were saying, we may have two kids, some might be saying, I am 75, I might be die in ten years… we have to think very hard how we did that, we looked all demographic information and asked 'do you need one-bedroom? Or three bedrooms?' Or the ability to convert to loft later. So we look at the adaptability of the properties, able to expand or sub-divided into… I am not sure smaller properties are easy to look after, but that would be true for older people" (Architect, AK3).

This quotation reflected another design principle that the architects pointed out. It is about designing houses for people with special health needs (e.g. wheelchair users) and the adaptability of dwellings in a cohousing community. It is worth mentioning that this design aspect has been overlooked in many cohousing cases. During my visit to LILAC Cohousing, the group members admitted that they did not give sufficient thought to the housing needs of older residents and people with special needs, such as people with mobility difficulties and dementia. Assistive facilities can only be found in some places in the common houses, for example a disabled toilet and handrails. The only option older residents can consider is to swap houses with other residents if they have mobility difficulties and cannot

manage the stairs. In addition, the flexibility and adaptability of the private dwellings were mentioned only once during the interviews with all project architects. Observations on the site also confirmed that private houses in the community were difficult or almost impossible to be transformed, merged, converted, expended or sub-divided. It was also difficult for people to move furniture around if they wanted to accommodate more people in the house, because the space in the house was very tight. This evidence shows that the levels of flexibility and adaptability of individual houses in cohousing communities are very low, significantly reducing the possibility that cohousing can be a lifetime housing option. Therefore, this study argues that adaptability issues and people's special living needs may not be fully addressed and supported from the design process. The design recommendations that should be made are:

- Increase the awareness of these design principles and understand their long-term benefits to the cohousing group members;
- Consider using multifunctional and mobile units (e.g. folding walls, folding bed and furniture on wheels) into the private dwelling design to increase adaptability; and
- Balance the practical benefits and group's financial capabilities in the design process (more discussion is presented in Section 3.5).

### 9.3.3 Design Principles: Group Members

The aim of this section is to identify the significant design principles from the users' perspective. This study found that the information collected by group members regarding cohousing design were limited because:

- Some participants did not get involved in the design process. The design process was completed before the person/ family joined in the group; and
- Some communities were in the early stage of their cohousing design. The project therefore did not yet have an architect, and group members knew very

little about the design standards and detailed design elements.

Like the principles highlighted by the architects, the results of the interviews with cohousing group members showed that design principles fall into three categories: design standards; design of private dwellings; and common spaces and facilities (See Table 9-3).

Table 9-3. Principles of design (group members)

| Category of Design | Principle of Design |
|---|---|
| 1. Design standards | Lifetime Homes (LH); Code for Sustainable Homes (CSH); Passivhaus (PH). |
| 2. Design of private dwellings | Adaptability of private dwellings; strategies of using design standards in private dwellings; future proof/ future plan. |
| 3. Common spaces and facilities | Future proof/ future plan. |

#### *9.3.3.1 Design Standards*

The interview results showed that the group members paid close attention to three design standards: LH, PH, and CSH. Different from environmentally sustainable design standards (CSH and PH), LH is a set of design criteria which aim for the improvement of a building's accessibility and adaptability (Lifetime Homes, n.d.). During the interviews, LH attracted most attention and it was highly valued by the group members. Five participants pointed out the LH standard and provided detailed examples to explain the importance of applying this standard. They stated:

> "Why we would build houses, that could only fit one particular way of living?... I think, it (applying Lifetime home standard, or build the houses to meet future needs) is just common sense, I never thought about it before. When I saw it, I thought of course this make sense! I thought you have to have the rooms for the person who walking with stick or a wheelchair, or a ramp, we don't have much land, so we got to build things like this. It will make sense. It makes more expensive, of course, but it worth doing in the long run" (Resident, RF2).

> "I think… to think about all of these things right to the beginning, because none of us know what is going to happen, we could be absolutely healthy, and suddenly we fall down or have an accident or something. We don't want that to happen, but it is better to think about and it is better to be aware of and better to be planning for it, so I think this design standard is very useful and necessary" (Resident, RF4).

As mentioned above, using this design standard could make buildings more expensive. During the interview, the group members also made suggestions on how to apply this design standard into the community when funds were insufficient:

> "We discussed within the group, maybe have one or two dwellings well-equipped, they could specifically meet these kinds of criteria, if somebody needs to go into that… but it is not compulsory for every unit to have something" (Resident, RF5).

In addition, some cohousing communities also considered adopting the LH standard for different housing types (e.g. only apply it to a three-bedroom houses because the staircase is wide enough), or some communities only applied certain design provisions/ terms instead of using the full standard. These examples provided a practical and more affordable way of adopting design standards in the cohousing design. At the same time, this study found that even though some of the group members could not accurately identify the name of the design standards, or their specific terms, they were able to describe many items that could be very important to their lives, such as the space for ceiling hoists, wet rooms, stair lifts, ramps and circulation space for wheelchair users. These design items were explained in the LH standard. This indicated that group members built awareness of housing adaptability and started to pay attention to the 'future-proof' design features.

#### *9.3.3.2 Design for Private and Common Areas*

When discussing the design of private and common areas, one design concept related to 'future-proofing' was repeated many times. The group members suggested that the same level of accessibility should be considered in both private and common areas in the community. The accessibility issues in the common area have always been overlooked, for example, wheelchair users and disabled people with reduced mobility cannot use the toilet in the common house because of stairs and/ or lack of turning space. Therefore, as part of the extended home, the common area should be fully accessible, especially for the people with mobility limitations or other health issues, as well as private dwellings. This was emphasised by group members:

> "You need something designed for people with difficulties when they get older, the access around the site, someone on the wheelchair can get everywhere on the site. and wheelchair accessible in the common house, something like that. They can get to their own home and get to the common house as well. We have to think about future proofing" (Resident, RL11).

> "We had conversations about door handle shapes in the common area, wheelchair accessibilities, we put something in the communal bathrooms, like grab rails, or facilities with different height. So for our communal area, which is placed on the ground floor of the building, each part of the communal space we thought very carefully" (Resident, RO16).

#### *9.3.3.3 Common Vision of Communal Area*

Last but not least, it is necessary to demonstrate the common vision towards the communal area (especially the common house) in relation to the wider neighbourhood. This could help to understand why group members want to design the common spaces in this way and how they want to use them in the future. Different from the architects, some group members believed that the common house was not only a social centre of the cohousing community, but also the connection between the community and the

wider neighbourhood. Therefore, this study found that adequate social space to accommodate visitors from outside the community (e.g. for social gatherings, charity events, coffee meetings and research events), and a high level of accessibility of all communal areas, became another design focus of the group members. This is a unique concept to develop links between cohousing communities and the surrounding environment. At the same time, it is also a practical way to make the outside world more aware of this form of living. As one of the group member reported:

> "We want our communal area to be something we can invite different communities into. We don't want to do a very isolated community. We want our community could create something reaching out to broader community" (Resident, RO16).

### 9.3.4 Co-design Process

The co-design process discussed in this section mainly concentrated on the residents-architects collaboration. The process of working through the design with a group rather than with an individual client places the focus strongly on those elements of the design that foster community and neighbourliness. Recent thinking about the social sustainability of urban spaces posits that spaces that are designed for social interaction work better for residents and other users (Williams 2005). However, the collaborative design process between group members began before the architects joined in. The design process can be completely different for each community. In one of the selected cases (Open House Project in Sheffield), one group member is an architect. He designed the dwelling blocks for the group, thus avoiding the need to recruit architects from outside the community, as the group could work directly with the builders. The time for architects to participate in cohousing design also varies. During the interviews, one participant (from K1 Cambridge cohousing) mentioned that more than one architects were involved in the design and construction processes, and they were

involved in the project for different design stages (e.g. planning and construction stages).

Generally, when the site selection is completed, group members (group founder members or design team members) commenced designing their future community by describing the common needs, priorities, principles, facilities, design standards, space usage plan and privacy concerns in the design brief document (some groups may call it a client brief or vision and mission statement, and it can be very detailed or very brief).

It is worth mentioning that the choices of design principles and standards is led and determined by the residents rather than by professionals. This design approach is very rare in residential design. The co-housing design process allows designers and end-users to spend time thinking about how best to create such spaces. The design brief document completed by group members played a significant role especially at the beginning stage. The existence of this document greatly improved communication efficiency between group members and architects. The architects could proceed smoothly based on this brief document and group budget. As an architect highlighted: “The design process is very straightforward, very easy, because this project is different from the other cohousing scheme, and our involvement only happened after the group given their briefs” (Architect AK1). Some architects conducted a number of activities and small games (in the game, the rule was ‘every group member needs to speak’) with the group members to understand every one’s focus and design intention. One of the architects highlighted that she knew the group members very well following certain activities. When she started to design the detail of the community, this kind of familiarity became very powerful and valuable in designing the private dwellings, access to the common house, parking issues and the many other details of community living.

The detailed design procedure may begin with any part of the community. However, the most common procedure is to start by subdividing the entire site into different parts in order to determine the location and floor area of the private and common facilities. Usually, the architect provides the initial layout drawings of the whole area to the group. Through long discussions and several revisions, a final planning proposal is agreed by the group members and architect for the planning application (building/ planning permission). Apart from considering the needs of the group members during this step, another requirement should be addressed during the design, which is about the planners' vision and concerns. As several current residents highlighted during the interviews, the planner's vision could make substantial changes to the overall plan, including the visual impact of the scheme on the surrounding area, aligning the blocks in line with the surrounding street pattern (e.g. historic pattern of the street) and the strategy of placing tall buildings (Chatterton, 2015). The acquisition of building permission means the end of the design stage and the start of construction. Accordingly, this study argues that the ~~neighbourhood~~ design of a cohousing is not an easy procedure. The complexity of the process became a drain on group member's time and energy. Therefore, it is significant to emphasise the importance of the design brief document, which could largely improve the efficiency of the overall design process. The design details of the common house and other design challenges will be explained in Sections 9.4 and 9.5.

In addition, another question was raised from the co-design procedure: Can architecture design solve social problems? This study found that there were many more factors (e.g. financial considerations, class, cultural issues, living habits and previous living experiences, personal beliefs) that influenced the creation of a spatially and socially integrated cohousing community. Design is only one aspect. This also reflects on the design of cohousing development framework (Chapter 10), where design was one of the themes. However, this research argues that the

co-design procedure could largely influence residents living and sustainable behaviours more than other types of residential models in the UK, as the user's needs are largely involved in, or even dominate, the community planning and construction processes.

## 9.4 Specialised Design Details and Elements

This section aims to identify the characteristics of certain design principles from the architects' perspectives and highlight the unique living requirements and considerations for different cohousing audiences (e.g. older residents and children) to foster intergenerational living. The unique financial recommendations are also provided at the end of this section. The design details are focused on the following aspects: dwelling types and mixture of units; design of the common house; analysis of design standards and technologies; intergenerational living requirements; and financial recommendations.

### 9.4.1 Dwelling Types and Mixture of Units

Through the interviews and site observations, this study found that the dwelling types in a cohousing community were simpler than standard houses, but the construction forms were more diverse. The construction forms of UK cohousing included: new-build; self-build; retrofitted; refurbished; reuse of historical sites/ buildings; and a mix. As mentioned earlier in the private dwelling design (Section 9.3.2.3), many architects had experience to simplify the dwelling types for group members, developers or planning authorities. Simplified dwelling types are a design feature of a cohousing neighbourhood. This can also help make the interior-design decisions easier for both group members and developers (because houses/ flats with the same dwelling type could be designed together, following the same topology; the building materials can be group purchased), and create a more efficient design collaboration. However, this is mainly applicable to new-builds or buildings consisting of similar units. Historical

buildings and renovated buildings may not be applicable due to unchangeable building structures and fixed functional zoning.

During the site observations and the participative experience of cohousing design group meetings, the most favoured dwelling types were: 1-bedroom; 2-bedroom; 3-bedroom; and 4-bedroom houses/ flats. Five-bedroom models were available at some large cohousing communities, but were not very common. As mentioned in Chapter 2, the private dwellings were generally smaller than standard houses in the housing market. This study took two of the selected cohousing projects (LILAC Cohousing and Lancaster Cohousing) as examples to explain the reduced-size of private dwellings (Table 9-4). Some projects also considered the 'London Housing Design Guide' (2010) and German space standards to define the minimum space required for each person (Table 9-5).

Table 9-4. Cohousing private dwelling size VS Average UK house size

| | | | | |
|---|---|---|---|---|
| Average UK house size | 1 bed (apartment): 46-60m$^2$ (BBC, 2013) | 2-bed: 64-100m$^2$ (David Wilson Homes, 2018) | 3-bed: 91m$^2$ (RIBA, 2015) | 4-bed: 146m$^2$ - Detached (David Wilson Homes, 2018) |
| LILAC Cohousing (Chatterton, 2015) | 1 bed: / | 2-bed: 71.2m$^2$ | 3-bed: 94 m$^2$ | 4-bed: 111m$^2$ |
| Lancaster (Lancaster Cohousing, 2020) | 1 bed flats: 54.8 m$^2$/ 40.4 m$^2$ | 2-bed: 65.4m$^2$ | 3-bed: 80.8 m$^2$/ 98.1m$^2$ | / |

Table 9-5.Minimum living space measurement

| | 1b,1p | 1b,2p | 2b,3p | 2b,4p | 3b,4p | 3b,5p | 3b,6p | 4b,5p | 4b,6b |
|---|---|---|---|---|---|---|---|---|---|
| London Housing Design Guide (m$^2$) | 37 | 50 | 61 | 70 | 74 | 86 | 95 | 90 | 99 |
| Germany (m$^2$) | 48 | 60 | 70 | 88 | | 100 | | | 110 |

Source: case for space, RIBA

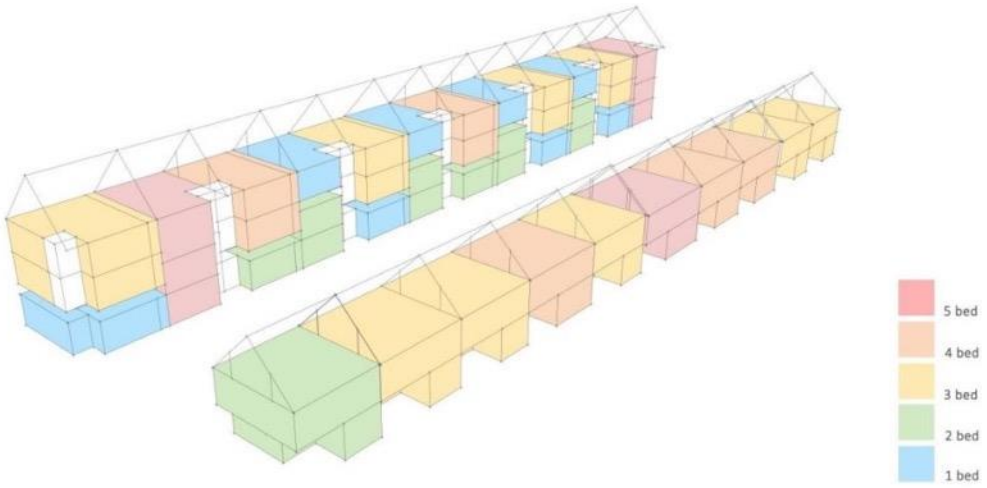



Figure 9-3. Mixed dwelling types
Source: K1 Cambridge cohousing client brief

In addition, the group members reported that the flats and houses should be mixed carefully to benefit residents rather than being grouped together on the site. One example was found in this study to explain the considerations of mixing different dwelling types (Figure 9-3). The mixture of private dwellings considered the following criteria:

- The dwelling mix should promote a broad age range across the site groups. Cohousing private dwelling size VS Average UK house size (older families with teenage children, students, young adults and older adults of retirement age).
- A mix of house sizes to be provided to suit current membership and to facilitate a continued intergenerational mix of community.
- House/ flat orientations and accessibility to the common house (K1 Cohousing client briefing study, 2014).

These criteria showed that the group members aimed to encourage future social interactions and promote diversity of various age groups for the long term by mixing different types of units.

### 9.4.2 Design of Common House

As discussed in cohousing literature (Chatterton, 2015; Meltzer, 2005), the concept of the common house is a well-established key feature of a cohousing community. It also creates a geographical heart looking inward towards the whole community (Chatterton, 2015). The aim of this section is to discuss what design principles and elements were considered when designing a common house. In addition, this study aimed to identify some elements which were retained as either essential or high priority for inclusion, especially when the group budget was very limited. During the interviews, architects did not specifically describe the detailed design process of the common house. The information for this section is mainly summarised from the findings of secondary data analysis. Detailed information of the design was available and provided by three selected cases (LILAC Cohousing, Five Rivers cohousing and K1 Cambridge cohousing). Three common houses analysed below fall into the category of new build.

The following diagram provided by Five Rivers cohousing displays all the design principles and elements related to the common house in a cohousing model. The design principles of the common house for this project can be simply summarised using four words: live; eat; make; and relax (Figure 9-4). The common house in each community can be very different; for example, some communities decided to use a common flat instead of an actual 'house' because of space limitations. However, this study found that the selected cohousing communities evidenced a lot in common in relation to spatial functions for the common house. For example, the kitchen, dining area, meeting area, guest rooms, storage space and laundry/ wet room were identified as very important elements for all the selected cases in this research. Table 9-6 shows the steps of defining the design priorities, principles and elements of the common

house among the three cohousing projects. This table also shows the items that were highlighted as essential elements.

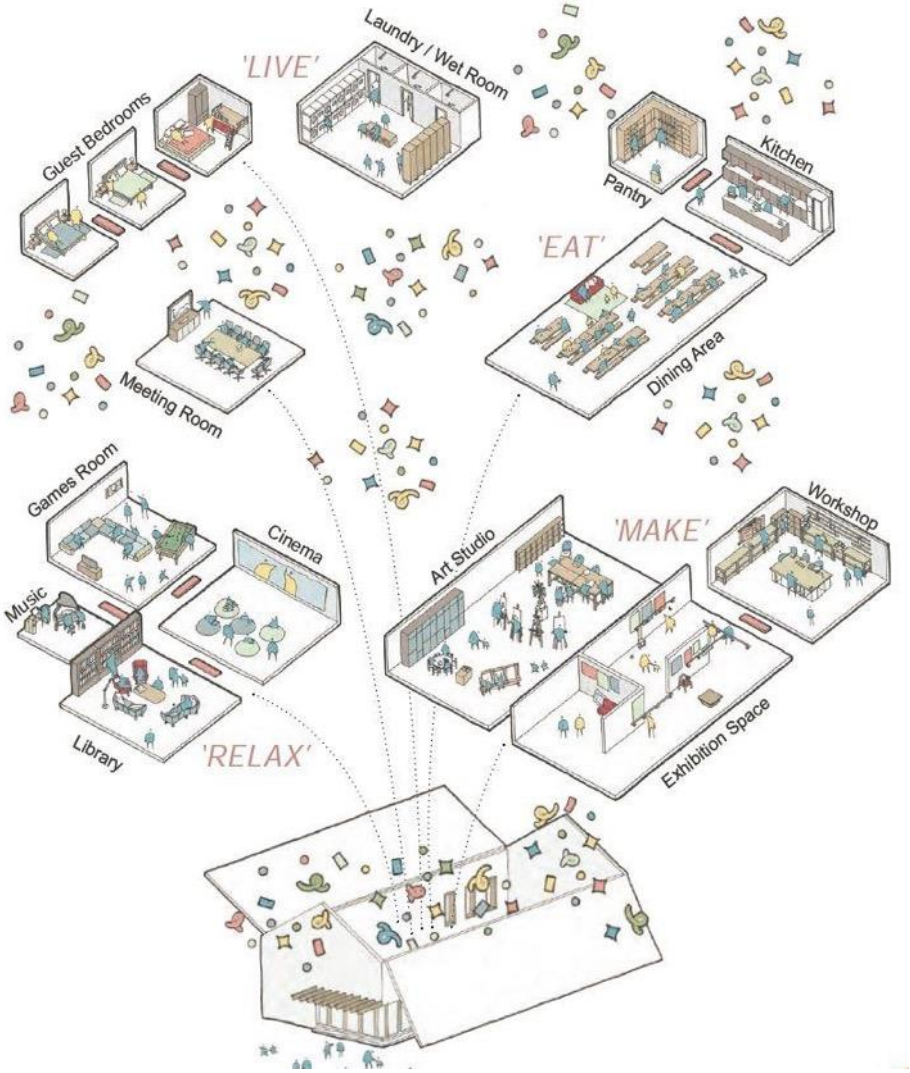



Figure 9-4. Design of common house
Source: Five Rivers cohousing live project workbook

Table 9-6. The comparisons of design principles and elements

| Project name | Step 1: Design principles | Step 2: Design elements | Step 3: Essential elements |
|---|---|---|---|
| LILAC (common house size: 135m$^2$) | A landmark building in terms of its environmental performance and function as the social hub. It would also help to save money as a community. | • Entrance, post and notice –board area.<br>• Communal kitchen (a hatch and shutter).<br>• Dining area.<br>• Laundry.<br>• Guestroom.<br>• Workshop space and tool storage.<br>• Children's play area. | Office; laundry; main dining room; kitchen; lobby/ post area; flexible function room; sitting nooks, toilet. |

| | | | |
|---|---|---|---|
| | | • Shared common storage space for communally owned stuff only.<br>• Outside space for eating and sitting.<br>• Nooks and crannies, alcoves, window seats, stair chairs for chatting quickly.<br>• Toilets.<br>• Office space.<br>• Vegetable, boot sink. | |
| Five Rivers | The following spatial functions need to be accommodated in the common house:<br>• 'Food' space.<br>• 'Rest/ play/ work' space.<br>• 'clean/ store' space.<br>• 'Guest' space. | • **'food' space:** kitchen units; pantry and storage;<br>• Informal seating; seating arrangements.<br><br>• **'Rest/ play/ work' space:** music room; crèche; work space; games/reading room; meeting areas; TV room.<br><br>• **'Clean/ store' space:** shower/ rest room; washing machine and dryer; storage; utilities; changing (wet) room.<br><br>• **'Guest' space:** single room; family room; dorm room. | N/A |
| K1 Cambridge | • The Common House should become a gateway into the site.<br>• It should be light and airy.<br>• Having a good view.<br>• The building should be cool in summer.<br>• Having flexible space.<br>• Having good storage.<br>• Meeting Passivhaus standard in order to allow further flexibility within the design;<br>• The common house should be completed no later than the first private homes are occupied.<br>• Connected by fibre optics to the common house, to an Integrated Reception System for TV, and to BT and Virgin telephone lines and broadband services.<br>• Guest bedrooms in the Common House will ideally have en-suite bathrooms. | | **Priority rating system:**<br>**Top priority (Priority 1)**<br>• Dining room.<br>• Kitchen (cooking for 60 people).<br>• Living/ sitting room.<br>• Workshop (repairing, fix and make things).<br>• Play room for kids.<br>• Large Multifunctional room (Games room, bar).<br>• Main entrance (clock room, mail room).<br>• Support functions (bathrooms, cupboard, bins, chair and table storage, telephone).<br>• Bike storage.<br>• Parking spaces.<br>**Priority 1.5:**<br>• Outdoor area (Patio or deck).<br>• Guest suites.<br>• Laundry. |

Table 9-6 shows the details of the design principles, elements and essential elements (high priority) regarding the common house in a cohousing community. The process of designing a common house may start with describing what kind of building the group wanted and the space allocations, and then identifying design elements and their costs. LILAC Cohousing is a typical example, which used this design strategy. This study also found that the 'functional partitioning' (see Five Rivers) and priority ranking method (see K1 Cambridge cohousing) were used in the selection of design elements. 'Functional partitioning' by Five Rivers Cohousing firstly defines the main functions of the spaces in the common house, such as the eating and meeting areas, before identifying the design elements in each area. The priority ranking method means that the group ranks all the design elements (e.g. the kitchen unit) in the common house based on the degree of demand. The architects could then design and arrange these elements using the ranking. K1 Cambridge cohousing employed this approach. The group provided a Likert scale (1 - essential, 1.5 - very, very important, 2 - very important, 2.5 - important, 3 - nice to have, 4 - don't care if we have this or not) to measure the importance level of certain items. This approach also provided a basis for architects to make decisions, especially when design funding was limited.

Reviewing Table 9-6, the kitchen units, sitting area (informal siting and seating arrangement, dining area), workplace (office or workshop) and laundry can be seen as the top priority elements for all cohousing communities who participated in this study. The post area, children's play area, storage, guest rooms and flexible function rooms also have high expectations and demands. The entertainment facilities were shown as optional elements in the common house, such as the TV room, music room, art studio and library.

### 9.4.3 The Analysis of Design Standards and Technologies

This section consists of two parts: the considered design standards; and advanced technologies.

#### *9.4.3.1 Considered Standards*

Table 9-7 shows the analysis of design standards which were mentioned in Section 2.2.1. Six design standards were evaluated below. The advantages and disadvantages were discussed and summarised by reviewing the interview findings and the results of the secondary data analysis. The level of concerns represents how selected groups valued these standards by considering and applying them during the planning procedure. During the interviews and secondary data analysis, the LH and PH were seen as the most popular design standards, and they were considered by almost all the selected communities. They targeted the energy performance level and adaptability of the cohousing communities. Besides, improving the level of community security through design standards was a new perspective for cohousing design. The standard SBD was a useful approach. However, it was only mentioned once in the secondary data material. Indeed, information regarding the design and financial challenges of applying this standard in a cohousing was very limited. This study found that there was no unified or simplified approach of choosing design standards. This depended on the conditions of the site and the financial capacity of the group.

Table 9-7. Research findings: Design standards analysis

| Name of Design Standard | Official Definition and Application | Advantages (+) and disadvantages (-) | Level of concern of the cohousing groups |
|---|---|---|---|
| Lifetime Homes Standard (replace by Requirement M4(2) and/ or M4(3) of the optional requirements in the Building Regulations) | Lifetime Homes are ordinary homes designed to incorporate sixteen Design Criteria that can be universally applied to new homes at minimal cost. Lifetime Homes criteria aims to improve the flexibility and | • More circulation space needed, not fit well with the small house (-)<br>• More expensive (-)<br>• It gives a lot of flexibility, | Considered by all selected cohousing groups. |

| | | | |
|---|---|---|---|
| | adaptability; they are thoughtfully designed to create and encourage better living environments for everyone (The Lifetime Home Design Guide, 2010). | especially for older people (+) | |
| Association for Environment Conscious Building (AECB Standard) | The AECB Building Standard is aimed at those wishing to create high-performance buildings using widely available technology at little or no extra cost. Individual self-builders and large-scale residential and non-residential developers could make a valuable contribution to the low-carbon building by meeting the AECB Building Standard (AECB. n.d.). | • Little or no extra cost (+)<br>• Apply to residential and non-residential buildings (+)<br>• Largely reducing overall $CO_2$ emissions and developing Low-carbon buildings (+) | Considered by two selected cohousing groups. |
| PassivHaus Standard | PassivHaus or 'Passive House' is the fastest growing energy performance standard. The PassivHaus standards strengths lie in the simplicity of its approach; build a house that has an excellent thermal performance, exceptional airtightness with mechanical ventilation.<br><br>This robust approach to building design allows the architects to minimise the heating demand of the building. The heat can then be recovered and circulated by a Mechanical Ventilation and Heat Recovery (MVHR) unit (BRE. n.d). | • More investment required at the beginning (-)<br>• Good for future savings; Lower running cost for the living space in the future. e.g. less heating and cooling cost (+) | Considered by six selected cohousing groups. |
| Code for Sustainable Homes (CSH) - withdrawn in 2015. | The Code for Sustainable Homes (the Code 1-6) is an environmental assessment method for rating and certifying the performance of new | • More investment required at the beginning (-)<br>• Good for future savings (+)<br>• Low-carbon | Considered by four selected cohousing groups. |

| | | | |
|---|---|---|---|
| | homes. It is a national standard for use in the design and construction of new homes to encouraging continuous improvement in sustainable home building.<br><br>CSH includes nine categories:<br>Energy and $CO_2$ Emissions; Water; Materials; Surface Water Run-off; Waste; Pollution; Health and Well-being; Management; Ecology. (Council, 2012). | (Zero-carbon) emissions (+) | |
| Secured by Design (SBD) | SBD has produced a series of authoritative Design Guides to assist the building, design and construction industry to incorporate security into developments to comply with the Building Regulations (SBD, 2019). | • Increased level of security in the neighbourhood (+)<br>• Less risks of crime and anti-social behaviour (+) | Considered by one selected cohousing group. |
| Disability Discrimination Act (DDA Standard) | The Disability Discrimination Act 1995 (DDA) was introduced in 1996 and Part III gave disabled people a right of access to goods, facilities, services and premises (Gawler, 2000). | • Perfect for disabled people and older people (+) | Considered by one selected cohousing group. |

Table 9-7 could benefit more cohousing groups by providing simple and clear design suggestions if the groups hope to target low environmental impact, accessibility, and adaptable community living.

#### *9.4.3.2 Advanced Technologies*

The purpose of this section is to show what technologies were considered in the design process, and what their advantages and disadvantages the technologies possessed, by applying them into the communities. The technologies listed in this section were indicated by the architects in the interviews and secondary data documents. They

covered a wide range of fields, including construction and materials, renewable energy, building performance and water system. These technologies and their features are shown in Table 9-8.

Table 9-8. Research findings: Advanced technologies in cohousing community

| Name of the technology | Definition | Features: advantages (+) and disadvantages (-) | Level of concern of the cohousing groups |
|---|---|---|---|
| Straw-bale construction with timber frame | A sustainable building method that uses bales of straw as structural elements, building insulation, or both. (Milutiene et al., 2012). | • Significantly reduce $CO_2$ emission (+)<br>• Affordable (+)<br>• Reduce heating and cooling demands (+)<br>• Compressed straw may expand due to absorption of moisture (-) (The Sustainable Home, 2013). | Considered by one selected cohousing group. |
| Biomass boiler | Wood-fuelled heating systems, burn wood pellets, chips or logs to provide warmth in a single room or to power central heating and hot water boilers. (Energy Saving Trust, 2020). | • Cheaper than other heating systems (+)<br>• Low-carbon option (+)<br>• Need to remove ash regularly (-)<br>• Need more space to put the wood boiler (-)<br>• Need space to store the fuel (-)<br>• May need a planning permission (-) | Considered by two selected cohousing group. |
| MVHR | Mechanical Ventilation Heat Recovery System. It offers a solution by bringing fresh air into all habitable areas without letting the heat escape (AIRFLOW, 2020). | • Reduce living (heating and cooling) costs (+)<br>• lightweight and easy to install (+)<br>• Low maintenance and easy access filters (+)<br>• Work well with new build, may have difficulties with old buildings (-)<br>• Investment needed to install (-)<br>• Requirement for | Considered by four selected cohousing groups. |

| | | | |
|---|---|---|---|
| | | walls (U-value 0.12-0.15) (-) | |
| Solar Photovoltaics (solar PV) and solar water | A technology that converts sunlight (solar radiation) into direct current electricity by using semiconductors. | • Clean and silent (+)<br>• locally available renewable resource, low environmental impact (+)<br>• Can be constructed to any size based on energy requirements. (+)<br>• Solar energy is more expensive to produce than conventional sources of energy (-)<br>• if the solar panels are damaged, the maintenance costs are very high (-) | Considered by five selected cohousing groups. |
| District heating system | a system for distributing heat generated in a centralised location through a system of insulated pipes for residential and commercial heating requirements (Energy, saving trust, 2018). | • District Heating: 5.51-14.94 p/kWh (+)<br>Gas Heating: 9.55-11.60 p/kWh<br>Electric Heating: 21.91-22.99 p/kWh.<br>Can be Cheaper than gas and electric heating (Sycous, n.d.). | Considered by one selected cohousing group. |
| Composting toilet | A composting toilet is a type of dry toilet that treats human excreta by a biological process called composting (The Guardian, 2019). | • Eco-friendly (+)<br>• Odourless (+)<br>• Reduce water usage (+)<br>• Self-contained compost toilets can be expensive (-) | Considered by two selected cohousing groups. |

This study found that all of technologies listed above can contribute to environmental sustainability to a certain level, especially for space heating. MVHR and solar PV were the most popular technologies that were considered and applied many times by cohousing groups (shaded in Table 9-8). These two technologies were both related to energy and building performance. Groups paid attention to the advanced environmental technologies that also highlighted the importance of energy technologies in contributing to low-impact living and healthy lifestyles. Additionally,

most of the technologies above have the potential to reduce living costs both in the long or short term. Even though some technologies required substantial investment to install (e.g. solar PV), the future savings are considerable.

### 9.4.4 Design for Intergenerational Cohousing

Intergenerational cohousing one type of cohousing found in the UK. The reason why this study focused on the design of intergenerational communities is that, during the observations, many people were willing to choose mixed-age communities to live in, but the living needs of various generations were not fully reflected and addressed in the cohousing design. Due to the fact that all selected cases in this study are intergenerational cohousing communities, accommodating the living needs of various age groups was extremely important for the neighbourhood design. As discussed in Section 9.3.2.3 (Design for Private Dwellings), the flexibility and adaptability of private dwellings and special needs of different age groups were neglected in the design. Only one selected case (the Five Rivers group) considered and fully addressed the details of intergenerational design principles in the design process. This section will use this case as an example to explain the design principles and elements.

As explained in Section 9.3.2.3, this study argues that adaptability and accessibility considerations for different age groups should be applied into both communal and private areas in the community rather than just for the private area. The design principles considered by the group fell into the following three categories (Five Rivers Cohousing workbook, 2019):

1) Groups with specific design requirements: older people; various family types (e.g. couples with no children, single-parent families, disabled people in the family, family with children at different ages); and young people (teenagers, young kids).
2) Housing types: adaptable houses and purpose-built houses.

3) Areas to consider (both communal and private areas): bedroom and communal spaces; bathroom; kitchen; and accessibility measure for people with mobility difficulties (e.g. wheelchair and walking frame users).

Guided by these principles, this study found that there are different design priorities for various age groups when selecting the design elements. For example, when designing spaces for families with young children, the attention was paid on adaptable areas that promoted privacy and social interaction with the family by using open layout kitchens, kitchen island with stools, and sufficient room with non-slippery surfaces. When designing spaces for older residents, health and safety were the priority. Architects considered wider and less steep staircases with handrails, walk-in showers with a built-in seat, non-slip surfaces, wheelchair ramps, suitable heights of kitchen equipment, door levers instead of door knobs and disabled toilet(s) in the common house. In order to increase the flexibility of the living space to cope when family circumstances changed, the open plan spatial layout, flexible walls, sliding doors and multifunctional furniture were also considered. These design elements should also be applied in the common spaces, including the common house, community workshop and outdoor paths. Specialised and personalised design can provide convenience for the residents. At the same time, it may also challenge the community decision making and financial scheme (e.g. a financial plan to pay off the community mortgage, see LILAC Cohousing), which could make the design process longer. Accordingly, the balance between simplified and specialised dwellings should be highlighted to assist the architects and group members for future cohousing design.

### 9.4.5 Financial Recommendations for Cohousing Design

The financial recommendations came from the architects' real design experiences with group members. The following recommendations were mainly aimed at the reduction of the initial design costs (e.g. materials purchase, design and construction fees).

Primarily, an architect reported that simplifying dwelling types and collaborating with builders can be a very practical approach to reducing initial design costs. Simplifying the housing types not only makes the purchase of building materials easier and more efficient (units with same dwelling type can use the same construction components and materials), but also reduces engineering and assembly difficulties for builders. The construction process can be carried out based on house types to avoid unnecessary mistakes. This was stated by an architect:

> "The design process for us is that we designed three versions of each house type, we then showed the customer and they picked their favourite design, so this is a way to suit all the people and try to accommodate everybody's wishes. We then collaborated with the builders to arrange the construction process for 41 houses in one go, so the construction fees have been reduced" (Architect, AL4).

Secondly, some architects highlighted that avoiding very expensive housing design (e.g. using better insulation instead of very expensive heating system) and bulk purchasing were very smart strategies of saving money (Architect AK3, Architect AO5). Specifically, due to the nature of collaborative design process, the cohousing residents have more flexibility of deciding what is suitable for their community. Some projects decided to buy same doors and lighting for all residential units, and same indoor furniture for all houses with same layout. The savings from the purchase discount can be used in other aspects of the cohousing design. This also increased the capital value of the investment for the group members. The significance of bulk purchasing was highlighted by an architect during the interview: "Buying in bulk to get the discount, we bought 200 doors all together, it saved a lot of money" (Architect AL4). Last but not least, spending wisely on design was a very unique idea. This is also relevant to the group members' future savings and the reduction of living costs. So how could they spend the design funds to maximise its value? The architects may have different

foci on design depending on the group members' needs, however, a very interesting design 'logic' should be highlighted, which is concerned with reversal of thinking and active and passive energy conservation. For example, if a complicated heating system was unaffordable for the group members or was unsuitable for the site, instead, architects would consider minimising heat loss by installing alternative technologies, such as MVHR or triple glazing windows. As one of the architects described:

> "It is important to spending money in different ways. We spent our money very liberally on super-insulation, triple glazing, comfort ventilation and do not spend money on complicated heating systems, for space heating and hot water. We also reduce the cost by using renewable energy. We are responsible to try and make sure we spent in term of quality of materials, and ecological things" (Architect, AL4).

To conclude, these financial recommendations and examples indicated the possibilities of reducing expenses at both the design and construction stages. This study shows that simplifying housing types, bulk purchasing strategies and effective spending were all considered as useful approaches to reduce the initial design costs. The suggestions explained above could be beneficial for the project architects and cohousing group members to reduce the construction and living costs.

## 9.5 Design Challenges for UK cohousing groups

The purpose of this section is to identify the main challenges in the design process. As mentioned earlier in the co-design process section (Section 9.3.4), the ~~neighbourhood~~ cohousing design of a cohousing community is the production of a joint design by the architects and group members. Therefore, this section includes and summarises the interview data from both six architects and sixteen group members. From both

designer and users' perspectives, the design challenges can be comprehensively understood. This section could be beneficial for future cohousing groups, architects, planners and academics to evaluate, speed up, and better deliver the cohousing design process and services by understanding existing challenges for UK cohousing groups. The data collected in this section was mainly from the participant interviews. In addition, the study found that the architects not only acted as an important design partner for the group members, but also served as a 'bridge' to connect residents and other stakeholders to the design (Figure 9-5).

From the architects' perspective, design challenges were divided into two groups based on the stakeholders: users; and non-users (Architect AK1, Architect AK3). The design challenges associated with the users meant the difficulties faced by the architects in their joint design with the group members. The design challenges associated with non-users represented the difficulties that the architects faced in working with other design-related stakeholders, such as planners, developers, engineers, planning authorities and builders.

### 9.5.1 Working with Group Members

The interview results showed that the biggest challenge in the design collaboration between the future residents and the architect was the very long and complicated decision-making process (shown in Figure 9-5). The main reason causing this difficult decision-making process was that of the collaboration approach. Specifically, due to the design principles in the project design proposal were not sufficiently specific for individual homeowners, so the project architects had to work directly with each household or individual (without a group-agreed detailed design brief), unsurprisingly every client held different opinions towards the housing design. There were always changes in the design proposal and it was difficult to reach an agreement. See the architects emphasised below. However, some groups provided a detailed design brief

documents for each housing types (e.g. 2-bed, 3-bed) before the architects get involved. This design brief includes uniformed floor plan for each housing type, group preferred furniture and lightings, and special living needs for older residents and children. This largely saves time in the design and planning stage.

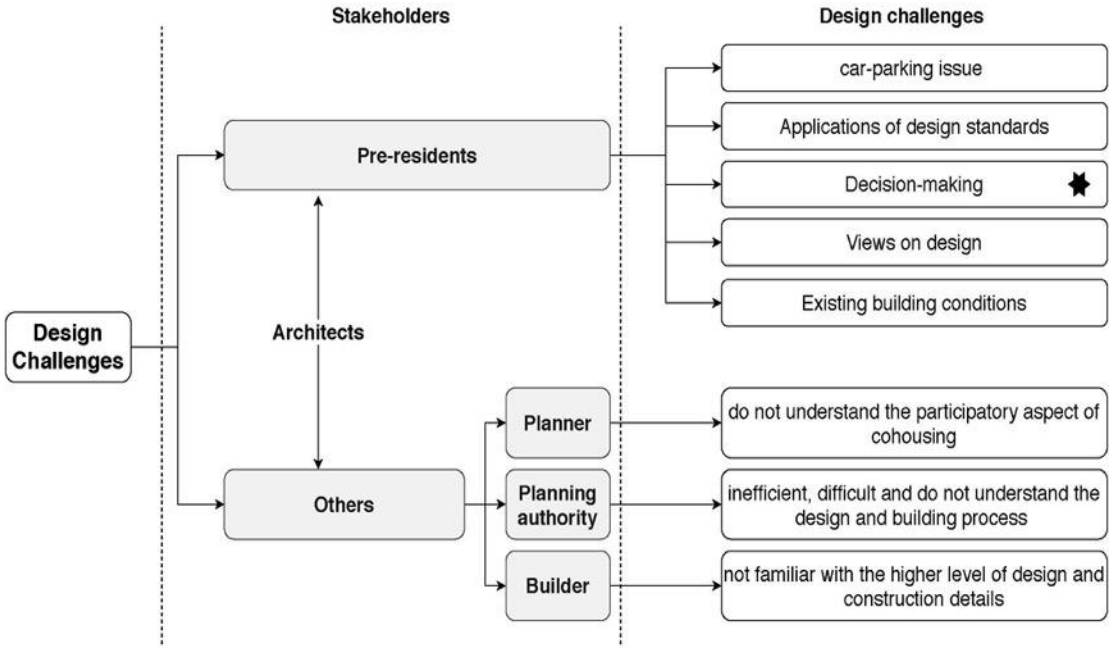



Figure 9-5. Design challenges from architects' perspective

> "Working with non-professional clients with many different families together is very challenging". People were taking very long time to make decision, hard to get people agree" (Architect, AK3).

> "Having a lot of clients, all with slightly different ideas. This takes a lot more time" (Architect, AS6).

> "We try to make the houses almost the same for each household. But then, people has different ideas, they change them. It is taken a lot longer do design, that process has been a lot longer. And that costs more design time and also affects them financially" (Architect, AS6).

This study found that this design process challenged the consensus decision making system of the community because the group decisions mostly focused on the decisions

of public matters (e.g. design of the common house). However, in relation to the design of private houses, the desire for housing diversity and various living needs of the group members may have caused some difficulties for the architects. Meanwhile, the decision-making process can be also difficult from the user's perspective, as one architect reported:

> "They [group members] are friends for many years, but they never had to make financial decisions together. I think if you don't know other people in the group, in some ways, that is easier, because it is going to be less personal. They have been friends and start to argue something about they have never done it before, that can be very difficult. Also, the decision-making takes time, when they finish work, they have to come to evening meetings when they are already tired. It is a difficult process" (Architect, AS6).

Additionally, two other major constraints on neighbourhood included the application of design standards and the condition of existing old buildings. Group members aimed for certain design standards, such as LH. However, budget limitations and the conditions of old buildings made the design extremely difficult, as one architect stated: "Big and old building is quite hard to work with, especially when you redesign the insulation and circulation system" (Architect, AS6). Some groups had to give up all or some design principles because the building itself was not compliant or beyond their budget.

From the residents' perspective, the biggest design challenge was the lack of structural guidance. Most residents evidenced no experience in design and possessed limited knowledge of community planning. A group member reported: "For our group, during the design process, something we checked over and over and then, there is a whole other area we haven't thought off. There is no document or research material we can follow" (Resident, RF4). This example highlighted the current research gaps and the driving factor to conduct this study.

### 9.5.2 Working with Non-user groups

The major challenges faced by architects and group members in working with other stakeholders was a lack of understanding of cohousing concepts and practices. This design challenge was mainly set by UK local authorities (city councils), planners, developers and builders. As participants reported:

> "The planers did not really understand the participatory aspect of cohousing. They want to be flexible enough which is able accommodate that from building model over time" (Architect, AK3).

> "I think the difficulties for us in the UK: A we don't have enough land, B the land seems to be hold by the developers who just want to maximize the big houses on the land, and not build properties just for one and two people. But in a cohousing, that is reasonable size for one and two people. So those properties' potential could be… for people who are older. But they are not adopted" (Resident, RK7).

This type of understanding gap resulted in a significant delay in the design and construction process. One typical example of this was car parking. Many developers did not understand the cohousing concept and the sharing culture (including sharing cars), questioning why the size of the car parking area was largely reduced and the placement of parking lots on the edge of the community. Considering the convenience of future residents to have enough car parking space and also potentially increasing the long-term benefits, the developers asked the architects to alter the design. This request went against the sustainable design concept of the cohousing community and made the design process very difficult. Even though the architect and group members eventually convinced the developers by making small changes (e.g. grouping car parking areas), the parking issue was raised as a common design challenge by many project architects. Additionally, this study found that the builders were unfamiliar with some special construction techniques or design standards in the process of construction, such as airtightness and MVHR, which again resulted in the architects

facing difficulties. One architect stated: “Working with builders sometime is difficult, because they are not familiar with the higher level of building details, it was very difficult to communicate with them” (Architect AS6). This may lead to construction mistakes made in the process and extra costs. Accordingly, all of the design challenges explained above emphasised that designing and building a cohousing community is a very time-consuming and challenging process. This study shows that architects, as a ‘bridge’ to connecting multiple stakeholders, faced many challenges. More comprehensive assistance and guidance are needed for architects and other stakeholders. This could help them to efficiently communicate and cooperate together.

## 9.6 Conclusion

To conclude, this chapter identified the significant design principles and specialised design elements from the architects and group members’ real experiences. The details of how this research can benefit different stakeholders will be explained in Chapter 10, section 10.3. This study summarised the advantages and disadvantages of the design standards considered by cohousing groups, and also provided detailed information on co-design process, dwelling types, common house design and advanced technologies. The design considerations of intergenerational living were also included in this study by analysing the different needs and responses of older people, young people and various types of families. Financial recommendations and design challenges were also provided.

Based on the research findings on cohousing design, the cohousing communities were designed with specific goal of providing a socially and environmentally sustainable model of living with a focus of intergenerational relationship. This study argues that the cohousing members have more flexibility of participating in the design process, adopting more suitable design standards. This study found that cohousing design was a very complicated and time-consuming process. The PH, LH and CSH standards

were the core standards considered by most UK cohousing projects. MVHR and solar PV were the popular environmental technologies for many cohousing projects. In the meantime, the adaptability and accessibility of the private dwellings and common spaces became the latest design focuses and current concern for group members and architects. The information provided in this chapter forms an indispensable part of the cohousing development framework. This will also benefit future cohousing architects, group members, developers, planners and local authorities to better design this living model and foster more efficient collaborations. The next chapter will explain the formulation of cohousing framework and recommendations for various stakeholder groups.

# Chapter 10 : A COHOUSING FRAMEWORK FOR COMMUNITY DESIGN AND PRACTICE

## 10.1 Introduction

As argued in the literature review and exploratory study, there is a need for a practical tool to guide the future design and long-term development of cohousing in the UK and beyond. Therefore, the purposes of the framework are to: a) develop a deeper understanding and contribution of cohousing model; b) show the potential (e.g. sustainable living, social coherence, and cohousing design) of the UK cohousing model; c) provide a practical guide for designing and joining a cohousing community for various stakeholders; and d) set out a summary of the key findings of this study. This chapter presents the cohousing developmental framework by demonstrating the formulation process, framework applications and stakeholders, and recommendations for policy and practice based on the overall findings of the study. The framework combines the cohousing literature, related theories and research findings (interviews and observations). Four main research themes (motivations, sustainability, social environment, and cohousing design) are established in the framework to answer the research question and sub-questions showed in section 1.4. In order to improve the practicability and usability of the framework, this Chapter also provides a visual guide with hierarchy for each potential user group including residents, architects, decision-makers, and housing providers.

The framework also uses a colour code to identify different levels of social, environmental, and economic sustainability. At the same time, the study evaluates the framework transferability to maximise the flexibility and adaptability for future applications. This is examined via descriptions, purposive sampling method of participants and applicable spatial settings (e.g. community-led housing, social housing). Finally, the recommendations for policy and practice are provided based on

the feedback and potential issues provided by the study participants. This Chapter is divided into four parts: a cohousing developmental framework; instructions for stakeholders; recommendations for policy and practice; and transferability.

## 10.2 A cohousing development framework

This section introduces the cohousing development framework and its formulation process. The framework provides a system which explores an effective developmental method for the future design and practice of a cohousing. Based on the legibility and accuracy principles, the final cohousing framework is visually presented using a wheel diagram format with three levels of information (primary/ core, secondary and tertiary themes). Each quarter of the circle represents a theme, with each theme distinguished by a colour code. The core themes are presented centrally in the framework (motivation, sustainability, social environment, and cohousing design) and summarised from the findings of interviews, observations, and secondary data analysis. Information at the subordinate level is arranged around the core themes. The framework should be read from the centre out. In order to provide recommendations and ~~'solutions'~~ design options for cohousing future design and practice, the keywords or phrases that best represent the results of the study are selected and listed in the diagram. Each theme and its sub-themes are in line with the structure of the corresponding thesis chapters.

There are two sets of colour codes (with corresponding grey scale) employed in the framework: to distinguish various stakeholder groups; and the study-proposed priorities of using this framework. Four colours (red, purple, blue and green) with three-line types (solid, dashed, and translucent dotted lines) collectively present a hierarchical sequence of future applications for stakeholders based on the degree of correlations to the cohousing model (Figure 10-1/ Appendix 13). In other words, this shows the priorities of using the information displayed in the framework for different

stakeholders. The second set of colour codes is determined by the definition of sustainability (Figure 10-2/ Appendix 13). Three colours (green, yellow and blue) are chosen to present environmental, social and economic sustainability. Therefore, the mixture of colour is a clear indicator to show the content of certain themes/ sub-sections without reading the text. In addition, it helps readers to locate different kinds of information towards sustainability across the themes. Each theme will be explained separately in the following sub-sections.

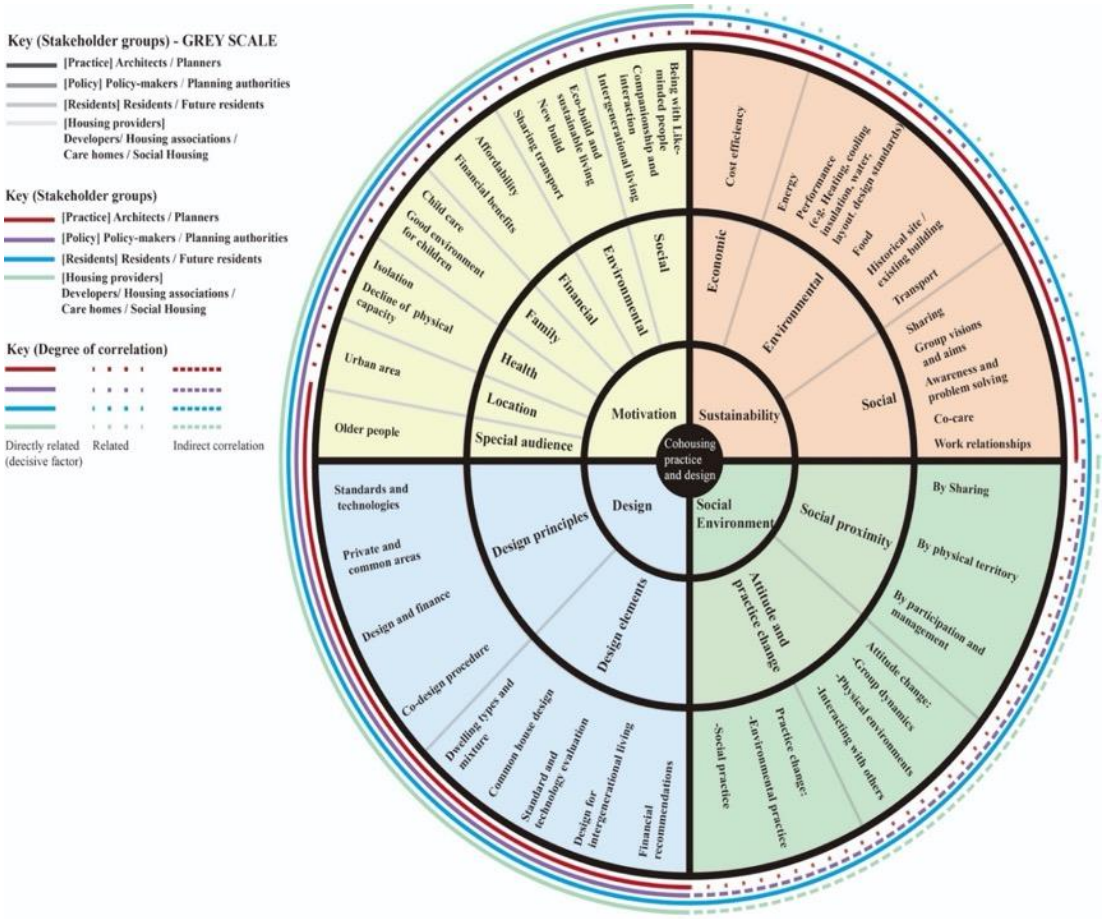



Figure 10-1. Cohousing framework (for stakeholders)

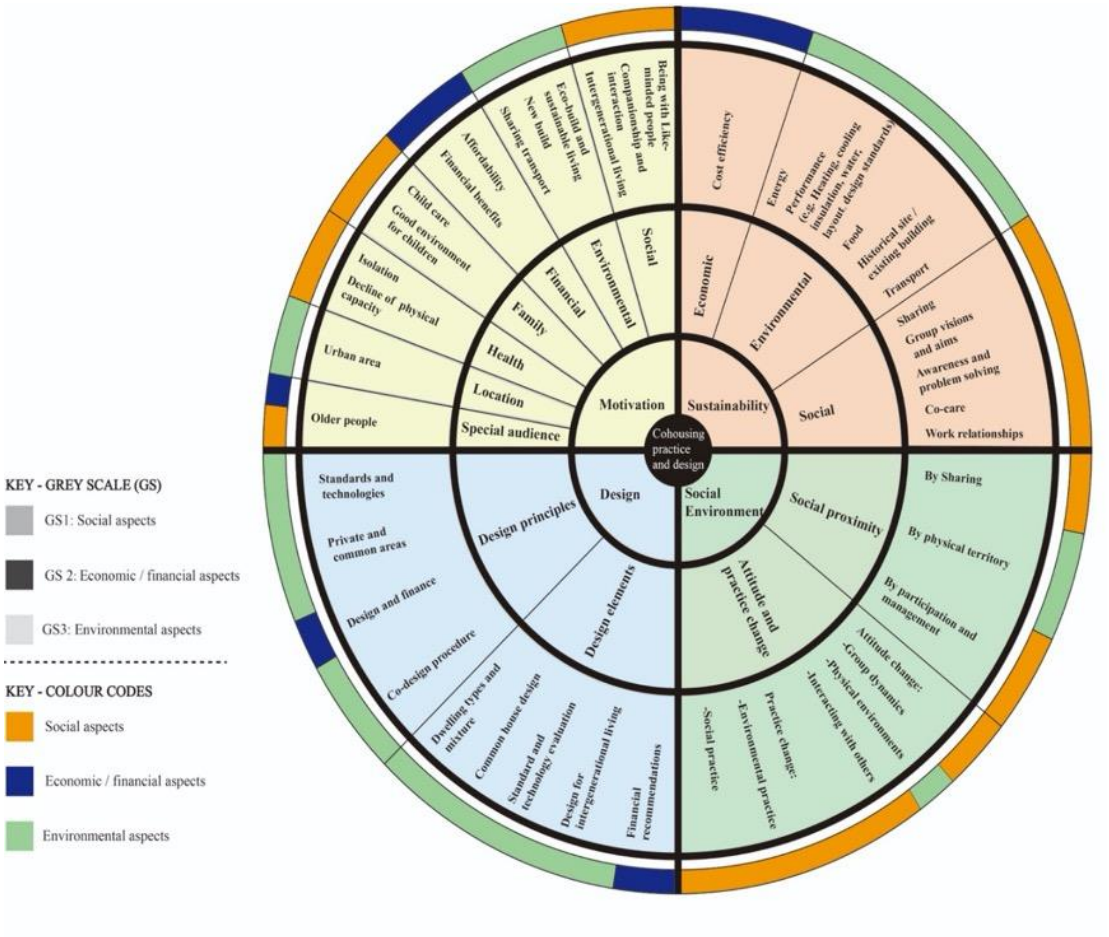



Figure 10-2. Cohousing framework (for sustainability)

### 10.2.1 Theme 1: The Motivation of Group Members

The aim of this theme was to identify what motivated people to enter a cohousing project in the UK. The research found that the motivations for entering cohousing were informed by a very difficult and complex decision-making process. Based on the interview results, the study identified that the following aspects were the primary factors for attracting people to create or join a cohousing community: social aspects; environmental sustainability; financial benefits; family considerations (particularly, childcare); health concerns; and site location (Figure 10-3). Adopting a detailed content analysis (defining key-concepts correlation pattern) for the interview data, social aspects, environmental sustainability and financial benefits were found to be the three top priorities. Among these, the interview results also showed that social purpose was the

dominant aspect for people to consider for joining a cohousing community within all selected cases in this study. Both participant groups (architects and residents) pointed out similar social factors as indicators to define group members' motivations, such as 'sharing', 'companionship', 'sense of belongings', 'like-minded people', 'intergenerational living' and 'previous living experience.'

At the same time, environmental sustainability and financial benefits also emerged as crucial aspects which could significantly influence a group member's decision making. Within the two groups, 'low environmental impact and sustainable living' was the most significant environmentally motivating concept. Specifically, both participant groups focused on ecologically sustainable living (e.g. recycling, growing food on site, sustainable design standards), eco-build, and the positive impacts of sharing cars. Environmental concerns were also strongly linked to group financial situations. However, regarding the financial aspect, some older people chose cohousing because they had lower incomes following retirement, their children had left home and they wanted to downsize to a smaller property which would be cheaper to maintain. Still mobile with reasonable health, they were seeking retirement properties with 'care', so cohousing was an alternative option for them. Young people or young families faced difficulties accessing any form of housing without savings or a property to sell. However, collaborative design processes involving group members into the design process to discuss energy saving strategies and well-insulated features to reduce living expenses, and sharing schemes (share cars and meals), are typical of cohousing and thus provided the potential to reduce living costs to the greatest extent.

Safe and healthy environments for children to grow up in was a driving aspect when families considered cohousing. Indeed, it was a common idea shared between the architects and group members. The benefits of multigenerational living mean that children ideally could learn from different people in the community and understand the

diversity of society. They could find their life role models, learn how to respect people and the importance of taking responsibility. Referring to health concerns, health-related issues such as declining physical capabilities and mental needs, affected housing choices and could be seen as a common fact between selected cases and participant groups. The visions related to health needs raised from existing and future residents were very similar. Put succinctly, explanations of health aspects were provided by architects and group members, indicating that older group members in particular struggled to look after large properties due to declining physical capabilities, and as a result of isolated and lonely. Finally, site location was another motivating factor. Preferring to live in the city rather than living in the rural area was the key answer when interviewing the two groups. The benefit of living in a city could be due to good local infrastructure and better transport systems. However, disadvantages also remained, including noise, pollution and traffic jams. Most of the participants chose the community located in the city where they were currently living. They had no intention to move out of the area due to few alternatives in the same region.

In addition, this study paid close attention to a special customer group of UK cohousing communities: older people. Different age limits (e.g., 65,60,55 or 50 years of age) were used to define the term ‘older people’ (World Health Organization (WHO), 2002). This study used the age definition ‘50 years old’ as an important threshold for defining senior cohousing (as was the case in the OWCH cohousing project in London) This is because based on the investigation of demographic information of selected cases (all cases are intergenerational cohousing) which showed that older people became the biggest customer group of the selected cases in this study. Taking senior cohousing into consideration, older people represented the largest audience group of the UK cohousing model. The interview results showed that all participants (architects, current residents and pre-residents) agreed to the following concept that cohousing can be a great housing option for older people. Specifically, intergenerational living and mutual

support in the community were the driving factors for older people to choose a cohousing.

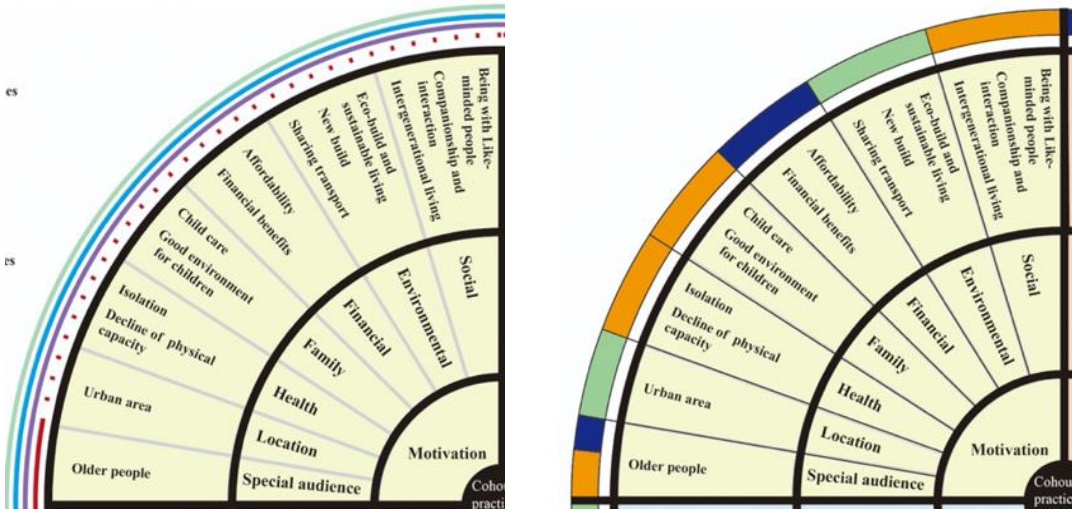



Figure 10-3. Framework theme 1

### 10.2.2 Theme 2: Sustainability

This second theme focused on the sustainable features and practices conducted in cohousing communities. The studies identified the categories, priorities, and challenges of sustainable living in cohousing communities through qualitative interviews. There were 18 categories on social, environmental and economic aspects of community sustainable living, which demonstrated the possibilities of how these categories could be combined to achieve greater levels of sustainability (Table 10-1). The study summarised the key findings from the interview data set (including both architects and group members) and displayed the core categories in the framework. 'Sharing' was identified as a common category which could contribute to both environmental, social and economic sustainability. The 18 categories distributed in the environmental, social and economic aspects are shown below in Figure 10-4.

Table 10-1. Key findings related to environmental, social and economic aspects of sustainability

| Dimensions of Sustainability | Main Categories of Findings (18) |
|---|---|
| Environmental sustainability | • Energy (energy saving, source of energy, renewable energy).<br>• Design/ sustainable standards, building regulations.<br>• Sharing.<br>• Heating system.<br>• Insulation and ventilation.<br>• Water system (drinking water, grey water, rainwater).<br>• Number or size of properties.<br>• Building types (new build development).<br>• Environmental technologies.<br>• Food supply.<br>• Historical site/ listed building.<br>• Transport. |
| Social sustainability | • Sharing.<br>• Group vision and aims.<br>• Group awareness and problem solving.<br>• Multi-generational living.<br>• Mutual supports.<br>• Work relationships in community. |
| Economic sustainability | • Sharing.<br>• Cost efficiency. |

The content analysis (coding process and key-concept correlation pattern comparison) identified the categories related to ‘Energy’ (e.g. energy saving techniques, energy source, renewable energy), ‘Sharing’, and ‘Heating’ as influential categories which significantly impacted the community’s environmentally sustainable living. These three categories also worked in harmony; the strongest connection (the biggest contributor

to environmentally sustainable living) was found between energy and heating system within the resident group.

Regarding social sustainability, the study found that residents paid more attention to the social aspects of community living compared to the architect group. Some residents pointed out that a sustainable vision formed part of their group identity since the initial stage. They highlighted that being sustainable was not always about the building and physical environment, it was also about group awareness and ways of people dealing with problems and conflicts, the continuity of sustainable concepts to the next generation, and the relationship to nature.

For economic sustainability, the study found that close attention has been paid mainly to cost efficiency. The cost efficiency category refers to the initial cost and cost in use. Specifically, they mainly represent the cost of land purchase, living costs for each household and the maintenance of the community. Both architects and residents identified that sharing could contribute to cost efficiency and reduce living costs in many ways, including sharing journeys to the supermarket and common meals. The study also found that living costs were largely affected by heating and insulation (categories 4 and 5). Having an efficient heating system (e.g. an MVHR system) and using better insulation techniques (e.g. double/ triple glazing) enabled residents to substantially reduce gas or electricity bills. In addition, this research found that the sustainable contribution of social factors (e.g. work relationships in the community and group problem solving) did not attract enough attention from architects during the design stage. Apart from the aspects of community sharing, few common ideas could be found between architects and residents regarding social sustainability. Therefore, the social needs of residents may not be addressed and fully supported through the

cohousing design. This study suggests that social factors should be more fully taken into account when designing the sustainable features of a cohousing community.

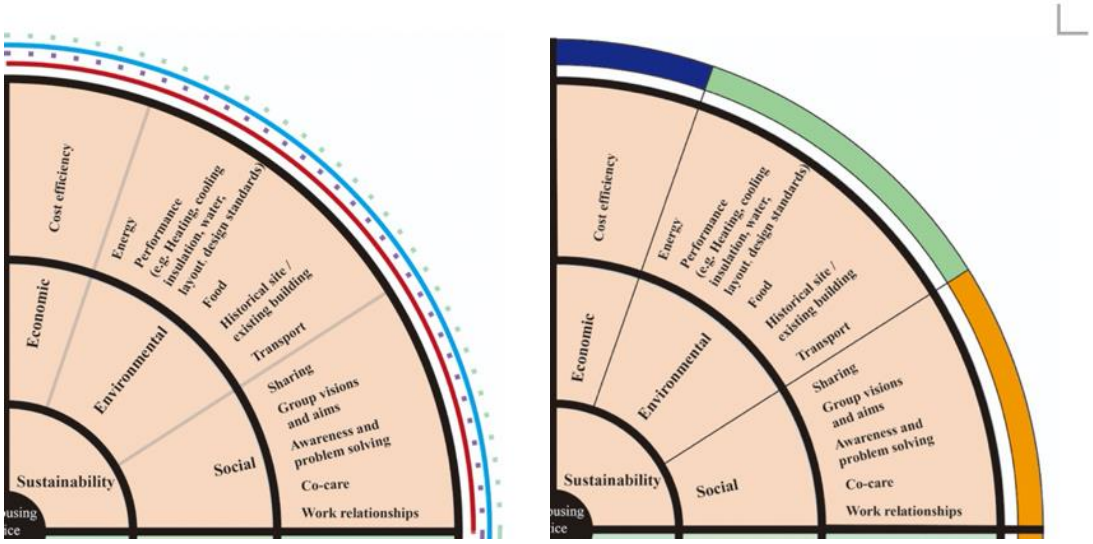



Figure 10-4. Framework theme 2

### 10.2.3 Theme 3: Social Environment

The analysis of the social environment of the cohousing communities consisted of two parts: social proximity (Chapter 7); and attitude and practice change (Chapter 8). Accordingly, exploration of the social environment involved multiple dimensions: the relationships between people and their living environment; individuals within group dynamics; as well as the interactions between group members. At the same time, practices conducted in different developmental stages were also considered. Social patterns and interactions were captured from the planning stage to real community living. Because of the unique procedure of community development and management, this theme identified the social principles of real life in a cohousing and explored what factors created group cohesiveness and kept the group going forwards, by summarising the findings of interviews and observations (Figure 10-5).

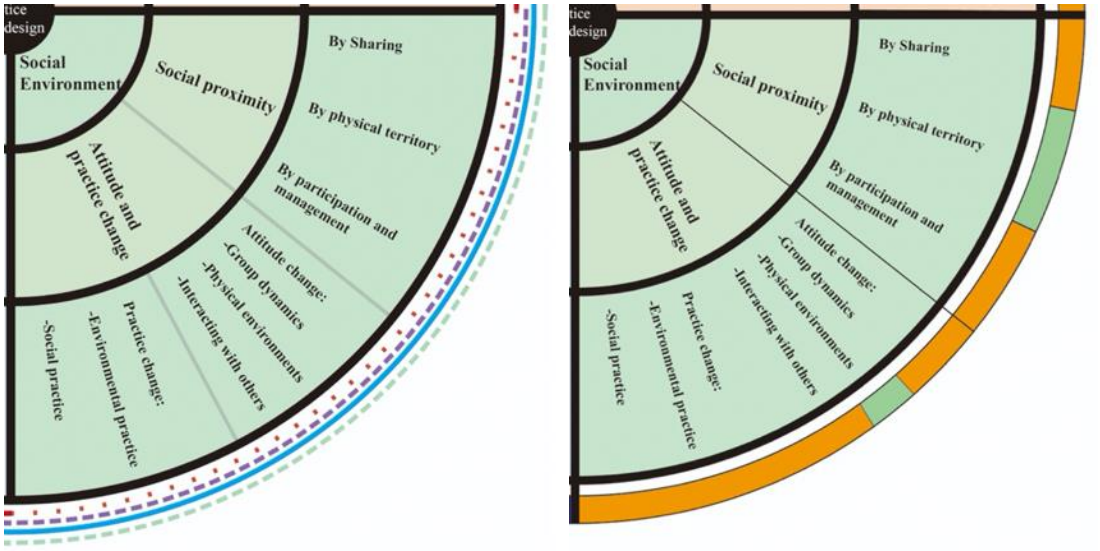



Figure 10-5. Framework theme 3

*10.2.3.1 Social Proximity*

Within the social proximity Chapter (Chapter 7), the term 'social proximity' was defined as the tendency for individuals to form interpersonal relations and contacts with those who are close by (Hall, 1966). However, there is an interesting debate regarding social proximity. This study argues that social proximity in cohousing communities is about knowing yourself, knowing the group and knowing the environment. This theme started with an explanation of the different types and reasons of sharing behaviour, followed by an analysis of how group members' social proximity was influenced by physical territories. Finally, the characteristics of group participation were discussed.

The research found that in a cohousing community, sharing could be achieved in both tangible and intangible ways (e.g. sharing tools and ideas). It also involved formal and informal manners (e.g. car club and sharing common garden). Sharing brings people together, and can contribute to environmental, social and economic sustainability. Meanwhile, the degree of sharing challenged the boundary of ownership, and can become a crucial criterion to measure social proximity and distance in a cohousing context. This research argues that the cohousing model enhances and enriches the

sharing culture, while acknowledging that the forms of sharing may challenge privacy and ownership. However, residents strongly expressed the point that personal privacy was extremely important for them, so they preferred a cohousing living model with a mixture of private dwellings and common facilities instead of fully communal living. There are many purposes encouraging group members to share in a community. The study showed that many group members participated in sharing for companionship and mutual support, whilst some people in a cohousing focused on the financial benefits (e.g. lower living costs through shared advanced technologies) rather than environmental concerns or social caring. Some people expressed that sharing allowed for the effective use of resources, thus placing less pressure on the environment.

Referring to the influences of the built environment to group social proximity, the data gathered from the case studies regarding social and physical proximity showed the correlation to the boundary of the following community areas: private area (private dwellings); semi-private areas; shared community areas; and areas shared with the wider neighbourhood. The following physical features (Table 10-2) of the corresponding community areas are highlighted as influential aspects which could greatly affect group members' social proximity.

Table 10-2. Influential physical features of social proximity

| **Space types** | **Features** |
|---|---|
| Private area | ▪ The size of a private dwelling.<br>▪ Having front door to protect privacy, also using common area as an extension of private dwellings.<br>▪ The distance from private unit to common house. |
| Semi-private area | ▪ The semi-private area as an exchange/ transit zone.<br>▪ The semi-private area as a staying zone.<br>▪ Soft and hard semi-private area(s). |

| | |
|---|---|
| Shard community area | ▪ Size and scale.<br>▪ Location and distance.<br>▪ Balance and amenity. |

Finally, the research identified six encouraging social features from group members' participations in the community living. They included: group participation and involvement; needs and support; food issues; concerns and attitudes to problem solving; community governance; and ownership. The discussion of group participation included where people met, how group members used the common spaces, how to organise things in the community and how to encourage people to complete group work in the community. The needs and supports were emphasised in pairs by the participants, and also highlighted that the satisfaction of individual was the basis of meeting group needs. Other attention was paid to the arrangement of common meals. The considerations of various cohousing groups towards the common meal were focused on whether the group should prepare vegetarian food all the time for the common meal and whether communities should adopt purely voluntary mechanisms to arrange the common meal. When problems emerged, the problem-solving attitudes of group members largely affected social proximity by changing how people felt and reacted.

#### *10.2.3.2 Attitude and Practice Changes*

The second half of description for evaluating cohousing's social environment concerned group members' attitudes and practice changes. This part aims to reveal the ideological and behavioural changes after joining a cohousing group, and at the same time, discover the correlations between group members' attitudes and daily practices (e.g. environmental and social practices). The attitude and practice changes were jointly analysed. The attitude changes of group members were identified in the following aspects: individuals within group dynamics; individuals interacting with

physical infrastructure; and individuals interacting with individuals. Subsequently, the corresponding socio-practical changes were highlighted due to the changed attitudes.

Within the domain of 'attitude change', the commonly agreed idea was that the group members treated social tensions, disappointment, different personalities and community acceptance in a positive and softer manner. Specifically, group members' attitudes changed from 'ignoring social tensions, feeling disappointed and angry, and avoiding difficult people' to 'treating social tensions as part of social experience'. They came to acknowledge and respect the differences between people and tried to solve problems as a team. At the same time, defining the balance between individual and community needs was another example of attitude change. Comparing with pre-residents' group, the interview results showed that current residents were more aware of the importance of satisfaction of personal needs. Some of the residents believed that the fulfilment of personal needs was a prerequisite for the achievement of group needs.

The attitude change of group members was also related to their understandings of the community-built environment and sustainable practice. The first feature of this type of change was people treating the common spaces in the community as an extension of their home space. This provided a new identity to the common spaces – community centre and extension of homes – and created a strong sense of attachment and belonging. At the same time, another type of attitude changes relevant to the community-built environment was the increased awareness of sustainable environmental practice. In other words, group members noticed that the 'action barriers' has been reduced under the influence of the entire group and accordingly felt it 'easier' to take a step forward towards environmental sustainable practice, because this 'can do' attitude could affect "how hard people are willing to try, and how much of an effort they are planning to exert" (Ajzen, 1991, p.181). Finally, the last significant feature of

attitude change was focused on ‘sharing replaces buying’. Based on the sharing culture of the cohousing model, people have dramatically increased opportunities to consider ‘sharing’ in a daily basis compared with living in other residential models. One of the impacts of this sharing concept was to reduce consumption and its impact on the built environment.

When discussing the attitude change of interacting with others, an interesting phenomenon was reported as ‘being supportive and enjoy helping others’. Group members emphasised that they were happy just being supportive and doing simple things for other people, especially the older residents, as they were willing to help. As a very important feature of attitude change, group members felt valued, cheerful, motivated and engaged with the entire group through both care giving and care receiving.

As philosophies change and adapt, behavioural changes can subsequently be expected. The interviews and observations results showed that the primary practical changes were manifested in the environmental (e.g. energy-related practices, landscape and food-related practices, usage of transport, and shopping habits) and social (being supportive, making decisions, eating habits, self-fulfilment, and group-fulfilment) domains. Based on the data analysis, the practice changes can be grouped into four levels:

- New practice: practice that never happened before/ rarely happens until moving into a cohousing community.
- Changing the frequency/ extent of doing something (doing more or less);
- Changing the way of doing something (e.g. doing things with others); and
- Stopping doing something after joining the group.

For the environmental practices, this study found that most of the practical changes occurred at the level of ‘changing the frequencies/ extent of doing something (doing more for less)’. In other words, rather than inspiring many ‘new’ practices and environmental-related actions to happen, the cohousing approach potentially promotes sustainability by changing the frequency, extent (behaviour intensity) or collaboration-manners of existing environmental-related practices. Specifically, compared with the previous living experience, group members reported that they were using **fewer** private cars, and that private cars were replaced by using **more** bikes and public transport more often. They also spent **more** time (or doing **more often**) sharing and maintaining common facilities, doing gardening and having vegetarian food in the community. Additionally, the study found that only two practices were considered as ‘never or rarely happen before’. They were ‘co-designing low carbon homes for future living’ and ‘growing food in the community’.

Differing from environmental practices, however, the study found that most of the socio-practical changes happened in the ‘new practice’ level (new practice: never or rarely happen before). In other words, the community environment enhanced several new social practices to occur. Due to changes to social and residential environments in cohousing communities, group members started taking on different and new tasks (sharing, living closely with non-family members) with new behaviours. At the same time, they also made group decisions and reconsidered the individual needs and the relationships between individual and the entire group. Therefore, this study found that ‘frequently doing simple things for other people’ and ‘becoming less selfish and less self-centred’ were the widely agreed and the most immediate socio-practical changes of group members.

### 10.2.4 Theme 4: Cohousing Design

The cohousing design can be understood as part of the group identity and community image. The design strategies can also represent the group responses to current environmental problems, global sustainable concepts and their social foci. The term 'cohousing design' represented in this theme is mainly concerned with the design of community physical infrastructures, such as spaces, facilities, distance and locations. In cohousing communities, social infrastructures are shaped by the physical environment. This theme presented in the framework contained two parts: design principles (basic design guidelines and considerations for the cohousing design); and design elements (details and evaluations for design components or elements, such as the common house). These design elements were informed by the design principles. Due to the collaborative design process of cohousing communities, the data was collected from both architects and group members through interviews (Figure 10-6).

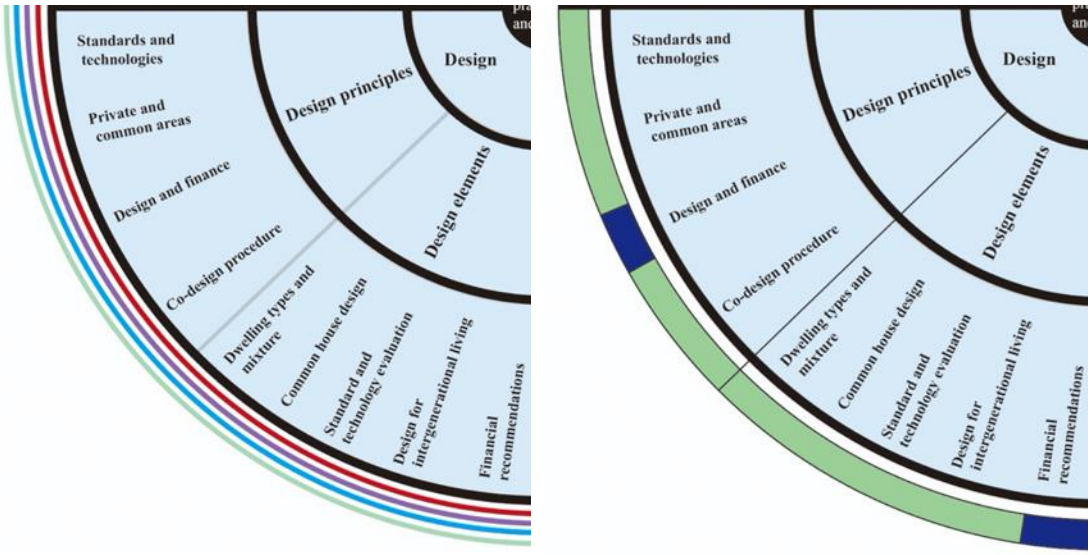



Figure 10-6. Framework theme 4

#### *10.2.4.1 Design Principles*

Within the design principles section, from both the architects and group members' perspectives, attention has been paid to the following aspects: design standards; community scale design; and co-design procedure.

- The selection of design standards

During the interviews, PH (standard in energy efficient construction), LH (sixteen design criteria intended to make homes more easily adaptable for lifetime use), and CSH (environmental assessment method) were preferentially considered by cohousing groups and applied to the cohousing design procedure. In addition, the AECB's silver performance standard, SBD and DDA act were also mentioned and applied to some of the selected cases. Furthermore, some local sustainable design strategies were considered by some cohousing groups, such as the 'Supplementary Planning Document and Practice Guide - Policy CS64' (climate change, resources and sustainable design of developments) conducted by Sheffield local council.

- Community scale design

Community scale design describes a larger design vision for the whole community and manages community design tasks as a whole. It may include community layout, space usage plan, maintenance cost, food and transport, and community energy use. The interview results showed that the design purpose was a very important design principle as highlighted by two architects. They described that understanding the design purpose and the living purposes of cohousing groups was the first and most important step of conducting their design. The study confirmed that, from the architects' perspective, the main design (physical design) purpose for the cohousing model was to promote the social interaction and engagement, which echoes with the findings of the 'group motivation' Chapter (Chapter 5) that social purposes are the dominant reason for people to join a cohousing community.

Space usage strategy was another focus of the community-scale design. The spatial design varies greatly due to the different field conditions of the respective communities.

Most of the selected cohousing cases in this study started the cohousing design with a focus on the private dwellings. The architect co-designed with group members to primarily discuss the location of the private housing blocks, the floor area and the types of units (e.g. 2-bed, 3-bed), and then designed the common area according to the group's future living scene and priorities.

Design for a special audience was a very unique point raised by an architect. The 'special audience' in this study meant that the architects designed the cohousing community for themselves and their family. This design procedure at the community level directly influenced the decision-making and construction process. Further, it was indirectly linked to the material infrastructure of the cohousing design. The design experience of architects can be very different when working with family members and very close friends. This design process is a double-edged sword with both advantages and disadvantages. The study found that strong familiarity with family members and friends, could make consensus decision-making with collective knowledge easier and quicker. However, in consequence, non-family members may face a biased view, or not possess the same voice as family members. Additionally, it is sometimes difficult for architects to maintain a professional distance.

- Co-design design procedure

The co-design process discussed in this section mainly concentrated on residents-architects collaboration. The design process can be completely different for each community. Generally, when the site selection is completed, group members (group founder members or design team members) started to design their future community by describing the common needs, priorities, principles, facilities, design standards, space usage plan and privacy concerns in the design brief document. It is worth mentioning that the choices of design principles and standards is led and determined by the residents rather than by the professions. This design approach is very rare in

residential design. The design brief document completed by group members played a significant role especially at the beginning stage. The existence of this document greatly improved efficiency in terms of communication between group members and architects. The architects could proceed smoothly based on this brief document and group budget.

Next, the most common procedure started by subdividing the entire site into different parts, in order to determine the location and floor area of the private and common facilities. The architect typically provided the initial layout drawings of the whole area to the group. Through long discussions and several revisions, a final planning proposal was agreed by the group members and the architect for the planning application (building/ planning permission). The acquisition of building permission heralded the end of the design stage and the start of construction. Accordingly, this study argues that the cohousing design of a cohousing was not an easy procedure. The complexity of the process became a drain on the time and energy of the group members. Therefore, it is significant to emphasise the importance of the design brief document, which could improve the efficiency of the overall design process.

#### *10.2.4.2 Design Elements*

This section aims to identify characteristics of certain design principles from both architects and residents' perspectives, and highlight the unique living requirements and considerations for different cohousing audiences (e.g. older residents and children) to foster intergenerational living. The unique financial recommendations are also provided at the end of this section. The design details are focused on the following aspects: dwelling types and mixture of units; the design of common house; the analysis of design standards and technologies; intergenerational living requirements; and financial recommendations.

- Dwelling Types and Mixture of Units

Many architects had experience to simplify the dwelling types for group members, developers or planning authorities. Simplified dwelling types is a design feature of cohousing neighbourhood. During the site observations and the participative experience of cohousing design group meetings, the most favoured dwelling types were: 1-bedroom, 2-bedroom, 3-bedroom and 4-bedroom houses/ flats. Not very common, five-bedroom models were available at some large cohousing communities.

In addition, some group members reported that the flats and houses should be mixed carefully to benefit residents rather than grouped together on the site. The group members highlighted the following criteria for the mixture of private dwellings:

- The dwelling mix should promote a broad age range across the site groups (older families with teenage children, students, young adults and older adults of retirement age);
- A mix of house sizes to be provided to suit current membership and to facilitate a continued intergenerational mix of community;
- House/ flat orientations; and accessibility to the common house (K1 Cohousing client briefing study, 2014).

These criteria showed that the group members aimed to encourage future social interactions and to promote diversity of various age groups for the long term by mixing different types of units.

- Common house design

The aim of this section is to discuss what design principles and elements were considered when designing a common house. In addition, this study aimed to identify some elements which were retained as either essential or high priority for inclusion, especially when the group budget was very limited.

The study found that the ‘functional partitioning’ and priority ranking methods were used in the selection of design elements in the common house. ‘Functional partitioning’ means that the group firstly defines the main functions of the spaces in the common house, such as the eating and meeting area, before subsequently identifying the design elements in each area. The priority ranking method means that the group ranks all the design elements (e.g. the kitchen unit) in the common house based on the degree of demand. The architects could then design and arrange these elements using the ranking. K1 Cambridge cohousing employed this approach, and the group provided a 6-Likert scale (1 - essential, 1.5 - very, very important, 2 - very important, 2.5 - important, 3 - nice to have, 4 - don’t care if we have this or not) to measure the importance level of certain items. This approach also provided a basis for architects to make decisions, especially when the faced with limited design funding.

Combining the findings of interviews and the secondary data analysis, the kitchen units, sitting area (informal siting and seating arrangement, dining area), workplace (office or workshop) and laundry can be seen as the top priority elements for all cohousing communities who participated in this study. The post area, children’s play area, storage, guest rooms and flexible function rooms also have high expectations and demands. The entertainment facilities were shown as optional elements in the common house, including the TV room, music room, art studio and library.

- The evaluation of design standards and advanced technologies

During the interviews and secondary data analysis, LH and PH were seen as the most popular design standards, as they were considered by almost all of the selected communities. They targeted the energy performance level and adaptability of the cohousing communities. Besides, improving community security level through a design standard was a new perspective for cohousing design. The standard SBD was a useful approach. However, it was only mentioned once in the secondary data material.

Information regarding the design and financial challenges of applying this standard in a cohousing was very limited. As such, this study found that there was no unified or simplified approach of choosing design standards as this all depended on the conditions of the site and the financial capacity of the group in question.

The advanced technologies identified in this study spanned a broad range of fields, including construction and materials, renewable energy, building performance and water system. They included: straw-bale construction with timber frame; biomass boiler; MVHR; solar PV; solar water heating; district heating system, and composting toilet.

This study found that all of technologies listed above could contribute to a certain level to environmental sustainability, especially for space heating. MVHR and solar PV were the most popular technologies that were considered and applied many times by cohousing groups. These two technologies were both related to energy and building performance. That groups paid special attention to these advanced environmental technologies also served to highlight the importance of energy technologies in contributing to low impact living and a healthy lifestyle. Additionally, most of the technologies above have the potential to reduce living costs both in the short and long term. Even though some technologies required substantial investment to install (e.g. solar PV), it must be noted that the future savings are considerable.

- Design for Intergenerational Cohousing

Intergenerational cohousing is one of the cohousing types in the UK. The reason why this study focused on the design of intergenerational communities is that, during the observations, many people were willing to choose mixed-age communities to live in, but the living needs of various generations are not fully reflected and addressed in the cohousing design. Due to the fact that all selected cases in this study were

intergenerational cohousing communities, accommodating the living needs of various age groups has become extremely important for cohousing design.

The study took Five Rivers Cohousing project as an example and analysed the design principles and elements considered during the planning stage. The study argues that the adaptability and accessibility considerations for different age groups should be applied into both communal and private areas in the community rather than just for the private area. The design principles considered by the group fall into the following three categories (Five Rivers Cohousing workbook, 2019):

1) Groups with specific design requirements: older people, various family types (e.g. couple no children, single-parent family, disabled people in the family, family has children with different ages) and young people (teenagers, young kids).
2) Housing types: adaptable houses and purpose-built houses.
3) Areas to consider (both communal and private areas): Bedroom and communal spaces, bathroom, kitchen and accessibility measure for people with mobility difficulties (e.g. wheelchair and walking frame users).

Guided by these principles, this study found that there are different design priorities for various age groups when selecting the design elements. For example, when designing spaces for families with young children, it focused on adaptable areas that promoted privacy and social interaction with the family through the use of open layout kitchens, kitchen islands with stools, and sufficient room with non-slippery surfaces. When designing spaces for older residents, health and safety became the priority. Architects considered wider and less steep staircases with handrails, walk-in showers with a built-in seat, non-slip surfaces, wheelchair ramps, suitable heights of kitchen equipment, door levers instead of doorknobs, and disabled toilet in the common house. In order to increase the flexibility of the living space to cope with changes in family circumstances,

open plan spatial layout, flexible walls, sliding doors and multifunctional furniture were also considered. These design elements should also be applied to common spaces, such as the common house, community workshop and outdoor paths.

- Financial recommendations

The financial recommendations came from the architects' real design experience with group members, and have been emphasised by the architects themselves during the interviews. These recommendations aimed to reduce the financial costs (initial cost) in many ways. Primarily, an architect reported that simplifying dwelling types and collaborating with builders can be a very practical approach to reduce the initial design costs. Simplifying the housing types not only makes the purchase of building materials easier and more efficient (units with the same dwelling type can use the same construction components and materials), it also reduces engineering and assembly difficulties for builders. Avoiding very expensive housing design and bulk purchasing was a very smart strategy. The savings from the purchase discount can be used in other aspects of the cohousing design. This also increased the capital value of the investment for the group members. Further, spending wisely on design was a very unique idea. This is also relevant to the group members' future savings and the reduction of living costs. So how can the design funds be spent to maximise its value? The architects may a have different focus on design depending on the group members' needs. However, a very interesting design 'logic' should be highlighted, which is about reversal of thinking and active and passive energy conservation. For example, if a complicated heating system is not affordable for the group members or not suitable for the site, instead, architects would consider minimising heat loss by installing alternative technologies, such as MVHR or triple-glazing windows.

## 10.3 Instructions for Stakeholder Groups

This section aims to provide application instructions for potential framework stakeholders, and to assist them to apply this framework in an efficient, practical and reasonable way. The stakeholders' relations to each theme are identified based on their relevance to the cohousing model, job specifications or living needs. The stakeholder groups are defined by the data collection process – apart from the cohousing residents and architects participated in this study, other stakeholder groups were identified by research participants or the secondary data documents provided by the community. Such stakeholder groups include:

- Practice-related group: architects and planners;
- Policy-related group: policy makers, city councils and planning authorities;
- Users: current residents and future groups; and
- Housing providers: developers, housing associations, care homes and social housing.

Based on the core themes of the framework, this study also produced Table 10-3 which presents a hierarchical application strategy for stakeholders. The strategy proposed by this research should be considered by stakeholders to build awareness and to take further action in the future. The stars in the following table represent the attention order in the actual practice (three stars – top priority). Additionally, this study also proposes that the theme related to one star should not be ignored. The instructions for each stakeholder group will be explained based on Table 10-3.

Table 10-3. Framework application analysis for the stakeholder

| Study Proposed | | | | | |
|---|---|---|---|---|---|
| **Themes** | **Items** | **Practice-related group** | **Policy-related group** | **Residents** | **Housing providers** |
| **Motivation** | Social aspects | ** | *** | *** | *** |
| | Environmental aspects | ** | *** | *** | *** |
| | Financial aspects | ** | *** | *** | *** |
| | Family aspects | ** | *** | *** | *** |
| | Health | ** | *** | *** | *** |
| | Site location | ** | *** | *** | *** |
| | Special customer group (older people) | *** | *** | *** | *** |
| **Sustainability** | Environmental sustainability | *** | ** | *** | ** |
| | Social sustainability | *** | ** | *** | ** |
| | Economic sustainability | *** | ** | *** | ** |
| **Social environment** | Social proximity | ** | * | *** | * |
| | Attitude and practice change | ** | * | *** | * |
| **Design** | Design principles | *** | *** | *** | *** |
| | Design elements | *** | *** | *** | *** |

### 10.3.1 Practice-related Group

The targeted stakeholders within the practice-related group are architects and planners. The red line (grey scale 1) in the framework represents this group. Based on the job specifications of architects and planners, this study suggests that the practice-related group could first start with cohousing design and sustainability, and also pay special attention to the largest customer group, older people. The research findings of these themes are directly associated with the built environment and physical infrastructures of the community. Moreover, older residents have special living requirements (e.g. on mobility and accessibility aspects) where the community physical environment is concerned. To this end, the proposed framework provides architects and planners with the tools to help them design the physical environment with the residents. Next, it is also relevant for the practice-related group to consider group motivations and community social patterns during the planning stage. This is because understanding the motivations of the group is critical for delivering pertinent cohousing design, and the social patterns and interactions are largely shaped by the physical infrastructure.

### 10.3.2 Policy-related Group

The policy-related group includes policy makers, city councils, and planning authorities. The purple line (grey scale 2) in the framework represents this group. The proposed framework helps the policy-related group to understand why cohousing scheme appeals to the public and also highlighted the design considerations and political obstacles faced by cohousing groups during the planning stages. This study proposes that the policy-related group could firstly concentrate on the information of group motivations and cohousing design because these two themes are the relevant ones to the policy making in housing. Additionally, it is fundamental to explaining the focus of planning permissions, people's housing decisions and preferences. Policy makers should also fully take into consideration the sustainable aspects (environmental, social and economic sustainability) and the community social environment. In particular, this study found that social interactions are the core and the most unique feature of a cohousing community, albeit that it has been overlooked by practitioners and policy makers because of the intangible form of social interactions, diverse community types and age groups.

### 10.3.3 Users

The users of a cohousing community are its current and future residents. The proposed framework shows more design possibilities and financial suggestions to the cohousing residents. Furthermore, the framework provides a clear vision for the cohousing group members to understand the social patterns and group dynamics in cohousing communities. Moreover, residents could benefit from the insights and tools of sustainability provided in the framework. The blue line (grey scale 3) in the framework represents this group. The resident group plays a dominant role in all stages of the development process, and they are also the project investors and administrators in the vast majority of UK cohousing projects. Therefore, this study proposes that this user group should pay attention to all of the themes listed in the framework and apply it

flexibly, dependent on site conditions, users' needs, priorities, interests and financial capabilities.

### 10.3.4 Housing Providers

The housing providers refer to the housing developers, housing associations, care homes and social housing providers. The housing providers could benefit from the proposed framework by understanding the motivations of people joining cohousing communities, their design considerations and difficulties. The framework can be used as design resources to support future collaborative housing design and promotion. The green line (grey scale 4) in the framework represents this group. Although the focus of these housing providers can be different, what they have in common is providing shelter for people with different needs. This study aims to provide instructions to this group by reflecting on this point. As such, this study suggests that knowing the motivations of people's housing decisions and the design of the community-led housing should be the priority of this group because these themes show which types of housing are in a high demand, why people choose to join, and how people's needs are met through design. For the next step, this group should also consider the environmentally sustainable values of the housing, as well as social and economic sustainability. More importantly, this study also aims to highlight the importance of the social environment, which has not been given enough attention by housing providers. The social environment will determine how spaces are designed and used, and it is an important foundation for all of the aspects that are developed in a cohousing.

To summarise, the cohousing framework is mainly presented with two parts of information: four core themes (motivation, sustainability, social environment and design aspects); and two sets of colours codes (stakeholders and sustainability). Through various colour codes, stakeholders are guided to use this framework with different foci and priorities, and efficiently search the content related to different

aspects of sustainability. In the following section, the recommendations will be provided for policy making and practice purposes. The proposed framework aims to enable stakeholders to achieve these recommendations.

## 10.4 Recommendations for Policy and Practice

This section provides recommendations for future policy making and community-related practices in accordance with the overall findings of this cohousing research. Specifically, the recommendations are based on research participants' (architects and group members) feedback about current living conditions, group collaborative experience, and the planning process of a cohousing. The recommendations took full account of the framework's core themes and also considered different priorities for making policy (government level – top down) and conducting practice (architects, design professionals and residents – bottom up). The recommendations are shown in the Table 10-4.

Table 10-4. Recommendations for policy and practice

| **Themes** | **Recommendations for policy and practice** |
|---|---|
| Motivation | ■ Assess the public's housing demand for community-led housing.<br>■ Assess and reduce the barriers to people joining a cohousing.<br>■ Standardise and promote the cohousing model as a living alternative in the housing market.<br>■ Promote cohousing model by the government and organisations and increase public acceptance of cohousing community living.<br>■ Provide financial support (loans and government funding) for young people and families to access cohousing.<br>■ Increase flexibilities and financial convenience for older people to access cohousing. |
| Sustainability | ■ Emphasise the balance among environmental, social and economic sustainability in a cohousing model.<br>■ Promote energy saving plans (in particular, reduce space heating demands) and a green lifestyle.<br>■ Provide guidelines and approaches for adopting design standards, building regulations, construction techniques and advanced technologies at the planning stage.<br>■ Produce a cost- efficiency strategy for cohousing groups.<br>■ Promote recycling, car sharing and increase access to public transportation. |

| | |
|---|---|
| | ■ Promote food growing in the community.<br>■ Encourage the use of renewable energy.<br>■ Advocate for a combination of active and passive energy saving plans.<br>■ Identify the financial benefits, possibilities and limitations to enhance economic sustainability.<br>■ Consider Passivhaus, Code for Sustainable Homes (CSH) and AECB design standards for improving building performance and energy efficiency. |
| Social environment | ■ Address social needs in the cohousing design procedure.<br>■ Emphasise the significance of mutual support and intergenerational living for physical and mental health for all members.<br>■ Encourage community participation and engagement while protecting privacy.<br>■ Stress that social activities are shaped by the physical infrastructure.<br>■ Physical environment should be designed to foster social activities, for example, placing the common house centrally in the community. Private space should be protected.<br>■ Activate the 'edge area' in the community to create opportunities for social interactions.<br>■ Adopt a voluntary system for all community work (no pressure on group members).<br>■ Consider the 'give and take' balance of all group members.<br>■ Consider the 'private-public' life balance of all group members. |
| Cohousing Design | ■ Provide information and platforms for better collaborations between professionals and group members.<br>■ Provide information on design principles and elements to guide future cohousing design.<br>■ Emphasise the particularity of the cohousing design process and highlight the importance of residents' participation in community planning.<br>■ Group members should provide a detailed 'design brief' before the architect joins the project, as this could improve the effectiveness of communications and reduce time for group decision making.<br>■ Consider the following design elements in the planning stage:<br>- location of common facilities and private dwellings;<br>- facilities in the common house;<br>- mixture of private dwellings;<br>- design standards (e.g. Passivhaus, CSH, Lifetime Homes);<br>- advanced technologies (e.g. solar PV, MVHR);<br>- adaptability, accessibility and flexibility of the community space<br>(both common and private areas) to meet multiple needs. |

## 10.5 Transferability

Transferability refers to the degree to which the results of qualitative research can be transferred to other contexts with other respondents – it is the interpretive equivalent of generalisability (Anney, 2014; Bitsch, 2005; Tobin & Begley, 2004). In this research, transferability indicates that the findings of study (the cohousing development framework) can be transferred to other residential settings with their users, such as various types of community-led housing, social housing and care homes. Transferability can be examined through thick description and purposeful sampling (Bitsch, 2005). The thick descriptions allow other researchers to replicate the study with similar conditions in other settings and carry out a "comparison of this context to other possible contexts to which transfer might be contemplated" (Anney, 2014, p.278; see also, Guba, 1981, p.86). The use of purposeful sampling means that the researcher should select the most representative informants who can provide greater in-depth information for the research (Cohen, Manion & Morrison, 2011). This will help other researchers to better define and understand the current research and its resilience of transferability.

Evaluated by these two criteria, this research meets the criteria with rich description towards the group motivations, community sustainability, social environment and cohousing design. Further, the research participants (cohousing residents and architects) were carefully selected to explain community living and their design concepts. As explained in Chapter 3 (Methodology Chapter), the architects and residents were the most suitable and accessible participant groups to answer the research question. In addition, I argue that the findings of this study (four core themes) can be fully/ partially adopted by other types of community-led housing (e.g. housing co-op, community land trusts) because they evidenced similar development processes, ownership models, or living patterns through sharing like cohousing. Furthermore, the final findings of the research, particularly the information explained in theme 3 (social environment) and 4 (cohousing design), can be used in older-people orientated

residential settings (e.g. retirement village, care home, home share system) because older people accounted for the largest customer group for cohousing in the UK, their physical and mental needs, and the relevant design standard are fully considered in this study. This information can guide the design of other living arrangements for older people. Moreover, the results of this study (theme 2- sustainability) can be transferred to guide the design of sustainable housing or communities (low/ zero carbon housing, eco-housing) because all categories and sub-categories of sustainability (environmental, social and economic) were fully addressed and analysed to promote a sustainable community with energy efficiency concepts. The approaches provided by this theme can benefit other eco developments to achieve greater levels of sustainability in the future.

## 10.6 Conclusion

To conclude, this chapter summarised the overall research findings and produced a framework for the future design and practices of cohousing communities. The framework consisted of four core themes: motivation; sustainability; social environment; and cohousing design. The framework contained three levels of information and two sets of colour codes. The colour codes and line types indicated the different stakeholder groups, their application priorities of the framework, and each section's content composition towards sustainability (environmental, social and economic sustainability). Next, the instructions of four stakeholder groups were provided, which proposed an information hierarchy to guide future applications for various stakeholders based on the degree of correlations to the cohousing model and stakeholders' job specifications. Furthermore, the recommendations were conducted for policy making and practice purposes in accordance with the research participants' (architects and group members) feedback of current living conditions, group collaborations and the planning procedure. Finally, the study argued that the results (framework) is

transferable to other contexts with other types of respondents. The research findings can be fully/ partially adopted by other types of community-led housing (e.g. Housing co-op, community land trusts), and older-people orientated residential settings (e.g. retirement village, care home, home share system) and guide the design of sustainable housing or communities (low/ zero carbon housing, eco-housing) in the future.

# Chapter 11 : CONCLUSION AND DISCUSSION

## 11.1 Introduction

This chapter reviews the research procedure and discussed the main findings. It briefly revisits the research aims, objectives and methods, and highlights this study's contribution to knowledge and future research. This chapter is structured into five sections. Firstly, it reintroduces the aims and objectives of this study. Secondly, it sums up the research methods by reflecting on the objectives. Thirdly, it summarises the main research findings and provides deeper discussions for this study. Next, this chapter clarifies the theoretical and practical contributions to knowledge. Finally, the areas of future research are explained at the end of the chapter.

## 11.2 The Study Aims and Objectives

The aim of this thesis was to investigate the ways in which cohousing can provide a lifelong housing option and intergenerational community, one that leads to balanced social engagement and low environmental impact. To achieve this, the research examined the contribution of the UK cohousing model in creating sustainable communities and meaningful social interactions. To solve the research problem identified through extensive literature and desktop review of UK cohousing models in Chapter 2, this study developed a framework especially for the environmental, social and design provision of cohousing in the UK. The framework was produced through engaging with cohousing architects and residents to support future sustainable development and ~~neighbourhood~~ cohousing design. The research aim was achieved through six objectives. They are enumerated as follows:

**Objective 1：** To establish how cohousing can contribute to an environmentally friendly sustainable living environment.

**Objective 2：** To identify the main attributes, characteristics and manifestations of cohousing in the UK.

**Objective 3：** To explore the motivations of cohousing members to entre or create a cohousing group.

**Objective 4：** To establish how cohousing design contributes to a sense of community and may lead to social cohesion and behavioural change.

**Objective 5：** To explore the principles, considerations, and elements of cohousing design.

**Objective 6：** To establish how to support economic sustainability in a cohousing environment.

## 11.3 Objectives and Selected Methods

The research objectives and methods were developed and aligned with research questions and sub-questions. This study was designed to achieve the first objective in the research phase1 - exploratory study. The second research phase (in-depth case studies) achieved all the remaining research objectives. The research process is explained by the following Figure 11-1.

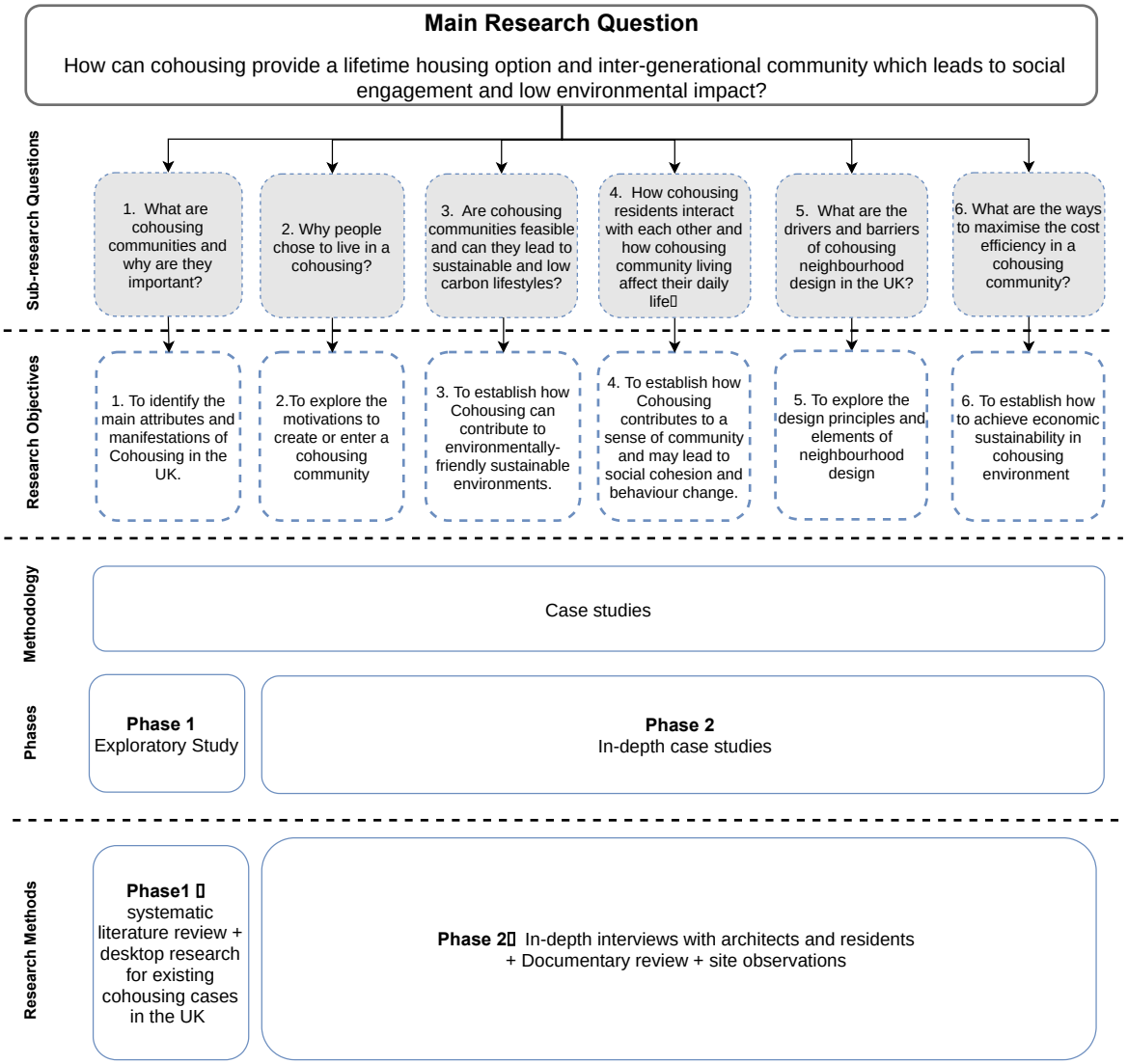



Figure 11-1. Research questions, objectives, and methods

Accordingly, the thesis chapters were organised to respond each objective and discuss the research findings (Figure 11-2).

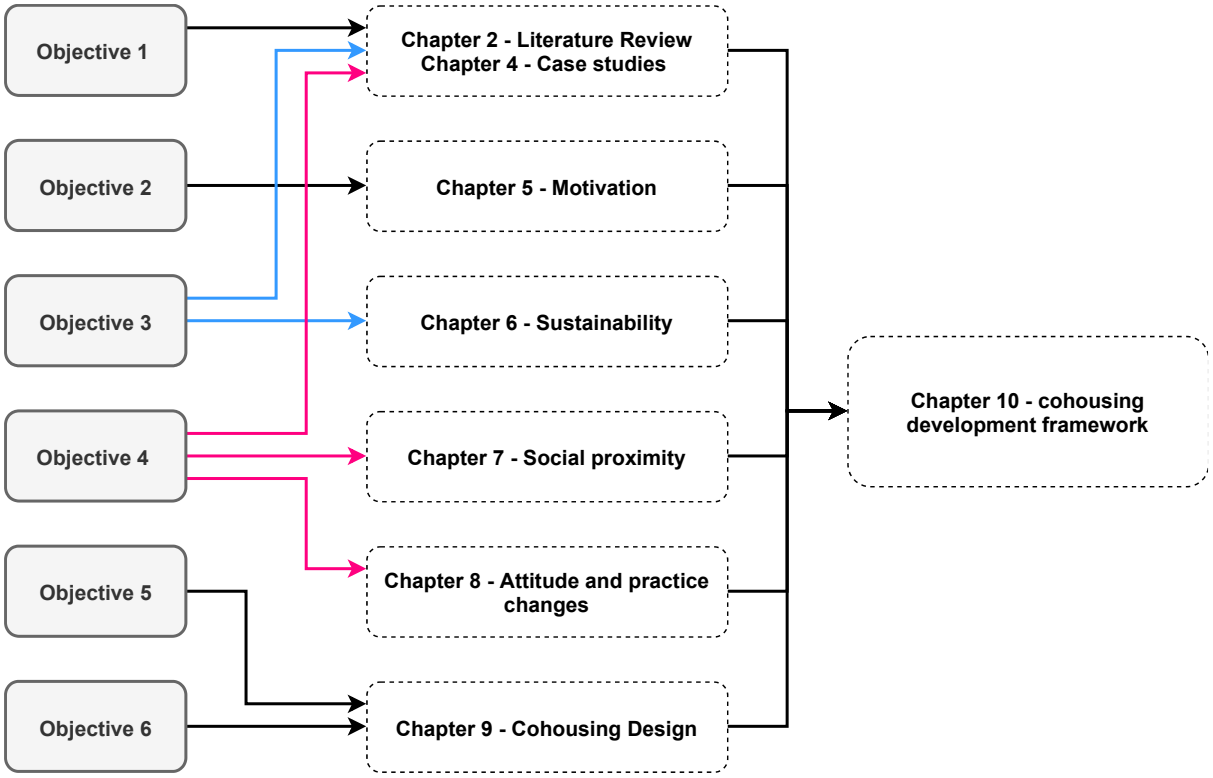



Figure 11-2. Study objectives and corresponding chapters

Combining the results of literature review, **the first research objective** examined the current status of UK cohousing model by conducting three exploratory case studies in Lancaster, Leeds and Cornwall. The pilot case studies were conducted through site visits (with pilot unstructured interviews) in established cohousing communities. The focus of this research objective was placed on the common living pattern of cohousing residents and the general understandings towards this living model in the UK. Specifically, to achieve this research objective, this study discussed the main attributes and manifestations of cohousing communities by outlining the features of physical infrastructure, common house, neighbourhood layout, sustainable lifestyle, sharing, common activities and affordability in Chapter 4. During the site investigation, different types of selected cohousing community (urban, sub-urban and rural cohousing models) were compared. In addition, based on the trend of cohousing development, this study identified that cohousing in the UK is still in its early stages of development compared with other European countries. This objective provided an understanding of the UK cohousing model and also became the foundation of developing in-depth case study protocols and interview questions for the next stage.

In Chapter 5, **the second objective** assessed the triggers and motivations of people who wanted to create or join a cohousing community. Another purpose of setting this objective was to explore the role of this living model in the UK housing market: fulfilling social needs,

environmental protection purposes, affordability or other factors. This objective was a fundamental step to understand the other features of a cohousing community because it shows what people value the most about this type of living. To achieve this objective, this study highlighted the importance of housing needs for human being and identified the complexity of housing decision making. This objective was achieved through interviews with cohousing members and project architects. The view comparison between cohousing members and architects demonstrated the harmony and cohesion between the designer and the occupant in the collaborative planning process. All motivation factors were compared and sorted from high to low through various coding techniques of content analysis.

**The third objective** examined the contribution of UK cohousing model on the environmental sustainability in Chapter 6. This has been assessed through interviews, site observation and secondary data documentary review. The interviews were undertaken to explore the understandings of sustainable lifestyle in the neighbourhood and the design process. The observations were used to examine residents' environmental practice, building material and technologies, and the maintenance of environmental technologies. The secondary data was collected to provide more details of the planning stage. To achieve this objective, this study explored various categories which could influence the degree of environmental sustainability, such as, space heating and cooling, energy source and usage, and environmental design standards. The opinions from architects and residents are compared through the content analysis. This objective affirmed cohousing's significant contribution to environmental sustainability and offered possible approaches and recommendations to achieve greater sustainability levels for UK cohousing communities.

**The fourth objective** evaluated the strong sense of community by analysing the social proximity and practice changes of cohousing residents in Chapters 7 and 8. Marcus (2000, p.146) stated: "A primary goal of cohousing is the desire of residents to live in a socially supportive setting". This thesis fully supports this claim. As identified in Chapter 5, the social need is the driving motivation of creating or entering cohousing. Therefore, the social patterns in the community setting became the focus of the research. As explained in Chapters 7 and 8, the social proximity and practice changes are measured through interviews and observations, supported by secondary data documentary review. The social proximity represented how residents define closeness and social boundaries in cohousing communities and also highlighted that the built environment has a great impact on the social patterns. Meanwhile, the attitude and practice changes were explained in Chapter 8, which revealed the entire 'attitude-practice changing circle' of residents. In other words, it demonstrated the relationship

between residents' thinking and practice by living in a cohousing. In sum, this objective analysed the social environment of the cohousing model in a micro scale and also addressed concerns of collective community living.

**The fifth objective** assessed the collaborative cohousing design strategies adopted by UK cohousing communities. To achieve this, the respondents (architects and residents) were interviewed to examine how community space are used, the cohousing design process and design principles. Additionally, site observations were undertaken to evaluate the design details in the community setting including the designs for the common house, private dwellings, indoor and outdoor public places. Furthermore, the secondary data (e.g. design reports, academic materials, community meeting minutes) provided by some selected cohousing projects has also been taken into consideration. As guided by ethnography, these resources are used as supporting materials to underpin the findings of interview and observation. Secondary data expanded the research data sets and addressed more design details and concerns of the residents. This objective also discussed the selection and application of environmental standards, revealed the most frequently considered and adopted design standards for cohousing groups. By achieving this objective, the physical infrastructures of the cohousing model were explained, which is essential for interpreting the social patterns of group members and sustainable contributions.

**The sixth objective** centred on the strategy of achieving economic sustainability and cost efficiency. This has been accessed through interviews with both architects and residents, and secondary data documentary review. These methods are used to examine a) how can cohousing reduce the expenses in planning and post-occupancy stage (e.g. through environmental design standards or group purchase discount); b) the financial incentives and motivations of joining cohousing, and c) cost efficiencies improved by social infrastructure (e.g. childcare provided by neighbours). Economic sustainability is one of the fundamental pillars of measuring sustainability in the built- environment. The achievement of cost efficiencies was a common intention of cohousing groups and also becomes a part of the group identity of the cohousing communities.

## 11.4 Research Findings and Discussion

As highlighted in the literature review, cohousing is a generic European term for "collaboratively designed and built housing spaces for multiple households that develop 'self-managed social architectures' to share activities and experience" (Nelson, 2018, p.xii). Through cohousing, residents are committed to living together as a community and gain the

benefit of a supportive social network (Garciano, 2011; Hagbert, et al., 2020). The environmental, social and economic contributions of cohousing developments have been identified by many scholars (McCamant & Durrett, 1989; Meltzer, 2005; Fromm, 2000; Garciano, 2011). The cohousing model is effective in inspiring people to make their life greener and healthier. Sustainable technologies, housing design factors and mutual social pertaining to sustainable practices could support people to achieve a low-carbon, even zero-carbon lifestyle (Marckmann et al., 2012). Meanwhile, the cohousing design of a cohousing model is driven by environmentally sustainable purposes (e.g. energy saving, low impact living) and also aims to encourage a strong sense of home and creates the sense of belonging to the community. Furthermore, various types of sharing are intertwined and enacted in community daily living. All the shared activities, community culture, rituals and participation associated with a core sense of purpose and meaning depend on this habituated practice (Jarvis, 2015). This study paid special attention to the ecological and social aspects of cohousing development, and reflected on the ideas of cost efficiency and economic sustainability.

On this basis, the research findings are summarised from site observations, interviews and secondary data analysis. The main findings are presented in six chapters (**Chapters 4 to 9**). The content of research findings was divided into two parts to explain the community living: 'What people do' and 'what people say'. All site observations have contributed to the former, and interviews findings and secondary data are the reference of the latter. Study findings are developed in five dimensions, group motivation, sustainability, social proximity, thinking and behavioural changes and cohousing design, and displayed using a colour-coded hierarchical framework.

**Chapter 4** is employed to demonstrate site-observation findings from two selected cases, LILAC and Lancaster Cohousing. The site observations were carried out through the community open-day events. LILAC Cohousing has a courtyard community layout and Lancaster Cohousing has a linear layout which can create completely different social patterns in the community. This study summarised that the social interactions and proximities are greatly shaped by the physical environment and layout. The strong social foci have identified in the following aspects: visualising social connections; the common meal; good environment for children; and common work relationship. Furthermore, this study found that these two cohousing communities could contribute to ecological sustainability by adopting various design standards, environmental technologies, water systems and food growing. Environmental concerns are one of the priorities of designing of these communities.

**Chapter 5** explored the motivations of group members to join cohousing. This study found that that the motivation for entering cohousing represents a complex decision-making process. Social, environmental, financial, family, health (physical and mental), and site location were all shown to be crucial in the decision to join cohousing communities. Within that, social, environmental sustainability, and financial aspects were identified as the three top priorities for people considering joining a cohousing community. Other aspects were also mentioned in the interviews, including 'policy', 'boosting factors,' and 'personal housing preference.' Boosting factors are trigger aspects rather than determining reasons that attracted attention and promoted recognition of and encouragement to live in the cohousing model, such as an inspiring book and a convincing programme on TV.

This study identified that cohousing in general advocates a balance between individualism and interdependence. The interview results reveal that social aspects were perceived as both benefits and challenges for residents and the public. Therefore, this balance should be highlighted in future cohousing developments. Furthermore, a lack of accessibility for young people and people with middle to low incomes, and the understanding and practice gaps between group members and developers and local authorities were the important financial barriers. In addition, this study found that the cohousing model still needs many kinds of support (e.g. assistance with knowledge structure and finance) and standardisation from the governmental and organisational levels. Moreover, the political visions of community-led housing (including cohousing) should be emphasised. This highlighted those existing misunderstandings of cohousing habitation from the public may become the biggest barrier for most people. Therefore, much work is required from the government to increase the acceptance of community-led housing and to reduce the barriers, such as by providing financial support, design guidelines and introducing cohousing model to wider social groups.

Finally, there is extremely limited access and progress in the UK for all types of community-led housing (e.g. cohousing, housing cooperatives, community land trusts) compared with the US and other countries in Western Europe (e.g. Denmark and Germany). The reasons include cultural misunderstanding and a lack of access to grants, loans, or mortgages, These highlight the need for governmental guidance and other forms of support to educate the public and promote community-led housing as a beneficial living option.

In **Chapter 6**, this study identified 18 categories under environmental (eleven categories), social (6 categories) and economic sustainability (1 category) dimensions based on the interview data. 'Sharing' was identified as a common category which could contribute to both environmental, social, and economic sustainability. These 18 categories are closely

connected and could be combined to help residents achieve higher sustainable levels and improved energy efficiency. Within all categories, the categories related to 'Energy' (e.g. energy saving techniques, energy source, and renewability), 'Sharing', and 'Heating' were identified as influential categories with a significant impact on the community's sustainable living. Furthermore, the residents paid more attention to social aspects of community living than the architect group. Some residents emphasised sustainable vision as part of their group identity, from the initial stage. They pointed out that to be sustainable is not always related to the building, it is also about group awareness and the ways residents deal with problems and conflicts; passing on sustainable concepts to the next generation; and the relationship to nature.

Within this chapter, this study acknowledged the huge potential of the cohousing model in sustainability. 18 categories identified in this research represented multiple approaches and opportunities to achieve greater sustainability. However, it is worth mentioning that when it comes to sustainability, most interviewees only think of environmental sustainability, while social sustainability has been ignored or mis-interpreted by many people, especially, architects. It also reflects the public's misunderstanding of the concept of sustainability. Accordingly, this study highlighted social factors as central to achieving the goals of greater sustainability. In other words, social aspects can be incentives for establishing environmental and economic sustainability in a cohousing community for the following reasons. First, group members congregate and become motivated by the idea of cohousing long before walls are built, and legal papers signed. Thus, the degree of environmental and economic sustainability is strongly based on how group members set their common intentions and their feelings of belonging to the group. Second, sharing can be considered the core of social sustainability in cohousing, and has a significant ecological and financial impact on the community. This study showed that different levels of sharing make up the 'flow' that connects the three aspects of sustainable development. Finally, environmental sustainability can be achieved if the group is harmonious and well-organised. Here, environmental 'peer influence' influences members' thinking and behaviour for a 'greener' and healthier lifestyle. These findings enhance understanding of sustainability in cohousing contexts across the UK.

In **Chapters 7 and 8**, this study explored two aspects of the social environment in cohousing communities, social proximity and behavioural changes. This study identified that social proximity is strongly associated with the community built environment and neighbourhood planning. First, the private units maintain residents' privacy and also provide space for personal interests and social life. The doors, windows and curtains of the private units not only provide physical boundaries, but also, can be seen as sensitive indicators to show people's

sociable statues (available, busy or not available). Second, the semi-private area is the transition area between private and common area, it is always overlooked by the architect and residents. However, this area offers psychological space before entering the common space and activates the whole area for residents to slow down, stop and meet. Finally, the size of the common area, location of the community facilities, distance between private and common area and the private and public life balance form the amenity of the entire community. This study found that the common space is co-produced, it is alive and meaningful when people are using it. The community physical environment influences the residents' social pattern and social proximity, in the meantime, residents are invited to play a key role to shape the community via their walking traffic, movements and daily activities.

In terms of attitude and practice changes explained in **Chapter 8**, this research found that the group members' attitudes and practices can be significantly affected by living in or joining a cohousing community. The attitude and practice changes can be a cyclical process, and also can happen simultaneously. The attitude change can be categorised into three groups: individuals within community dynamics, individual interacting with physical built environments, and individuals interacting with individuals. The interview results show that, within these three data groups, the greatest change in people's attitudes can be found in the relationship between individual and community dynamics. Group members are increasingly aware of the differences of understanding cohousing model itself, different ways of treating social tensions, disappointment and effect of various personalities, and the importance of group and individual capabilities. Additionally, the noteworthy practical changes were grouped into two categories: environmental and social practices. The data of group members' practical changes were also evaluated at four practical levels: 1) new practice; 2) changing the frequencies/ extent of doing something; 3) changing the way of doing something (e.g. doing things with others) and, 4) stopping doing something after joining the group. The research found that referring to the environmental practices, most of the practical changes occur at the second level, but in terms of social practice, most of the socio-practical changes happen in the first level.

As described two aspects of the social environment above, this study expanded the understanding of human-environment relationship in a cohousing context. Specifically, the living experiences accumulated and consolidated with the passage of time, combine with the physical infrastructure/ elements in a more complex whole which shapes the social pattern of all cohousing residents. In other words, this unique living pattern, a routine woven together from the relationship that residents have built up with their everyday surroundings. This is a collective form of order which is hard to be seen in other residential models. Furthermore, **Chapters 7 and 8** presented a way of exploring the social environment of cohousing as well

as described a set of tools and principles for understanding the common area in the community. On one hand, the social proximity measured in this study revealed a hidden dimension of the cohousing community living. It exposed the relations between 'public and private lives', 'exposures and enclosure', and 'front and back'. Just like Gullen (1971, p.10) stated, passing through a town is "a journey through pressures and vacuums, a sequence of exposures and enclosures, of constraints and relief". Reflecting on the literature review, this study argues that social proximity is difficult to be measured simply by social distance and physical settings, it is determined by many factors, such as previous habits, emotional bonding, physical barriers, and spatial volumes. On the other hand, attitude and practice changes are visible since people were involved in the cohousing planning process. Understanding attitude - practice change is a very complex process. However, it is significant for the research because the environmental impact and social patterns can be demonstrated by identifying how attitude and practice are changed and how new practices are conducted. This study acknowledges that attitude - practice change is a cyclical simultaneous process. These changes not only created a new form of order and entity in an individual community, but also established a meaningful social norm of collective community living.

In **Chapter 9**, the 'cohousing design process and principles' is the last and crucial section presented in the cohousing framework. In this section, the research findings are divided into three parts: design principles, detailed elements and design challenges. Referring to design principles, the special attention has been paid to environmental design standards, community scale design and design of private dwellings. This study found that PH, LH, and CSH were preferentially considered by cohousing groups and applied into the cohousing design procedure. Furthermore, the following design principles have received attention when discussing the dwelling design: design for people with special needs (e.g. wheelchair users); flexibility and adaptability of private dwellings; housing size; renewable energy usage and maintenance cost; natural lighting level and orientation (south facing); storage space; and dedicated area of private outdoor space and good acoustic separation. Among these principles, 'housing size' is frequently mentioned as the most important design principle.

Next, this study explored several design elements based on the design principles which cannot be ignored from the cohousing design procedure. They include dwelling types, common facilities placed in the common house, advanced technologies (e.g. MVHR and solar PV), and elements for intergenerational cohousing (e.g. ageing and children-friendly environment). At the end of the section, this study proposed financial recommendations and design challenges for future design. Based on the interviews of architects, they reported that simplifying dwelling types and collaborating with builders can be a very practical approach to reduce the initial

design costs. Besides, avoiding very expensive housing design and bulk purchasing can be helpful.

Finally, the design challenges were summarised. From the architects' perspective, design challenges were divided into two groups based on the stakeholders: users and non-users. The design challenges associated with the users mean the difficulties faced by the architects in their joint design with the group members. The design challenges associated with non-users represent the difficulties that architects faced in working with other design-related stakeholders, such as planning authorities and builders. For the users, the main reason that caused difficulties was the architects-residents collaboration approach. Specifically, the project architects directly worked with each family or individuals, but unfortunately every client had different opinions towards the housing design. There were always changes in the design proposal and it was difficult to reach an agreement. However, for the non-user group, the difficulties faced by architects in working with other stakeholders was the lack of understanding of cohousing concepts and practices.

Based on the research findings in **Chapter 9**, this study argues that the architectural and cohousing design served to enhance the sense of community. This is a typical feature of UK cohousing groups. In other words, the physical form of a cohousing community could enhance the ability of residents to meet casually; also, the residents could feel themselves blending in and being part of neighbourhood context in which they occupied. Furthermore, this study suggests that cohousing design should take environmental sustainability, social needs and potential vulnerable groups into account (e.g. older people, children and those with mobility difficulties). By evaluating the design principles and elements in the selected cases, this study found that social needs are difficult to be fully met in the cohousing design, especially, most of the building blocks in the cohousing community have limited flexibility and adaptability to be transformed or redesigned for future needs, such as adding a wheelchair ramp or a stairlift. Therefore, the future-proof design can be the future task. Moreover, reflecting on the literature review, this study identified the 'edging area' in the cohousing context in **Chapter 4**, however, the importance of edging area has not been fully recognised by architects and residents; so this area was not fully activated through the neighbourhood planning, which made the outdoor private space and common area could not be proper designed and connected.

Finally, the framework (**Chapter 10**) summarised the overall research findings and produced design recommendations for various stakeholders. Based on the information listed above, the framework consisted of four core themes: motivation, sustainability, social environment and cohousing design. It has three levels of information and two sets of colour codes. Next, the

instructions of four stakeholder groups were provided, which proposed an information hierarchy to guide future applications for various stakeholders based on the degree of correlations to cohousing model and stakeholders' job specifications. Furthermore, the recommendations were developed for future cohousing design. This study results (framework) are transferable to other contexts with other respondents. The research findings can be fully or partially adopted by other types of community-led housing, the older-people-orientated residential settings and guide the design of eco-housing or sustainable communities in the future.

## 11.5 Contribution to Knowledge

This study contributes to the debate on cohousing development in the UK, particularly, its contribution centres on the social interactions, sustainable lifestyle and environmental sustainability of cohousing communities. The research findings have significant contributions to the housing research area in the UK and beyond. They fall into the following categories: the cohousing developmental framework; theoretical contributions; and research methodology.

### 11.5.1 The Cohousing Developmental Framework

This study developed a framework to the implementation of sustainable neighbourhood design and social engagement for cohousing groups. The framework serves as a guiding tool particularly for architects, residents, decision makers and housing providers. It offers hieratical inductions for cohousing stakeholders, which enables a more efficient way of adopting the framework. This framework centres on four domains – motivation, sustainability, social environment and neighbourhood design – and posits a set of recommendations that contributes to the accomplishment of outlined drivers to social cohesion and sustainable housing provision. Furthermore, this framework is an essential innovation in cohousing development and practice. It not only identified the main considerations and factors during the planning stage, but also evaluated the human-environment relationship and socio-environmental practice in a micro scale by measuring social proximity, practice changes and cohousing's physical infrastructure. Moreover, as a disciplinary research, this study reflected on multiple urban and social theories and integrated core elements (e.g. low-impact sustainable lifestyle, social interaction and cost efficiency) of sustainability. The framework produced by the research can be used as a fundamental structural guide and essential reference document for the future cohousing groups and other types of community-led housing.

### 11.5.2 Theoretical Contributions

The theoretical contributions of this thesis are divided into two parts. First, it contributes to the deeper understanding of the cohousing model and second, it evaluated the key principles of guiding theories and expanded the breadth and depth of these theories. Primarily, as an architectural research, this thesis provided a comprehensive understanding of UK cohousing model by interpreting community life scenes and physical infrastructure, explaining design strategies and analysing social patterns. In other words, this thesis defined cohousing model in the UK context and evaluated the role of cohousing in sustainable and social dimensions. Furthermore, guided by foundation theories, this study offered an approach to tackle and narrow down complicated research problems of cohousing model and highlighted feasible solutions in multiple dimensions. This thesis is a significant research on literature related to UK cohousing, which filled the knowledge gap and provided an important theoretical basis for future development.

Secondly, as explained in Chapter 2, this study was guided by multiple urban and community theories. These theories provided inclusive concepts and principles of studying urban public life and complex community settings. By evaluating these principles in cohousing communities, this thesis added another dimension to these foundation theories and enriched the understanding of collective living in residential communities. Additionally, this study found that some ideas in foundation theories cannot fully explain the living patterns of cohousing groups, such as the changes in social distance in cohousing communities, therefore, this thesis also contributes to the application of theories and accordingly created new ways of understanding the social phenomena in cohousing communities. Moreover, a profound analysis was conducted in this study on the people's motivation of entering cohousing. This highlighted the importance of social needs and made a significant contribution to examining housing decisions.

### 11.5.3 Methodologies

The methodology adopted for this research presents a robust combination of interviews, site observations and a secondary data documentary review in multiple case studies. Influenced mainly by environmental psychology and ethnography, this combination can be a model for conducting qualitative research in studying cohousing and other residential models, because it can integrate participants' attitude, daily practice, design and management procedure, and their physical living environment. Additionally, the data visualisation techniques were adopted in this research to visualise the existing literature, research design procedure and research findings. As architectural research, this is a successful innovation in the field of qualitative data visualisation. This visualisation approach can intuitively present the trends, causality and

interrelationships among the text data set. Combing the architectural drawing, this demonstrates the great potential of integrating qualitative data visualisation with architectural research.

Furthermore, the research design used in the construction of this framework demonstrates wide consultation, acceptability and transferability among key stakeholder groups. An empirical study with four key stakeholder groups – architects and planners, residents, decision makers, and housing providers – helped to uncover the benefits and challenges of cohousing development in the UK. This approach also outlined varying drivers which are slowing down cohousing developments in the UK context. In other words, the thesis identified that the growing deficits are exacerbated by the absence of a collaborative effort among stakeholders in supporting cohousing groups. This is primarily as a result of a lack of understanding of cohousing model, a lack of governmental and local support, and inefficient collaboration among stakeholders.

## 11.6 Areas of Future Research

This study acknowledges that housing is a complex phenomenon, and housing research is a very intricate and long-term procedure, especially for collaborative living model, because of its cross-disciplinary structure, and the multi-faceted nature. Therefore, this section aims to demonstrate future research directions and a developed research plan based on the current research in the field and research findings of the present study. The study suggests four key areas of further research：

a) Socio-environmental practice

Cohousing model can be a very typical platform for socio-environment studies because of its special resident-driven developmental process and group supervision. Based on the findings of the present research, this study affirms the close connection and influence between people and surrounding environment. This connection interprets a symbiotic and balanced relationship between the physical environment and occupiers' living patterns and daily practice. However, socio-environmental practice research is rarely developed in a collaborative community setting. Therefore, the explorations of the social environment of a cohousing in this study is a starting point, and hence the future research aims to provide deeper understandings of evaluating human-environment relationship in cohousing communities and also identify key principles of this 'mutual shaping procedure' for creating a more liveable, healthy, reliable and green living environment in the future.

b) Adaptability of physical infrastructure for older people

This study found that the population of older people is a large customer group of the cohousing model in the UK, also, cohousing is proved as a possible living option for the older people. On this basis, the adaptable age-friendly living environment in cohousing community becomes essential. However, this research identified the deficiency of awareness and active ageing strategy for older residents in the established intergenerational cohousing communities. Therefore, the future research will concentrate on the key principles and detailed design elements in building adaptable cohousing environment for intergenerational groups. The future research can learn from other residential models and tackle the design difficulties and barriers for older people and intends to provide hierarchal design guidelines to support future groups and architects in building a more liveable age-friendly cohousing environment.

c) Scalability and transferability

The proposed framework is tailored to the cohousing development in the UK. However, this study found that cohousing model and community-led housing have a lot in common, also, the developmental experience of cohousing can benefit other residential models. Therefore, future studies can further investigate its scalability and transferability to other contexts either within the UK or other countries.

d) Cohousing model in global pandemic

In the context of the global pandemic, people become more isolated from each other because of the health concerns and social distancing policy. However, surprisingly, the number of applications for the collaborative living model (e.g., commune, cohousing) increased dramatically in the UK during the pandemic (The Guardian, 2021). In addition, it is also reported that these applicants cover all ages groups. This phenomenon represents that the collaborative residential model has its value and ‘unique charm’ while seeking social distance. Specifically, “this (collaborative living) is about housing, but it is also about how people are choosing to eat and to form human connections. There is a recognition that the lifestyles of the past are permanently broken.” (Jarvis, n.d.). In the meantime, this residential model and form of living are facing its new challenge: How can this form of residential model, which seeks closeness and emotional connection, survive and be maintained in the pressure of global pandemic? In other words, future research can also focus on exploring a reasonable and feasible management mechanism to promote such housing and also ensuring people's mental health in the context of pandemic and other health crises.

## 11.7 Limitations of the Study

The following limitations of this research are acknowledged:

- Educational background

As a PhD student with backgrounds in decorative arts and interior design, I was faced with a steep learning curve to understand the field of architectural research. The cross-disciplinary nature of this research afforded the study new angles, visions and possibilities especially in relation to sustainability.

- Limited data access

During the data collection period, which ran from 2017 to early 2018, the UK had fewer than 30 fully established and active cohousing communities, with very limited access to data. For example, some cohousing communities completely refused visits for academic purposes. While other communities allowed academic visits only on community open days. However, the study acknowledges that a cohousing community is a busy living place, accepting academic visits for many researchers is a huge commitment, which requires time and energy. The eight cohousing communities selected for this study covered multiple developmental stages, building types, tenure forms, and membership types. As such, the number of selected communities could support the study's findings.

- Research methodological limitations

Due to the nature of qualitative research and phenomenological analysis methods, the research has been carried out based on the researcher's personal experience and research background, which may not reveal all possibilities of sustainable living and social cohesion in a cohousing community. In addition, telephone interviews were conducted with some participants, but were limited in terms of capturing their expressions, gestures, and other forms of body language. Meanwhile, cohousing group members who participated in this study were aged from 49 to 73 years, meaning a lack of information from younger generations. Recruiting young people is also a challenge faced by many communities.

Finally, the sample size of this study was evaluated using Malterud's information power (IP) model. Based on IP, the sample size was sufficiently large to clarify the aims of the study. However, the research findings are meaningful only in the social context of a cohousing community. Due to the developmental focuses of each selected cohousing community, the findings may not be able to represent the current status of all British cohousing models, or similar collective residential models in the UK. More work will be required with a larger sample size for the broader collective housing research in the future.

## 11.8 Conclusion

This thesis demonstrated the nature, potentials and developmental barriers of the current cohousing approaches in the UK. Through this research, this study explored various essential aspects of group motivations, sustainability, social infrastructure and neighbourhood design and also examined how cost efficiencies were generated and maintained. All research findings are summarised and presented through a cohousing framework which can assist four different groups of cohousing stakeholders. The framework is also developed as a guiding tool that can be applied into current and future cohousing developments. Finally, this research acknowledged that the cohousing model plays an essential part of community-led housing. The residential-led development and co-supervision processes differentiate cohousing from other types of residential model in the UK. However, more work is required from the government, funders and other housing providers to make this housing approach more accessible and flexible to the wider public.

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# APPENDICES

## APPENDIX 1: INTERVIEW QUESTIONS

1. What is your/ your clients' 'motivation' to create / join a community?
2. Why did you choose to move into this cohousing community? What are the most important factors for your consideration or choice of this community?
3. How can cohousing scheme contribute to sustainable living and sustainable communities?
4. What motivates and sustains social interaction in cohousing communities?
5. How does cohousing community living affect your thinking and behaviour?
6. Do you think that cohousing is an option for older people, and would multigenerational living be attractive in this context?
7. Could the Cohousing model fit into Lifetime Home or other design standards?
8. What is the biggest challenge of living in a cohousing community (residents)?
9. What is the biggest challenge of design and work with a cohousing group (architects)?
10. Affordability is normally a driver for cohousing. How can cohousing be an affordable option to different social groups?

## APPENDIX 2: LIST OF PARTICIOANTS

| Participants | Gender | Age | Name of the cohousing community | Location of the community | Participant Codes |
|---|---|---|---|---|---|
| Architect 1 | Male | NA | Cambridge K1 cohousing | Cambridge | AK1 |
| Architect 2 | Female | NA | Cambridge K1 cohousing | Cambridge | AK2 |
| Architect 3 | Male | NA | Cambridge K1 cohousing | Cambridge | AK3 |
| Architect 4 | Male | NA | Lancaster Cohousing | Halton | AL4 |
| Architect 5 | Male | NA | Open House Project | Sheffield | AO5 |
| Architect 6 | Male | NA | Shirle Hill Cohousing | Sheffield | AS6 |
| | | | | | |
| ~~Resident 1~~ | ~~Male~~ | ~~50+~~ | ~~Cannock Mill Cohousing~~ | ~~Colchester~~ | ~~RC1~~ |
| Resident 2 | Male | 50+ | Five Rivers Cohousing | Sheffield | RF2 |
| Resident 3 | Female | 50+ | Five Rivers Cohousing | Sheffield | RF3 |
| Resident 4 | Female | 50+ | Five Rivers Cohousing | Sheffield | RF4 |
| Resident 5 | Female | 50+ | Five Rivers Cohousing | Sheffield | RF5 |
| Resident 6 | Male | 40+ | Cambridge K1 cohousing | Cambridge | RK6 |
| Resident 7 | Female | 60+ | Cambridge K1 cohousing | Cambridge | RK7 |
| Resident 8 | Male | 40+ | Lancaster Cohousing | Halton | RL8 |
| Resident 9 | Male | 40+ | Lancaster Cohousing | Halton | RL9 |
| Resident 10 | Male | 50+ | Lancaster Cohousing | Halton | RL10 |

| | | | | | |
|---|---|---|---|---|---|
| Resident 11 | Female | 60+ | LILAC | Leeds | RL11 |
| Resident 12 | Male | 40+ | LILAC | Leeds | RL12 |
| Resident 13 | Female | 50+ | LILAC | Leeds | RL13 |
| Resident 14 | Female | 50+ | On the Brink Cohousing | Sheffield | RO14 |
| Resident 15 | Female | 50+ | On the Brink Cohousing | Sheffield | RO15 |
| Resident 16 | Female | 40+ | On the Brink Cohousing | Sheffield | RO16 |
| Resident 17 | Female | 60+ | Open House Project | Sheffield | RO17 |
| Resident 18 | Male | 60+ | Open House Project | Sheffield | RO18 |
| ~~Resident 19~~ | ~~Female~~ | ~~50+~~ | ~~cohousing~~ | ~~Bude~~ | ~~RT19~~ |

## APPENDIX 3: EXAMPLES OF INTERVIEW TRANCRIPTS

Example 1: Architect Interview Transcript

| Participants | Gender | Age | Name of the cohousing community | Location of the community | Time of the Interview | Participant Codes |
|---|---|---|---|---|---|---|
| Architect 3 | Male | NA | Cambridge K1 cohousing | Cambridge | October 2018 | AK3 |

**Q1: What is your group's motivation to create / join a community?**

Why are people interested in cohousing model? The answer is a mix.

a. Some of them had the past experience of living in alternative models, perhaps a housing commune or something like that.

b. Others felt isolated and looking for a sense of belonging and sense of community and felt that was lost in their current situation, they felt they didn't know their neighbours. They felt there was a great sense of community either for their memories or their stories.

c. Other people who just want to do something different. They thought cohousing is a good idea, and logical.

d. Other people I would say they have some environmental motivating factors. They want to live in a more sustainable way.

e. Young couples were planning to have a family or young couple with young children, they were looking for somewhere where the kids could benefit from living in the community interactions with more people, not being isolated.

f. Then you had more elderly people who perhaps retired. The property they were living was too big, they wanted to downsize to something smaller and wanted to do something good with their money. Speak to someone positive and buy themselves somewhere to live.

**Q2: Why did you choose to move into this cohousing community? What are the most important factors for your consideration or choice of this community?**

The group I work with, because they have to go through the process. We went through a series of workshops and went through a sort of hierarchy decision making in order to allow the group to reach a consensus about what is important, what we agree, what we disagree. From memory, we looked at how important different activities are, towards people. Like, meeting, eating, work, and so on. Then also, how personal shared, how private those activities were. You might get 10 people in the room saying, eating is an important thing, some people say is not important. Some may say it is a very private thing, some may say is a shared thing. We

try to test out using some games, tests and activities that would allow the group to discuss these things and come to an agreement on that. And then, end of each session, we have a series of statements that would be adopted. Some of them (residents) could be quite open, general and high level, the way to use the spaces, the way they interact or decision making. others might be much more specific about having a garden or not having a garden. I can pass some information about that.

We were going back to what holds people together. I don't know. In terms of the process, we went through, we were identifying the things people feel important, and we included that into the client brief, that is all information in one place, and then, take you forward to the past workshop, we were expanding the group later because we need more people. We held an open event, someone in the public audience said, how do I know if I get on with you if I move to this community? We would say, "if you read this and agree with this, you probably get one with us."

It was not about the people understanding the brief, it was about writing the brief. It is a different form of decision.

**How about the decision-making process? You think the group decision-making is quite hard?**

We did a very brief study; everybody signed up to that to each step of the way. Because we had a hierarchy of decision making, so one to one decision is never agreed to it. It is more about designing the decision-making process rather than the group is not able to decide. We work really hard to make decisions, we gave them enough information to be able to make decisions, in a way they could stand by.

**Q3. How can cohousing scheme contribute to sustainable living and sustainable communities?**

I think for some people, it could work. You know nowadays how far people travel to work is probably more important. One of the discussions we had with the group, whether they wanted a flexible workspace in the common house for example, and one of the motivators for that was to not have to do the work miles, to be able to build work relationships as well as social one. I think growing food is great, you can reduce your impact on the planet that way, but it is not viable for everybody. I think if people are interested in that, that is one way to contribute. And food miles are important, growing your own food I think is much more rewarding than just

environmental impact. There is a whole layer roof and wellbeing, which I think some people are attracted to. So, one last thing our group was quite motivated about, the environmental issues, it was really there, existing interest in there, cohousing was built to…originally going to be a passive house, we talked a lot about different standards they could adopt, Lifetime homes or Passive House, or BREEAM, we went through, and there are experts come to talk to them, and then they make some decisions once they had information and what they wanted to do. I think cohousing would work well, just the standards have been an option, if that would be interested to the group.

**Q4: What motivates and sustains social interaction in cohousing communities? NA**

**Q5: How the cohousing community living affects group members' thinking and behaviour?**

I don't know, you have to ask them. I think whenever you build, we all adopt our behaviour to our built environment. The built environment which design for the particular type of behaviour – growing own food or share meals – then that may encourage these things to happen, the consequence is always happen when you do interesting things, you have to talk to a group.

**Q6: Do you think that cohousing is an option for older people, and would multigenerational living be attractive in this context?**

Yes, I can see it would be attractive. I think it attracts people who got money. It is not cheap. So, it is attractive for people who got money and they are old, but it is difficult to access if you don't have either a good income or you have a property you could sell. For older people, tend to be people who are selling their houses and moving in. it is possible for somebody to rent, where they may not be able to afford to buy.

**Q7: Could Cohousing model fit into Lifetime Home or other design standards?**

I am not involved with the construction process, when we left, it was going to be the Passive House and Lifetime home. Lifetime Home (standards) do not exist anymore. It has been replaced by Part M. (building regulations - category one is fully wheelchair accessible, category two which is wheelchair adaptable, category three which is visitable). Lifetime Home is not a standard the local government could apply. There is extra cost, if you go for these high standards, you exclude more people from the community.

**Q8: What is your biggest challenge to work with in a cohousing group?**

The biggest challenge is knowing we are going to work with non-professional clients with many different families together. We have to create an architecture agreement, the way we have to get everybody to agree, process to allow people to agree and make decision and move forward. That was the biggest challenge, but we did not find that difficult, we were lucky.

Once actually working on the project, the biggest challenge was the planning authority. Because all the planning regulations and requirements were based around a certain set of expectations of what the group want to do, how the developers want to save money, people would use or need cars, so the biggest challenge was the parking, the master plan to the site has the parking centre, and some people they didn't need it…they wanted the space to grow or the places for their kids to play. But the plan is to protect future residents- they might have cars, might want the place to park, but the planners did not really understand the participatory aspect of cohousing. They (planners) want to be flexible enough which is able to accommodate that from building model over time.

**Q9: Affordability is normally a driver for cohousing. How can cohousing be an affordable option to different social groups?**

In Cambridge, because there are lots of high-tech sort of industries going on, so you get lots of young people, young professionals, they have very good salaries, they could afford it. But again, it is not about the age, it is about the access to a mortgage, about the equity. I think yes, generally, if you look at the country as a whole, people would find it hard to access. In the same way, they would not be able to access other forms of housing. Cohousing is not an answer for cheaper housing, but cohousing is not necessarily to be more expensive than mainstream housing. You are talking earlier on about environmental benefit, I think if you sacrifice the environmental aspiration, you can have cheaper cohousing. (balance of environmental & social) This is very interesting, it can be very middle class… but housing co-operative provides a model, where you can have…people have lower income, and also land trust that type of thing. It depends how it sets wup and what the ambitions are. You (could) have a route which aims to create affordable housing, access from the large demographic, that should happen. But that wasn't necessarily the case, there were people concerned about that, environmental material… and also, people have the experience to make the thing happen straightforward, people already have the confidence and success in their own life to be able to do that.

**Q10: As far as I know, the size of each home in a cohousing is smaller than the mainstream housing in the market. Are your customers satisfied with the size of the unit?**

The decision about the size is based on…we did an exercise with the group, we ask them to put down their age, activities in the house, in five years, in ten years, in fifteen years, some young people were saying, we may have two kids, some might be saying, I am 65, I might die in ten years… we have to think very hard how we did that, we looked all demographic info, do you need a one-bedroom (flat)? Or three bedrooms? Or the ability to convert to a loft later. So we look at the adaptability of the properties, able to expand or sub-divided into… I am not sure smaller properties are easy to look after, but that would be true for older people. And what the group decided was they would rather have all the properties a few bedrooms, have a common house with a guest room, without having a bedroom empty all the time. They worked out the minimum space they needed was, and also shared space, they were happy to put money in common space then everyone could use it, or they have a small kitchen in their own house and have a bigger kitchen in the common house.

Example 2: Resident Interview Transcript

| Participants | Gender | Age | Name of the cohousing community | Location of the community | Time of the interview | Participant Codes |
|---|---|---|---|---|---|---|
| Resident 10 | Male | 50+ | Lancaster Cohousing | Halton | April 2018 | RL10 |

**Q1: What is your 'motivation' to create / join a community?**

I lived in a communal housing co-op before, I was there for 20 years, we spent 20 years trying not to use the word 'commune'. Now I just tell people I lived in a commune for 20 years. Hahahah…the reason we did not want to use that was because people have a lot of bias when you use the word 'commune', and we like to think we were different, in some ways the cooperative had aspects on cohousing. So in the late 1990s, I came across the American handbook on cohousing. I am more interested in than I am being more communal. When the opportunity came to be part of the setting up the cohousing scheme, I jumped at it, and we moved from the co-op to Lancaster. Part because of the work I was doing, we were keen to move back to something more communal, something more cooperative.

**Q2: Why did you choose to move into this cohousing community? What are the most important factors for your consideration or choice of this community?**

When we leave the housing co-op, we spent a lot of time, we were looking for cohousing, I mean we specifically chose and spend lot of time looking and different cities, we wanted to move back to a more… because the housing co-op on the semi-rural area, it was on the edge of the village, so moving here is a bit déjà vu, because we converted an old industrial building for the co-op on the bank of the river, buying here is a bit, oh, dear, we doing this again, buying old factories on the side of the river. In some way, it is very familiar, sort of location, and I suppose we really like Lancaster, we don't think we would move to a cohousing in a different place, and there were quite a lot of people involved at the beginning, if it did not happen in Lancaster, we will move somewhere else. I've been here since we moved in, 5 years, I have been involved in the project from the point it started.

So, we moved in 2012, I think it is more useful to look at the founding generation, they are the people who had the idea, then the people moved in, who don't want the people moving in to. but we have the previous experience, I had some ideas. Anybody who comes now and buy the house, can see what it is like, some people found this is not what they wanted, we had

quite a few people moved out, some of them quite quickly realising, some of them taking a bit longer to go “this is not going to work for me”.

**Q3. How can cohousing scheme contribute to sustainable living and sustainable communities? I realised, the community adopted the Biomass, is this kind of technology more expensive in the early stage, but it can reduce the cost and save energy in the future?**

No, the finance behind the Biomass and district heating are… we are partly the…once you down to passive house level, you don’t need a huge amount of heat, for the houses, is largely hot water. The original plan is to have a gas boiler on every terrace, so one domestic gas boiler for each terrace. Because we need to heat mill building, there was an engineer argument said, but a big boiler in the mill, you do need a lot of heat to the winter, and basically back the rest of the houses on the heating system for the mill. At the time, there were decent grants available to do that, so, it is a combination of using the money. The money would gone into heating system for the house was not really needed. And needing to heat the mill, and the grant, so we did not pay any extra for that system. In fact, our original aim is, to buy a house here it will cost you no more than to buy an ordinary new house in Halton. So there was no premium for communal facilities, no premium for the environmental specification. We did that. We even have money left over. And I am working with some local people who have been inspired by us, who want to set up an older person’s cohousing just next door.

**Q4: What motivates and sustain social interaction in cohousing communities? How the cohousing community living affects your thinking and behaviour?**

I think it has. There is a slightly strange paradox, I think you have to be slightly selfish to survive in a cooperative situation, you have to make sure you are getting enough what you need to get, to be able to cooperate with other people. otherwise, you come to resent it I think, you come to resent the fact, everybody gets what they want, I don’t get what I want, so I think you have to be slightly selfish, and do I want to do this. Because I spent 20 years living in the same place communally, I aware that your needs change as time passes and in that time at the housing cooperative we all ate together very communal, some individuals said I can’t do this, I am doing a collage course, I need to come home, I don’t want to spent my time with lots of people, I need my own space, I think it is being able to do that within a communal setup, be able to say, I can’t do all of these things now, and community accepting the over time you will contribute enough, if you can’t do the commitments now, the community sort of accepts the, it will happen overtime. which makes me feel much more relaxed, whether people are pulling

their weight at any particular time. which is not true for other people here – 'we agree to do this, why other people not done this now'. well, overtime. But yes, there will be people who don't do what is asked them and leave, but there will be people who come here to do far more. And in some ways, it is too much hard work to get people to… we are not about pleasing, nobody wants to give a timesheet, say they have done lot of work. Because we don't want to feel like work. It is home. There is attention about this space (common house) for instance, is it an extension of our home or is it a community centre for one street. The answer is 'It is both'.

**Q5: Do you think that cohousing is an option for older people and would multigenerational living be attractive in this context?**

Yes, it is option for older people, 2/3 of the people here being over 55. The people we attract the people could afford our houses, are older people.

**Q6: Could Cohousing model fit into Lifetime Home or other design standard?**

At that time, it was code for sustainable homes. We went for level 6. They still recognize it, but there is no longer a code really. The government drop it. This code, nobody thought through communal facilities in the codes, they all aimed individual houses. The difficult things were how far your waste bins are from your own front door. They have a set distance, they say your bin should not be too far from your door, because that discourages recycling if you have to walk a long way. But all our bins are in our bin areas, so the things feel a bit silly, just doing it to make the code. The code is not designed for, but you can still make it work. you are going to do better, we all want to recycle, it is more ethical rather than how far it is away from my door. If you look on the UK cohousing network website, there are nearly 70 groups, there are lots of 1970s communes, now calling themselves cohousing. Because they were setup with a similar legal structure, people own their own units, and other communal facilities. But I will say they are different sorts of cohousing, they don't have all the design criteria, a new build or a retrofit. I will say this (cohousing) is work for me, but we have achieved far more than I thought. And yes, there are things we did not get right, there are difficulties. But I like talking to people, because you get to see other people's eyes. People are just amazed. I would like to say we tried too hard here, we want to do so many things, why don't we just relax a bit, take a bit more time, you know the founding generations, they are pioneers, there is a particular mindset and spirits who set things up, I am aware there is a danger… I mean, one of the co-founders here, I think he moved on, because he is looking for another project to set up, because he likes setting things up, not necessarily got the attitude to make things work and keep them going.

That are different personalities. When we achieve what we want to achieve, some people will go, “wow, this is it, we have done it”. but other people go, “no, no, no, we could do far more!”.

Some people found, the way to do outside, that is quite exciting for me. You could get people who support you, support your views and your ideas, and you can go out do them in the wider community. That is a really interesting dynamic of influence. Because, for cohousing, other people need to be inspired to do it, we can’t replicate ourselves. We can only be an example; we can help people with advice. For us, we are very media friendly, some group are not media friendly at all. Sometimes, people go, “come on! We have five tours this month, this is getting a bit much, this is my home, I don’t want to live in a theme park”, but in our community vision, you suppose to in rotation once a year, people come to tour your house! It does not work like that. Some people would allow a tour every time people come; other people will never want people in their house.

**Q7: The biggest challenge to live in a cohousing community.**

I think we are not used to negotiating, I think that is the difficulty, about space, and the compromise now requires. It is quite obvious here, because of our size and also size of the group. There is no way you get everything you want; I think the smaller group that might not be obvious. There are compromises, but there are also huge benefits, all my reasons living communally, actually boil down to access to resources. I would never have access to on my own. In the end, when I considered leaving, (previously, the other housing co-op), it was always, any alternatives, did not look good. Even when we moved out, the alternatives did not feel good, and people leave for all sorts of reasons. I don’t quite know why we left at the end.

**Q8: Affordability is normally a driver for cohousing. How can cohousing be an affordable option to different social groups?**

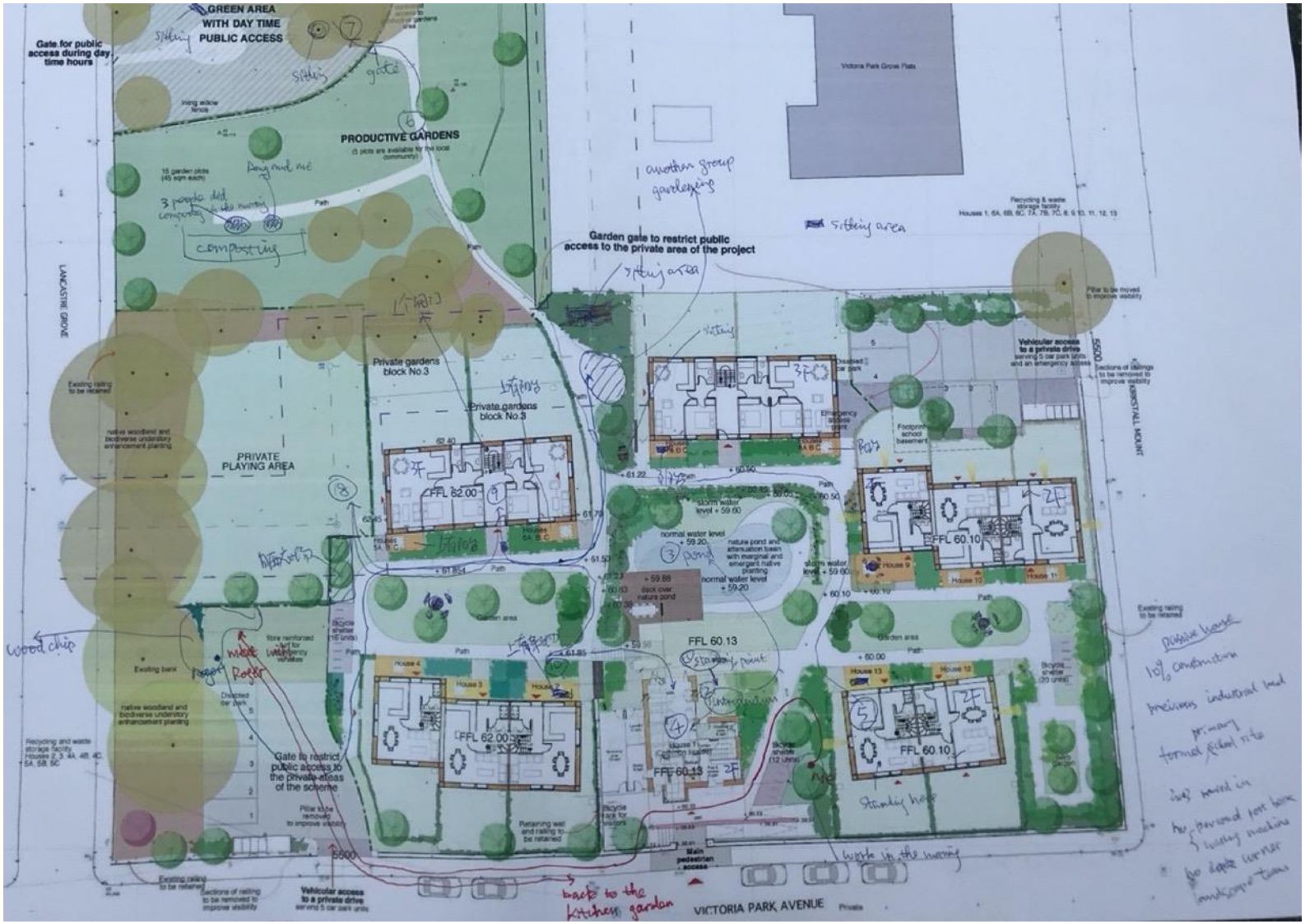
I mean the way younger people have lived here is when properties have been rented out, there are properties have been bought by other members, and then being rented out, there are not properties we own as a community. We thought something to start with we would have to provide some affordable housing as a planning condition. But, as it turned out because the site is seen so difficult by the planners, they dropped that requirement. It could be used as residential use for housing, there are additional costs. We started to build it in 2010. We were the biggest housing builder in Lancaster district the year we finished. We provided more houses than the other housing builder. But I still find that difficult as big house builders. I mean we keep talking about how we could provide some affordable spaces, I think the only way will be - to think bigger than we are thinking at the moment. That is difficult, we are a big community already, there are people who probably think some of the difficulties to do with the size, and

we have been in Denmark, which has the most experience with cohousing, they would make us into two communities, providing two common houses. I think we need more communal space, more communal facilities, it would make a difference, it would make potential, positive difference.

**Q9: Are there any initiatives in the community to help people with mobility difficulties (wheelchair users) and cognitive impairment (people with dementia)?**

The original design specification was for lifetime homes. I would say the majority of the houses compliant for that. I think some of the designs don't actually meet lifetime homes. I think 12 of our units don't actually fully compliant. But they are better than standard houses. In the communal facilities, we provide disable toilet, but we discovered when somebody came in wheelchair, they were impossible to use. As they were built, they were impossible for them to be used. We spent some money and putting that right. It is very embarrassing, to have a disable toilet there, the disable person can't use. And the shower they can't use. And we have been told these compliant the regulations. Certainly, in the mill, we raised some money and we have now got ceiling hoist in the disable toilet. We were aware of that, the houses are built to take stairlift, but there isn't a stairlift unless you need one. Let's talk about the senior cohousing, they are having one or two flats for people in wheelchair, fully kitted out. And we did things like lower work surface for somebody in a wheelchair. They could work in the kitchen. so, there are some thoughts about it. I will ask someone in a wheelchair to come and design it rather than architects design it using regulations. In term of all the disabilities, we were particular aware of people who losing their hearing. This room (the common house) is still pretty awful if you get large number of people in. it is the acoustics in the room, my background is in the construction industry, I have yet to meet architects to understand acoustic. It can get complicated. What interesting is…because this building (the common house) is not a commercial building, then all the regulations to do with the commercial building, don't really apply here. And we are walk that line, when it suits us, this is extension of our homes. And we don't want to pay business rate for the tax on it, so this part of our homes, we pay our council tax. We are sort of a public building as well. We have something that would compliant public building design code, not all of them. The sloping roof could help (for the sound), it changes the angle of the sound. But in this building, if some small children are shouting, it makes it louder and louder, that is a serious problem, then adults need to overcome that, speak louder, the noisy level goes up. People with poor hearing, it will become worse and worse, and you blame the children. But it is actually the room. That is why we got these panels to control the sound. We retrofit it after the building was built. And so as LILAC, LILAC got the same sort of thing on their ceiling. Because we are passive house, the noise does not travel outside of the building. And also triple-glazing. In the house, it is very quiet.

## APPENDIX 4: EXAMPLE OF FIELD NOTES




The field notes were taken through the site observation in LILAC cohousing, Leeds.

# APPENDIX 5: ETHICAL APPROVEL


Downloaded: 12/01/2017
Approved: 12/01/2017

JingJing Wang
Registration number: 160100747
School of Architecture
Programme: ARCR131

Dear JingJing

**PROJECT TITLE:** A development framework for sustainable lifetime cohousing communities
**APPLICATION:** Reference Number 011610

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 12/01/2017 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 011610 (dated 11/01/2017).
- Participant information sheet 1024900 version 1 (09/11/2016).
- Participant consent form 1024901 version 1 (09/11/2016).

If during the course of the project you need to deviate significantly from the above-approved documentation please inform me since written approval will be required.

Yours sincerely

Cheryl Armitage
Ethics Administrator
School of Architecture

## APPENDIX 6: PARTICIPANT INFORMATION SHEET

# Participant Information Sheet

**Study title:** A development framework for sustainable lifetime cohousing communities

**Invitation to take part in this study:**
You are being invited to take part in a research project. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

**Purpose of the study:**
The purpose of this study is to define the role of cohousing in shaping a sustainable living environment through case studies and interviews with stakeholders. The evaluation will identify best practice, and will enable to establish the value of cohousing in delivering sustainable lifestyle through physical design settings, multigenerational living and social interaction.

**Why you have been invited to participate:**
As part of the research, we would like to interview coordinators, cofounders, architects and the residents of
cohousing communities and observe the common meals and regular meetings in the community settings. We would like to gather information on cohousing and relevant living model's physical environment and social factors; identify if cohousing scheme can be an option to lead sustainable living. There are around 30 participants will be involved in the interview activity.

**Do I have to take part?**
You do not have to take part. This is entirely voluntary. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form and you can still withdraw at any time without it affecting any benefits that you are entitled to in any way. You do not have to give a reason. This is for all stages of the study.

**What will happen to me if I take part?**
First of all, you will be interviewed. The interview should take approximately 30-40 minutes. The interview will be tape recorded for transcription, and all information used will be anonymous. If audio recording is not acceptable, then hand-written notes will be undertaken. There are no costs or risks associated with this activity.

The set of open-ended questions are used for the interview to elaborate the opinions and views if you decided to take part. It is not a matter of 'right' or 'wrong', we appreciate that you could share your honest opinions and thoughts with us.

Then, the participant observation will take place, the community common meal and regular meeting will be observed. The activity will be video recorded with the participants permission. If video recording is not acceptable, hand-written notes will be undertaken through an observation checklist. The meals and meetings will not be interrupted or intervened by the researcher and observation process.

During this study, we will visit about 3 cohousing communities in the UK. However, you are under no obligation to continue with observation of the study.

**What are the possible disadvantage and risks of take part?**
The research does not include any activities aim to shock or offend to participants.
It does not involve any possible distress, discomfort or harm (physical, social, emotional and psychological) to the participants.

**Can I withdraw from this study?**
You will be able to stop the interview at any time, and you do not have to answer any questions, but it will not be possible to remove the data from the study up until final analysis has been undertaken.

**What are the possible benefits of taking part?**
Whilst there are no immediate benefits for those people participating in the projects, you will be able to inform the research by sharing your experience and opinion of living in cohousing communities. This will inform the research findings and design and policy recommendations for sustainable living environments.

**What do I do if I have any issues or complaints?**
If you have any complaints about this research or researchers, please contact Professor Karim Hadjri, School of Architecture, The University of Sheffield, Arts Tower, Western Bank, Sheffield S10 2TN, UK. Tel: +44 114 222 0307. Email: k.hadjri@sheffield.ac.uk

**Will my taking part in this project be kept confidential?**
All the information that we collect about you during the course of the research will be kept strictly confidential. You will not be able to be identified in any reports or publications.

**What type of information will be sought from me and why is the collection of this information relevant for achieving the research project's objectives?**
You will be asked some interview questions and/or participate in the community observation. Interview questions will target physical design features, social factors, understanding of lifelong homes and affordability. Observation will only focus on common meals and community meetings. In order to identify the role of cohousing in creating sustainable living environments and communities, it is vital to understand the current status and development process of a cohousing community; and what is the special value of the cohousing community compared with other living models (i.e., sheltered housing, care home). Your participation is very important for us and it will help us to identify the meaning and value of cohousing in the UK.

**What will happen to the results of the research study?**
It will be disseminated widely: at a research seminar and a conference, and a paper will be published in an academic journal. We will send you a copy of the final report and we will invite you to attend the research seminar if you are happy to be involved.

Due to the nature of this research, it is very likely that other researchers may find the data collected to be useful in answering future research questions. We will ask for your explicit consent for your data to be shared in this way and if you agree, we will ensure that the data collected about you is untraceable back to you before allowing others to use it

**Who is organising and funding the research?**
This research is self-funded by the individual researcher Amy JingJing Wang

**Who has ethically reviewed the project?**
This research has been ethically approved via the School of Architecture's ethics review procedure.

The University's Research Ethics Committee monitors the ethics application.

**Contact for Further Information**
If you have questions about this study and the interview, please contact Amy JingJing Wang, The school of Architecture, The University of Sheffield, Arts Tower, Western Bank. Sheffield S10 2TN, UK Email: jwang130@sheffield.ac.uk

Thank you for taking time to read the information sheet.

Yours faithfully,

Amy JingJing Wang

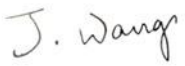
## APPENDIX 7: CONCENT FORM

# CONSENT FORM (Interview)

**Full title of Project**: A development framework for sustainable lifetime cohousing communities

**Name, position and contact address of Researcher**:
Amy Jingjing Wang
FT PhD student
School of Architecture
The University of Sheffield
Email: jwang130@sheffield.ac.uk

| | Please initial box |
|---|---|
| I confirm that I have read and understand the information sheet, dated 14 July 2018 for the above study and have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. | ☐ |
| I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason. | ☐ |
| I understand that my responses will be kept strictly confidential (only if true).<br>I give permission for members of the research team to have access to my anonymised responses. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in the report or reports that result from the research. | ☐ |
| I understand that it will not be possible to withdraw my data from the study after final analysis has been undertaken | ☐ |
| I agree to the interview being audio recorded | ☐ |
| I agree to the use of anonymised quotes in publications | ☐ |
| I agree to take part in the above study. | ☐ |

| | | |
|---|---|---|
| Name of Participant<br>(or legal representative) | Date | Signature |
| Amy JingJing Wang | |  |
| Name of Researcher | Date | Signature |
| Prof. Karim Hadjri | | Karim Hadjri |
| Lead Researcher | Date | Signature |

Copies:

Once this has been signed by all parties the participant should receive a copy of the signed and dated participant consent form, the letter/pre-written script/information sheet and any other written information provided to the participants. A copy of the signed and dated consent form should be placed in the project's main record (e.g., a site file), which must be kept in a secure location.

## APPENDIX 8: PUBLICATIONS

### Journal papers

Wang, J., Pan, Y. and Hadjri, K. (2020): Social sustainability and supportive living: exploring motivations of British cohousing groups, *Housing and Society,* 48 (1). DOI: 10.1080/08882746.2020.1788344

Wang, J., Hadjri, K., Bennett, S. and Morris, D., (2020). The role of cohousing in social communication and sustainable living environments. *WIT Transactions on The Built Environment*, 193, pp.247-258.

Wang J., Pan, Y., and Hadjri, K. (2018) Exploring Collaborative Design and Sustainable Living in British Cohousing Communities. *Asian Journal of Behavioural Studies,* 3(14), 30-30. (Web of science index)

Wang J & Hadjri K (2018) The Role of Cohousing In Building Sustainable Communities: Case studies from the UK. *Asian Journal of Quality of Life,* 3(13), 187-197. (Web of science index)

Gadakari T, Wang J & Hadjri K (2018) Designing Residential Buildings for Older People in China to Promote Ageing-in-place. *Asian Journal of Quality of Life,* 3(13), 18-28. (Web of science index)

### Conference proceeding journal

Wang, J., Pan, Y. and Hadjri, K., 2018. Creative Housing Design: Promoting sustainable living in cohousing community in the UK. *Environment-Behaviour Proceedings Journal,* 3(8), pp.129-140.

Gadakari, T., Wang, J., Hadjri, K. and Huang, J., 2017. Promoting Ageing-in-Place: Design of residential buildings for older people in China. *Environment-Behaviour Proceedings Journal,* 2(6), pp.113-121.

Wang J & Hadjri K. 2017. The role of co-housing in building sustainable communities: Case studies from the UK. *Environment-Behaviour Proceedings Journal,* Vol. 2(6) (pp 255-265), 14 October 2017 - 16 October 2017.

Wang J, Hadjri, K, Morris, D. & Bennett S. 2016. The role of cohousing in social communication and sustainable living environments. *Third {OIKONET} Conference,* University of Central Lancashire, Vol. 23

### Chapter in book

Age-Friendly Housing Environments

Hadjri, K., Gadakari, T., Huang, J. & Wang, J., 1 Feb 2018, ODESSA: Optimising Care Delivery Models to Support Ageing-in-Place. University of Sheffield, p. 14-19 6 p.
Research output: Chapter in Book/Report/Conference proceeding › Chapter

Scenario Building and Evaluation for Older People in China

Hadjri, K., Gadakari, T., Huang, J. & Wang, J., 2018, ODESSA: Optimising Care Delivery Models to Support Ageing-in-Place. University of Sheffield, p. 29-32 4 p.
Research output: Chapter in Book/Report/Conference proceeding › Chapter

### Research Project

ODESSA Project Age-friendly environments: A review of case studies

Hadjri, K., Gadakari, T., Wang, J. & Huang, J., 2017, University of Sheffield.

Housing and Society

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/rhas20

# Social sustainability and supportive living: exploring motivations of British cohousing groups

Jingjing Wang , Yiru Pan & Karim Hadjri

**To cite this article:** Jingjing Wang , Yiru Pan & Karim Hadjri (2020): Social sustainability and supportive living: exploring motivations of British cohousing groups, Housing and Society, DOI: 10.1080/08882746.2020.1788344

**To link to this article:** https://doi.org/10.1080/08882746.2020.1788344

# The role of cohousing in social communication and sustainable living environments

J. Wang[1], K. Hadjri[1], S. Bennett[2] & D. Morris[3]
[1]*School of Architecture, The University of Sheffield, UK*
[2]*School of Art, Design and Fashion,*
*University of Central Lancashire, UK*
[3]*School of Social Work, Care and Community,*
*University of Central Lancashire, UK*

## Abstract

Cohousing is a new form of human settlement which offers a possible solution to the housing crisis. In cohousing communities, people come together and share facilities and belongings, such as a garden, central workshops and car. The energy efficiency contributes to a reduced cost of living for tenants. Equally, cohousing and its community have the potential to offer a different scale of social organisation whilst delivering an environmental concept that leads to a low carbon lifestyle. This paper will present work conducted as part of a PhD study which aims to examine the timeline and consequences of a green agenda moving towards a sustainable living model, by exploring debates around cohousing and sustainable communities and social interaction. Examining people's contemporary lifestyles as a starting point, this research will develop methods to encourage a greater commitment to cohousing and sustainable living environments. This paper will review two case studies in order to examine the role of cohousing in creating sustainable living environments in the UK. Cohousing concepts will be analysed according to size and features, community structures, cultural and economic values. How cohousing can be utilised as an evaluation tool for social sustainability, to guide behavioural change and foster sustainable living will be examined. Additionally, it is anticipated that the information produced by this research could potentially be applied to different settings and environments in the UK and beyond, accelerating the implementation of environmentally-friendly homes and communities.

*Keywords: cohousing, social communication, sustainable living environments, low carbon lifestyle, affordable housing.*


WIT Transactions on The Built Environment, Vol 193, © 2020 WIT Press
www.witpress.com, ISSN 1746-3509 (on-line)
doi:10.2495/GD170201

# Exploring Collaborative Design and Sustainable Living in British Cohousing Communities

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The University of Sheffield, UK

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## Abstract

Cohousing is a new collaborative housing concept to foster closer social bonding and sustainable communities. This paper discusses the key principles, priorities, and challenges of Cohousing design through interviews with four architects and four Cohousing community residents. The interviews were carried out 1) to demonstrate the application of the design standards, 2) to understand residents' thinking and behaviour change, and 3) to establish the environmental and social sustainability in a cohousing setting. The findings could lead to a toolkit and guide for Cohousing design process and to establish a better understanding of Cohousing design and development process in the UK.

Keywords: Cohousing Community; Cohousing Design; Environmental Sustainability; Social Sustainability;


http://dx.doi.org/10.21834/ajbes.v3i14.163

# The Role of Cohousing in Building Sustainable Communities: Case studies from the UK

Jingjing Wang, Karim Hadjri

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The University of Sheffield, UK

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## Abstract

This paper explored the role of cohousing models in the UK and discussed the benefits and limitations of cohousing models by exploring residents' motivation and daily living. Through case studies in the UK, semi-structured interviews were carried out to establish the environmental and social sustainability of cohousing and to understand residents thinking and behaviour. This study found that cohousing could benefit various age groups, and promote residents' thinking and behaviour change towards sustainable living. The findings of this research will establish a better understanding of UK cohousing and highlight the potentials and possibilities of cohousing communities.

Keywords: sustainable communities, cohousing, environmental sustainability, social sustainability


DOI: https://doi.org/10.21834/ajqol.v3i13.176

# Designing Residential Buildings for Older People in China to Promote Ageing-in-place

Tulika Gadakari [1], Jingjing Wang [2], Karim Hadjri [2], Junjie Huang [2]

[1] School of Art and Design,
Coventry University, UK
[2] School of Architecture,
The University of Sheffield, UK

tulika.gadakari@coventry.ac.uk

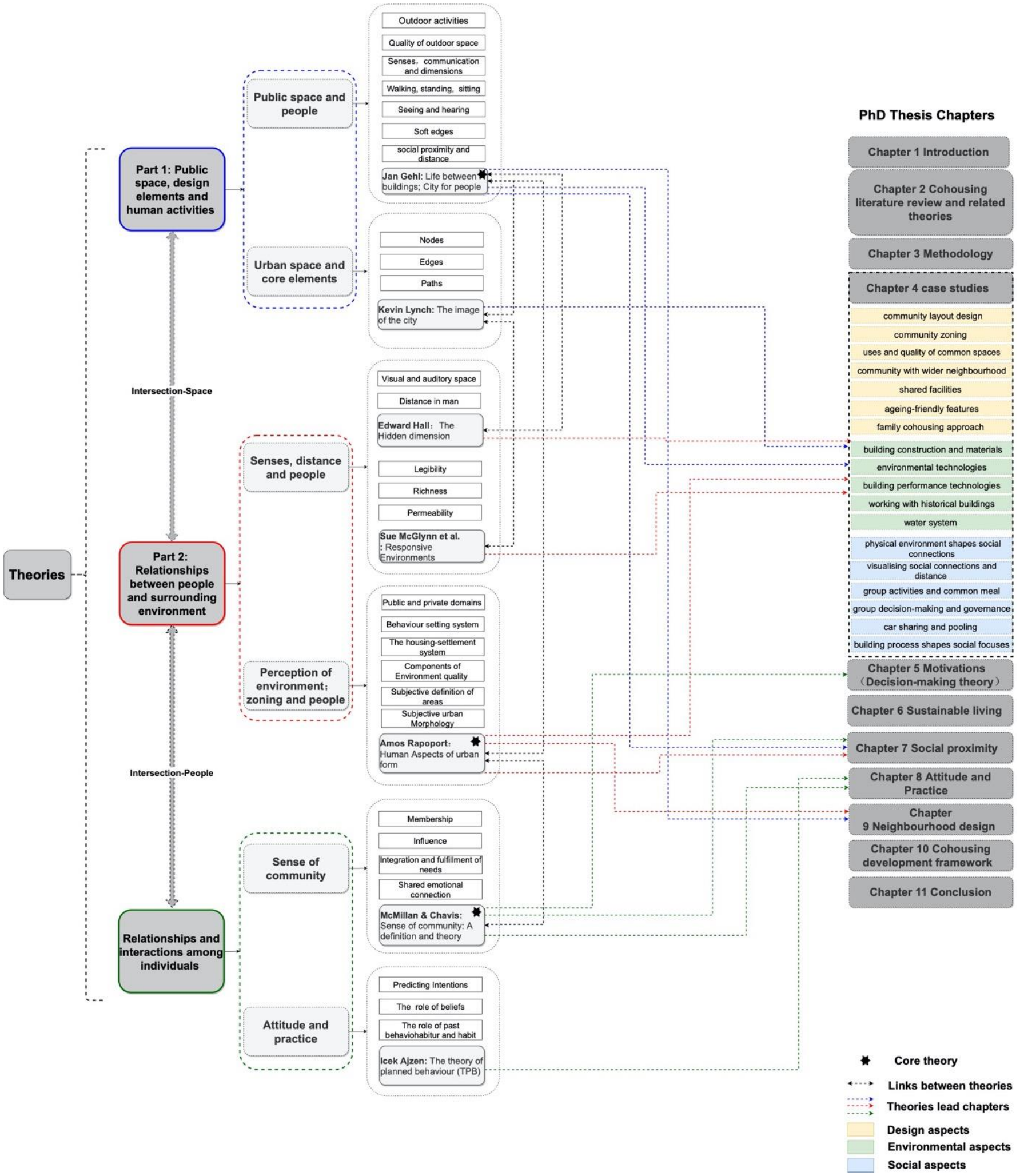
## Abstract

Ageing-in-place is the most common ageing model in China. Therefore, design of age-friendly residential buildings and neighbourhoods becomes an important factor leading to improvement in older people's health and quality of life. This paper presents the current situation of the ageing population in Chinese cities by qualitatively analysing existing literature, design standards and conducting stakeholder interviews to understand older people's housing choices and aims to identify physical design factors, challenges and potentials of residential design for older people. The findings will fill the knowledge gap of age-friendly residential models in China and guide better design to meet older people's needs.

Keywords: ageing; age-friendly design; residential building; spatial design


DOI: https://doi.org/10.21834/ajqol.v3i13.158

## APPENDIX 9: THE THEORY MAPPING



## APPENDIX 10: CLASSIFIED INTERVIEW ANSWERS FROM ARCHITECTS AND RESIDENTS WITHIN THEMES

Ecologocial Sustainability

| | Energy | Design/ sustainable standards, Building regulations | Heating system | Insulation and ventilation | Water system | Number or size of dwellings | New build development | Environmen-tal technologies | Food supply |
|---|---|---|---|---|---|---|---|---|---|
| C | ●● | ●● | ● | ●● | ● | ●● | | ● | ● |
| A | ●●● | ● | ●● | ●● | | | | | ● |
| R | ●●●●●● | ●● | ●● | | ●●● | ● | ●● | ●●●● | ● |

**Common:**
1. Using ground source
2. Reducing car use/owning fewer cars

**Architects:**
1: Investing in renewable energy sources for heating systems and hot water
2: Using solar energy, wind energy, and natural facilities to make gardens grow better
3: Using passive house designs to reduce energy use

**Residents:**
1: Using electricity and gas in the building; everybody has individual boilers
3: Small houses are cleaner and more efficient to heat than large houses
4: Thinking about the source of the energy, which is also very important
5: Sharing food and space with people can help save energy
6: Using ecological technologies to save energy

**Common:**
1. Adopting sustainable design standards, following building regulations and various guidelines. e.g. Code for sustainable homes (CSH), PassivHaus, Lifetime Homes, BREEAM, AECB
2. Using PassivHaus standards to reduce heating demands so a full central heating system is not required.

**Architects:**
1. The application of the sustainable design standards depends on members' affordability and whether members focus on big living space or highest housing quality

**Residents:**
1: Looking for a new-build development to apply high ecological standards
2: Unable to afford passive house standards

**Common:**
1. Having better insulation and heating to reduce bill

**Architects:**
1. Investing in renewable energy sources for heating systems and hot water
2. Designing to reduce the consumption

**Residents:**
1. Shared heating system
2. Designing the heating system to make it work well with historical building, or individual dwelling can benefit from the heating system applied in the historical building

**Common:**
1. Having better/ super-insulation
2. Double or triple-glazing

**Architects:**
1. Minimising ventilation heat loss – Mechanical ventilation and heat recovery (MVHR) and airtight construction
2. Spending money in different ways, such as on super-insulation and triple glazing, and not spending money on very complicated heating systems

**Residents:**
N/A

**Common:**
1. Using renewable energy sources for water (hot water and drinking water)

**Architects:**
N/A

**Residents:**
1. Thinking about grey water systems
2. Collecting rainwater to water the garden
3. Urban drainage system

**Common:**
1. Small houses are cleaner and more efficient to heat than large houses
2. Choosing smaller dwellings and using common house; using shared guest room when needed

**Architects:**
N/A

**Residents:**
1. Less property in the community, so people own less

**Common:**
1. Wanting to be part of a new build rather than encouraging the conversion of a big old house
2. Looking for a new-build development to apply high ecological standards

**Architects:**
N/A

**Residents:**
N/A

**Common:**
1. Having solar panels

**Architects:**
N/A

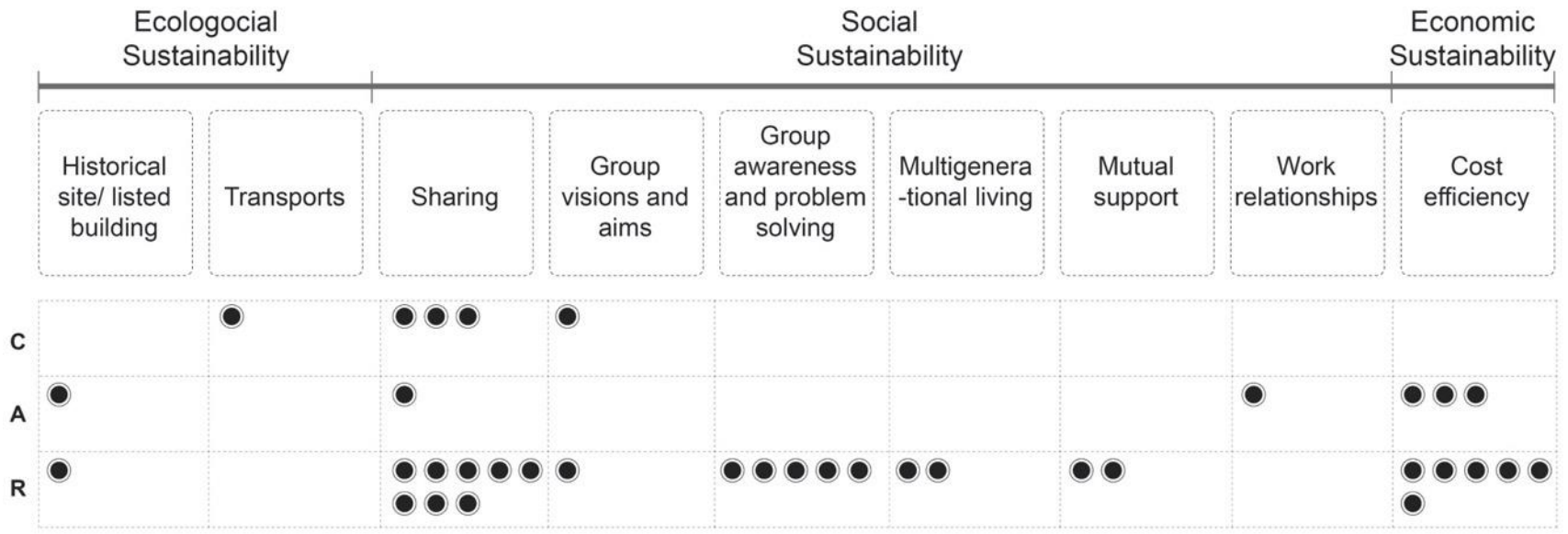
**Residents:**
1. Rainwater collection system
2. Depends on the technologies that the group can afford
3. Using ecological technologies is one of our group aims
4.Having biomass technology

**Common:**
1. Cohousing communities provide more spaces to grow food

**Architects:**
1. Growing food is not viable for everyone

**Residents:**
1. Self-sufficiency in terms of food would pose a big challenge for any group

**C - Common**
**A - Architects**
**R - Residents**




**Common:**
N/A

**Architects:**
1. Victorian houses are hard to work with, because they are very big and old buildings

**Residents:**
1. "Look after" listed buildings

**Common:**
1. Shared car use, shared trips. saving erergy

**Architects:**
N/A

**Residents:**
N/A

**Common:**
1. Sharing facilities (e.g. laundry and tools)
2. Sharing meals to reduce food waste
3. Using common house, sharing space (guest room, workshop)

**Architects:**
1. Reducing Home-Work distance (work miles) by having flexible work space in the common house

**Residents:**
1. Shared car use
2. Shared maintenance
3. Giving more room in people's home, using shared facilities
4. Using different kinds of resources by sharing
5. Shared heating systems
6. Enabling more activities through a common house (e.g. having a gym in a common house)
7. Establishing the culture of sharing within the community
8. Sharing can have an ecological impact

**Common:**
1. Environmental sustainable living is one of the development visions of the group

**Architects:**
N/A

**Residents:**
1. Using ecological technologies is one of our group aims

**Common:**
N/A

**Architects:**
N/A

**Residents:**
1:Sustainability needs to be more achievable and set in a group context
2: Sustainable technologies are symbolic and inspirational; they can not only help people, but also inspire them to believe they can achieve their goals
3: Wanting to establish something that is long term, such as multigenerational community
4: Becoming more aware of things such as sustainability
5: Working through problems; cohousing communities encourage holistic thinking about the land, the earth, and our resources
amultigenerati-onal community

**Common:**
N/A

**Architects:**
N/A

**Residents:**
1. Multigenera-tional living can lead to long-term consequences, including positive ecological ones
2.Intergenera-tion is very important for sustainable living

**Common:**
N/A

**Architects:**
N/A

**Residents:**
1. Helping each other with daily tasks
2. Helping each other to be more environmentally friendly, to reduce pollution

**Common:**
N/A

**Architects:**
1. Reducing Home-Work distance (work miles) by having a flexible work space in the common house, so as to build work relationships as well as social ones

**Residents:**
N/A

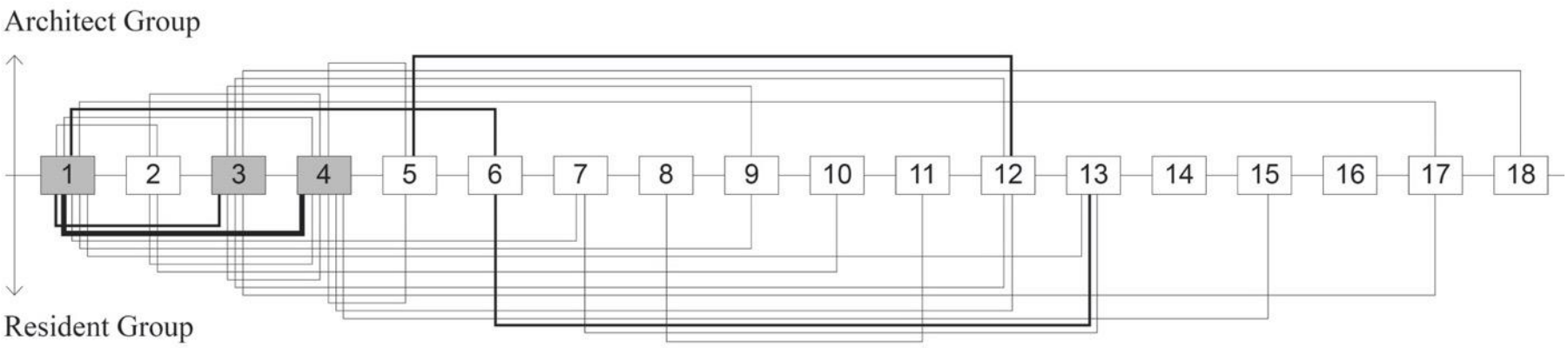
**Common:**
N/A

**Architects:**
1. Collaborating with builders and redesigning all properties in bulk, reducing construction costs
2. Spending money in different ways, such as on super-insulation and triple glazing, and not spending money on very complicated heating systems
3. Good insulation reduced heating costs

**Residents:**
1. There have to be some compromises, because we will not be able to afford everything we want
2. Cohousing is more expensive
3. There is a balance between sustainability and finance
4. The power of a group purchase is helpful
5. Buying a cohousing property will cost no more than a normal house
6. A long time is needed to see the financial benefits of cohousing

**C - Common**
**A - Architects**
**R - Residents**

## APPENDIX 11: LINKS BETWEEN CORE THEMES WITHIN TWO PARTICIPANT GROUPS




**Key**

- One concept was mentioned between categories
- Two concepts were mentioned between categories
- Three concepts were mentioned between categories
- Categories influential for sustainable living

**Notes**

* The thickness, density (number of lines), and flow of the lines measure the relations between categories.

**Environmental sustainability**

1 Energy (energy saving, source of energy, renewable energy)
2 Design/sustainable standards, building regulations
3 Sharing
4 Heating system
5 Insulation and ventilation
6 Water system (drinking water, grey water, rainwater)
9 Number or size of properties
10 Building types (new build)
13 Environmental technologies
14 Food supply
15 Historical site/listed building
17 Transport

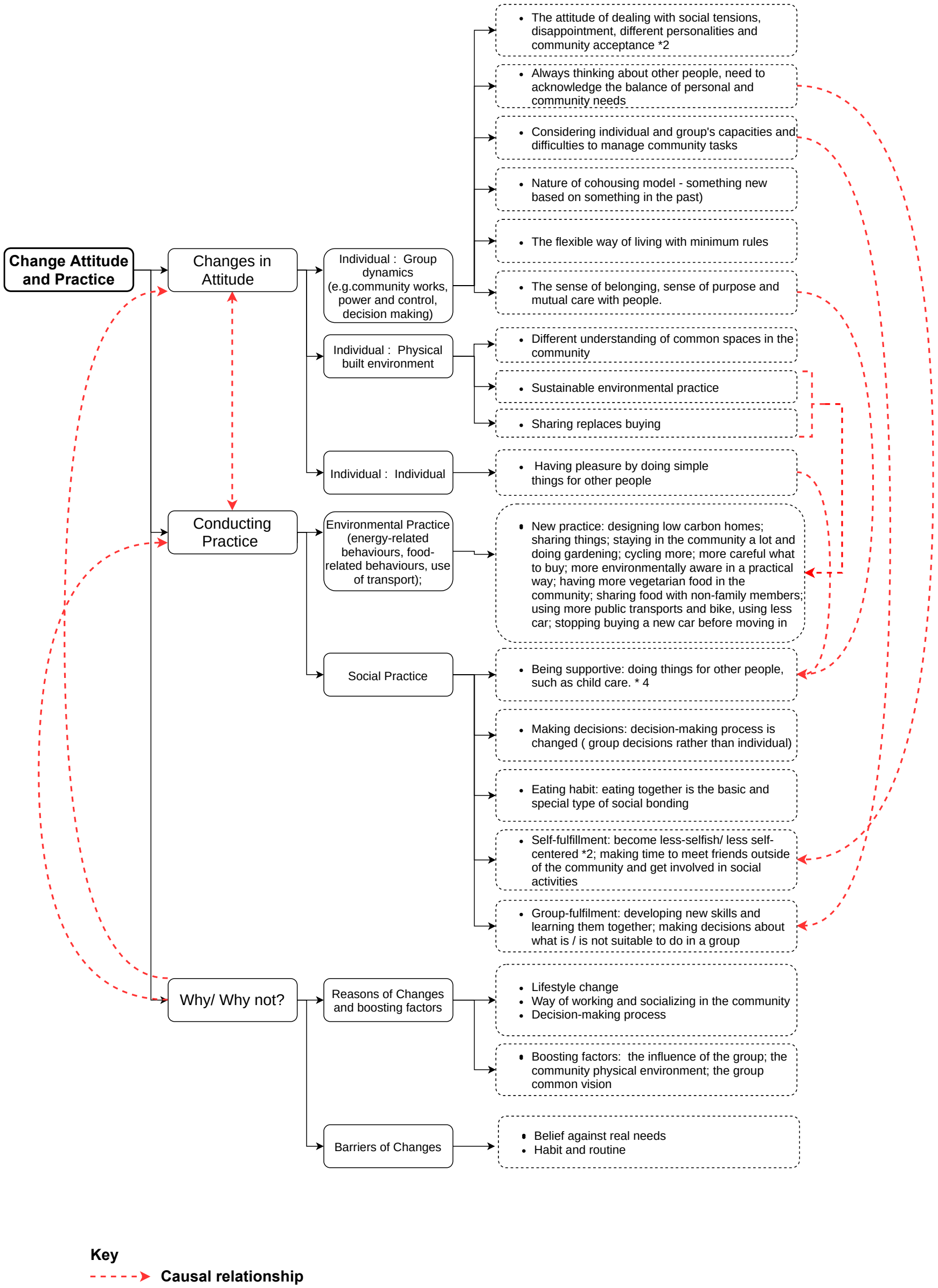
**Social sustainability**

7 Group vision and aims
8 Group awareness and problem solving
11 Multigenerational living
16 Mutual support
18 Work-relationships in community

**Economic sustainability**

12 Cost efficiency

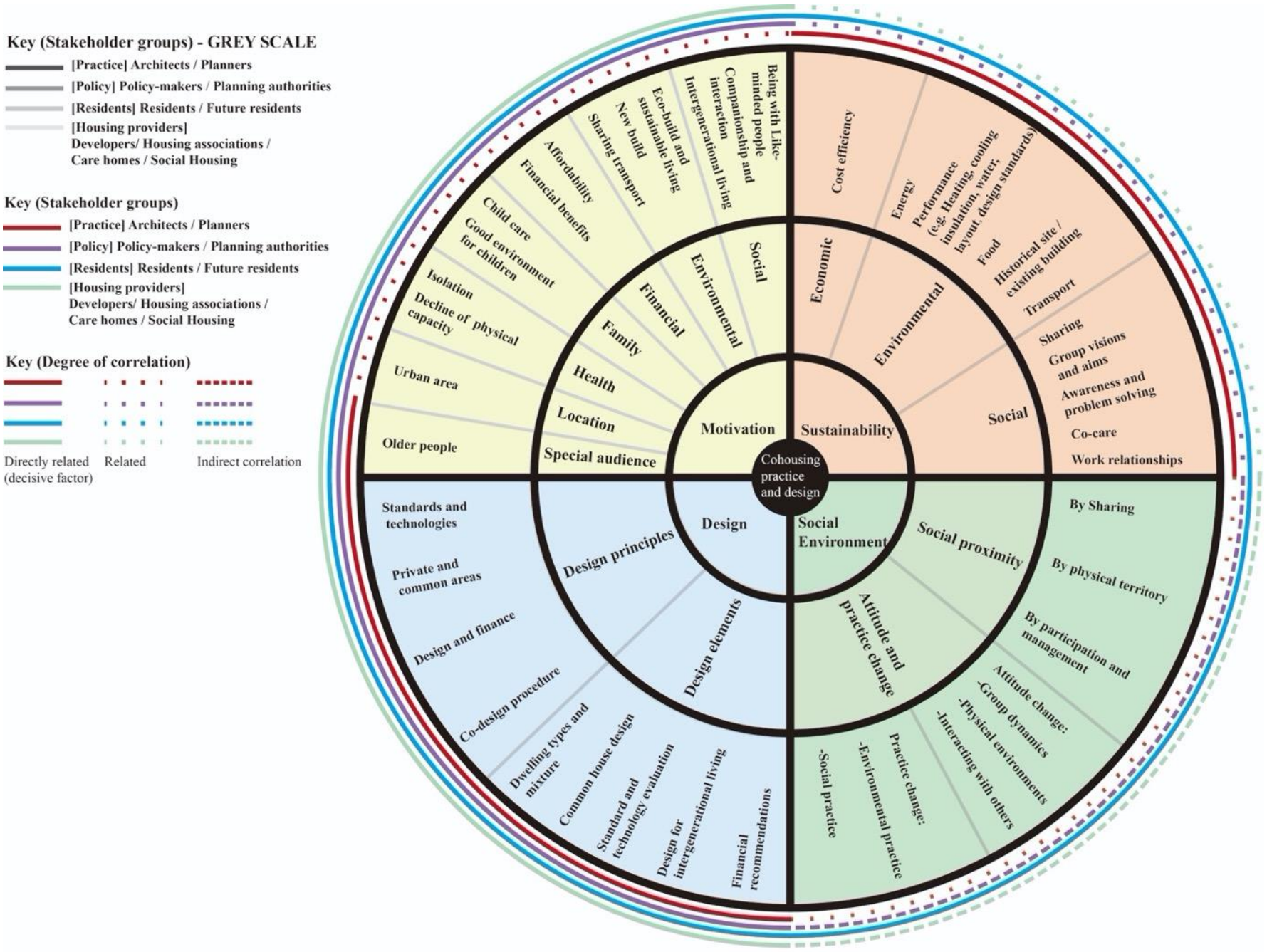
## APPENDIX 12: STRUCTURE OF CHAPTER 8

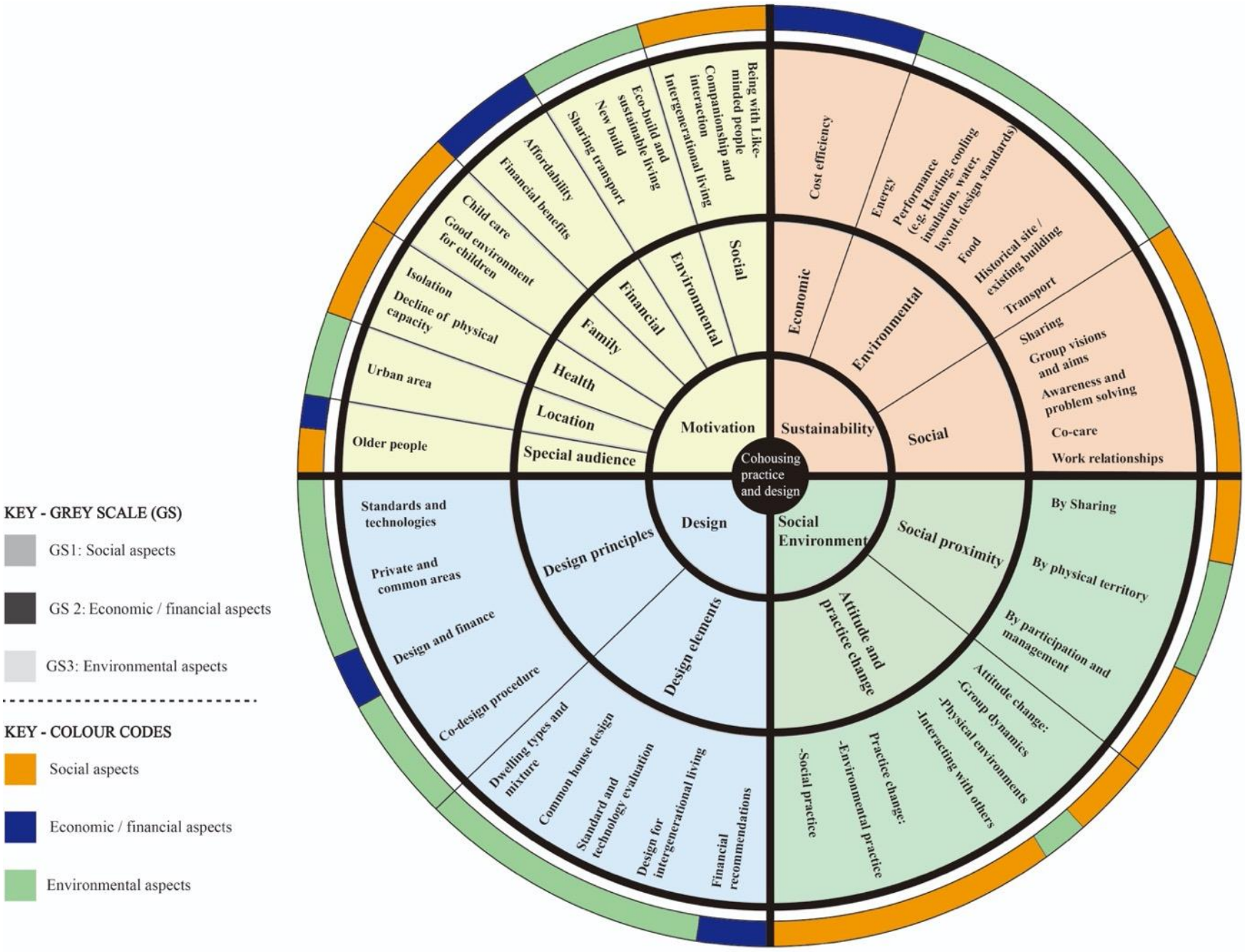



**Key**

**Causal relationship**

## APPENDIX 13: COHOUSING FRAMEWORK




KEY - GREY SCALE (GS)
GS1: Social aspects
GS 2: Economic / financial aspects
GS3: Environmental aspects
KEY - COLOUR CODES
Social aspects
Economic / financial aspects
Environmental aspects
Cohousing practice and design
Motivation
Social
Environmental
Financial
Being with Like-minded people
Companionship and interaction
Intergenerational living
Eco-build and sustainable living
New build
Sharing transport
Affordability
Financial benefits
Child care
Good environment for children
Isolation
Decline of physical capacity
Urban area
Older people
Family
Health
Location
Special audience
Sustainability
Economic
Environmental
Social
Cost efficiency
Energy
Performance (e.g. Heating, cooling insulation, water, layout, design standards)
Food
Historical site / existing building
Transport
Sharing
Group visions and aims
Awareness and problem solving
Co-care
Work relationships
Design
Design principles
Design elements
Standards and technologies
Private and common areas
Design and finance
Co-design procedure
Dwelling types and mixture
Common house design
Standard and technology evaluation
Design for intergenerational living
Financial recommendations
Social Environment
Social proximity
Attitude and practice change
By Sharing
By physical territory
By participation and management
Attitude change:
-Group dynamics
-Physical environments
-Interacting with others
Practice change:
-Environmental practice
-Social practice