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Achieving Sustainable Urban Development: Analyzing the Cohousing Model and Local Governance in De Kersentuin, Netherlands

Name: Shahenda Wahib

Supervisor: Manjunath Sadashiva

Specialisation: Urban Housing, Equity, and Social Justice

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Urban Development Studies of
Erasmus University Rotterdam

Summary

The ongoing global trend of urbanization has concentrated the world's population in cities, leading to significant challenges, particularly in the housing sector. In the Netherlands, issues like housing shortages, affordability, and energy inefficiencies have heightened the demand for innovative housing solutions. Sustainable Urban Development (SUD) has emerged as a transformative approach, yet its integration with grassroots Cohousing in the Dutch context remains underexplored.

This research examines the potential of cohousing as a transformative housing model and its role in promoting SUD within local urban governance. Unlike traditional housing, cohousing emphasizes ecological consciousness and social well-being through collaborative efforts among community groups and stakeholders. This shapes an environmentally efficient and socially cohesive housing paradigm. The study centers on a specific cohousing variant, "Collective Private Commissioning" (CPOs), in Utrecht, Netherlands, allowing for an in-depth exploration within a local context. The research addresses challenges such as the relative nature of sustainability concepts and language barriers in interviews. By bridging theory with empirical insights, the study enriches understanding and provides evidence-based clarity on the cohousing model's relationship with SUD. This investigation is significant for academic discourse and policy-making, offering nuanced insights into how cohousing can tackle housing challenges, foster sustainable practices, and align with local governance objectives. Understanding the interplay between cohousing, local governance, and SUD informs informed urban development strategies.

The study employs a mixed-methods approach, combining qualitative data from interviews and observations with quantitative insights from surveys and case study documents for a comprehensive perspective. This strategy ensures robust findings, as data analysis uses open coding and frequency analysis. The varied data collection methods foster triangulation for validity and reliability.

The multifaceted contributions of cohousing to social, environmental, and economic sustainability are revealed. The analysis shows how cohousing nurtures social cohesion, fostering belonging and shared responsibility among residents. It also demonstrates how cohousing promotes an environmentally conscious lifestyle, influencing energy consumption and sustainable practices. Economically, cohousing lowers living costs and builds resilient communities. Partnership relations, as seen in the De Kersentuin case study, highlight the synergies and challenges in cohousing development. However, the time-intensive nature of cohousing might limit its scalability in urgent housing scenarios.

While Cohousing is not a panacea for all housing needs, it offers a valuable model within a diverse housing landscape. Future research should adopt broader perspectives to enhance cohousing's accessibility and applicability, addressing diverse urban housing challenges. In navigating urbanization complexities, cohousing stands as a practical step toward a more sustainable future.

Keywords

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Abbreviations

ALV	Residents Association
CPO	Collective Private Commissioning
EPC	Energy Performance Coefficient
ES	Environmental Sustainability
IHS	Institute for Housing and Urban Development Studies
LUG	Local Urban Governance
SDG	Sustainable Development Goals
SKB	Kersentuin Management Foundation
SS	Social Sustainability
SUD	Sustainable Urban Development
UN	United Nations
VvE	Homeowners Association

Chapter 1: Introduction

This chapter introduces the research and its problem statement, sections 1.1 and 1.2 respectively, followed by the academic and social relevance. It also lists the study's objectives and questions (sections 1.4 and 1.5). Finally, the study's scope and limitations are discussed in section 1.6.

1.1 Introduction

Urbanization is rising steadily worldwide, with cities currently housing the majority of the world's population, and this percentage continues to rise (Nijkamp & Perrels, 2018). By 2050, it is estimated that approximately 68% of the global population will reside in urban regions. (UN, 2018). Although urban development promotes economic and social prosperity, it also is the catalyst of many societal issues nowadays. These problems include housing and resource shortages, pollution, climate change, biodiversity loss, and declining health and well-being (Nijkamp & Perrels, 2018). The recent economic recession and pandemic have further exacerbated these pre-existing challenges.

In the evolving urban development landscape, modern communities face multifaceted challenges. Within this framework, the housing sector is a key area where these issues are most pronounced (Moroke et al., 2019). The challenges that modern housing faces, including affordability, energy accessibility, and resource inefficiencies, require innovative solutions (Tosics, 2004). European urbanization trends, over the past decades, have highlighted the significance of sustainability (Medeiros & Van Der Zwet, 2019). The concept of "sustainable urban development" (SUD) has gained popularity with governments and policy-makers (Nijkamp & Perrels, 2018), presenting a transformative process that addresses current needs while safeguarding the future (WCED, 1987). SUD represents a balanced, integrative, and adaptive transformation process rather than a predefined final state. In the housing sector, sustainability is often interpreted as the retrofitting process for more environmental friendliness. However, recent discourse emphasizes the integration of social, economic, and environmental dimensions in neighborhood development (Lambrechts et al., 2021). Moreover, following the SUD trend, rising concerns about climate change and other societal consequences of contemporary living patterns have heightened the need to establish lifestyles that are socially, economically, and ecologically more sustainable (Hagbert et al., 2019).

Amid the persistent global housing crisis, many initiatives have emerged, ranging from top-down or bottom-up approaches (Madden & Marcuse, 2016). The bottom-up Grassroots innovations address societal issues directly by catering to community needs. In the past years, European cities have seen the emergence of many grassroots housing innovations including Cohousing, which is under the umbrella term of community-led housing (Tummers, 2016). In the Netherlands, the Cohousing model arose as an alternative to traditional housing, aiming to reduce ecological impact and enhance social welfare (Tummers & MacGregor, 2019). Cohousing is recognized for its potential to enhance social cohesion, resilience, and environmental impact reduction (Daly, 2017; Marckmann et al., 2012). The model involves collaborative efforts between community groups and various public and private stakeholders (Czischke, 2018).

These collaborative processes within the local urban governance framework drive the realization of cohousing projects. This framework enables private and public stakeholders to work together towards shared goals. Achieving sustainable solutions requires active public engagement throughout all project stages (Bredenoord et al., 2014). According to Ernst et al. (2016), to achieve SUD, the local governance scheme has to be characterized by a culture of collaboration and co-creation processes performed through different partnership relations.

Hence, the local governance framework is vital to understand how the cohousing model achieves SUD. This research focuses on cohousing initiatives and local urban governance within the Netherlands context.

1.2 Problem Statement

The Netherlands' urban development grapples with significant "wicked problems," including high energy consumption, waste production, and inefficient resource use. The housing sector faces many issues of affordability, availability, and accessibility. There is a huge shortage of affordable housing that afflicts many alongside shortages in available building land. Private developer speculation and market dynamics further affect housing provision, often treating it as a commodity rather than a basic human right (Jarvis, 2015; Boyer & Leland, 2018). While social housing schemes are affordable, they are not available to everyone and are characterized by long waiting lists, averaging 7 years (Times, 2021). To tackle this shortage, the Netherlands's 12 provinces agreed to construct 917,000 housing units by 2030. The government also targets a 49% reduction in built environment greenhouse gas emissions by transforming 1.5 million existing homes (EZK, 2019). Increasingly, local communities recognize the need for sustainable built environments. However, policymakers and property owners have yet to effectively address these challenges (Seyfang, 2010; Gibbs & O'Neill, 2015). To achieve its set goals, the Dutch government encourages housing innovation for sustainability, (Ernst et al., 2016), exemplified by the Utrecht municipality (Gemeente Utrecht, n.d.).

Despite growing cohousing research, understanding the link between the Cohousing model and SUD within the Dutch housing sector remains limited. While theoretical frameworks highlight cohousing's potential, empirical evidence is lacking. Existing literature often addresses isolated SUD principles, neglecting integrated approaches. This study aims to bridge these gaps by examining **how the cohousing model factors contribute to SUD within the context of local governance.** While perceived as an alternative to traditional housing, cohousing constitutes a small fraction of Dutch housing. Researchers suggest its advantages for social, economic, and environmental sustainability, fostering "affordable, low-impact, and socially cohesive housing that can empower communities" (Lang et al., 2019, p. 59).

This research undertakes a thorough examination of cohousing, a transformative housing model, and its potential to promote SUD. The focus of this study is to look into the relationship between the cohousing model and SUD within the complex framework of local governance. The study intends to shed light on the possibility of cohousing as a feasible solution and catalyzer for sustainable urban development in the Dutch housing sector by exploring this relationship.

1.3 Relevance of the research topic

1.3.1 Social Relevance

The cohousing model has the potential to be a vital approach in tackling modern-day "wicked problems" in the housing sector. It aids in creating an equitable, just environment with democratic processes and addresses social inequality. In addition, it also fosters the creation of intentional communities where the environmental agenda is a high priority. Moreover, linking

and aligning cohousing with the Netherlands' sustainability goals in the housing sector could aid in the institutional shift to more participative governance. This research could assist both Cohousing actors in developing an understanding of their role in transitions toward sustainability and policymakers in identifying critical aspects of Cohousing that can be addressed with adapted policy actions. Moreover, establishing how cohousing could be a sustainable housing model will influence future policy recommendations and institutional changes.

1.3.2 Academic Relevance

Addressing the gap between theory and practice will allow us to understand the potential to use the cohousing model as an alternative to existing housing schemes. It could shed light on the current debate on whether cohousing is a utopian solution or a pragmatic one. Moreover, it could assist in identifying the specific characteristics of cohousing that impact SUD, hence, opening doors to future research to examine this relationship or the possibility to integrate it in other housing schemes. In addition, this research could be pertinent to understanding modern cohousing realization in an advanced liberal context where sustainable urban development has become a priority for urban governance. Furthermore, identifying challenges and opportunities in the cohousing realization might encourage further research to examine this phenomenon and propose possible solutions.

1.4 Research Objectives

This research aims to advance recent studies by exploring whether and how the cohousing model could promote sustainable urban development (SUD) in the housing sector and examining the different opportunities and challenges faced in the context of local governance. This objective will be achieved by attempting to:

- analyze the Cohousing model and its characteristics,
- identify the different social, economic, and environmental principles of SUD,
- explore how the aspects of cohousing achieve SUD, and
- explore the cohousing's relationship with the local government.

1.5 Main research question and research sub-questions

This thesis will tackle the question:

How does the cohousing model contribute to the sustainable urban development of the housing sector in the context of local urban governance?

The main question will be tackled by answering the following sub-questions:

1 How does the cohousing model address social sustainability?
2 How does the cohousing model address environmental sustainability?
3 How does the cohousing model address economic sustainability?
4 What factors hinder/realize the cohousing model in context of local urban governance?

1.6 Scope and limitations

The scope of this research is focused on the cohousing model, in particular "Collective Private Commissioning" or "CPOs" (a form of cohousing particular to the Netherlands) in Utrecht, Netherlands. Dimensions and characteristics of this housing type in a neighborhood scale along with its partnership relations with other stakeholders will be addressed through focusing on a case study project. This might narrow the scope of the analysis. However, an in-depth analysis is required for this type of research. Taking into consideration the time limitation of this study, future research could analyze other forms of cohousing and add to the literature in this scope. First limitation noted is that the concepts of SUD are relative and not absolute concepts, hence could be operationalized in multiple ways according to the context and scope of the study (Ceano-Vivas et al., 2014). Moreover, social, economic, and environmental sustainability are operationalized into multiple variables, however, because of the time limitation, the research only focused on relevant ones. Future research could tackle the relationship between cohousing and the other variables. Second, the language barrier meant that only people who speak English could participate in interviews, however, this was addressed in the surveys. Finally, some stakeholders were hard to reach, thus findings didn't include their contribution.

Chapter 2: Literature review

2.1 What is cohousing?

This study places particular emphasis on cohousing, a distinctive neighborhood design that gives residents priority in planning, building, and management of their community (Boyer & Leland, 2018). Cohousing could be defined as "housing shaped and controlled by a group that represents the residents and/or the wider community that will be served by the housing" (Lang et al.,2019, p. 59). Moreover, according to William (2006, p. 200), "Cohousing combines the autonomy of private dwellings with the advantages of community living. It has private units, semi-private spaces, and indoor and outdoor communal spaces, as illustrated in Figure 1. Thus, communities are very diverse. The design and processes operating in cohousing encourage a 'collaborative' lifestyle and greater interdependence between residents." Contemporary cohousing typologies have been diversely translated into different contexts. its physical designs range from refurbished buildings to low-rise dwellings grouped around a courtyard, or high-rise structures with shared amenities (Arrigoitia & Tummers, 2019).

Projects are usually co-designed by architects and future users to achieve a common goal or vision aligned with the community's needs (Tummers, 2015; Krofkors, 2012). It can be initiated by various stakeholders, including architects, a group of community members posing as a developer (community-led), or developers like housing corporations. It can also target different demographic groups and cater to their needs (Arrigoitia & Tummers, 2019). For instance, senior residents' cohousing schemes are also rising in popularity as a noninstitutional approach to community aging in place that may decrease reliance on family members or facilities like "assisted- living" in addition to improving the quality of life while cutting governmental costs (Labit, 2015). There are other typologies like intergenerational cohousing, Centraal Wonen (Netherlands), eco-cohousing, live and work community, etc., depending on the users' diverse motivations to initiate it. This diversity allows each cohousing initiative to be unique and different from one context to another. Hence, cohousing is a broad term, and boundaries between one typology to another could be vague. This research will focus on community-led cohousing where community is at the center of all processes.
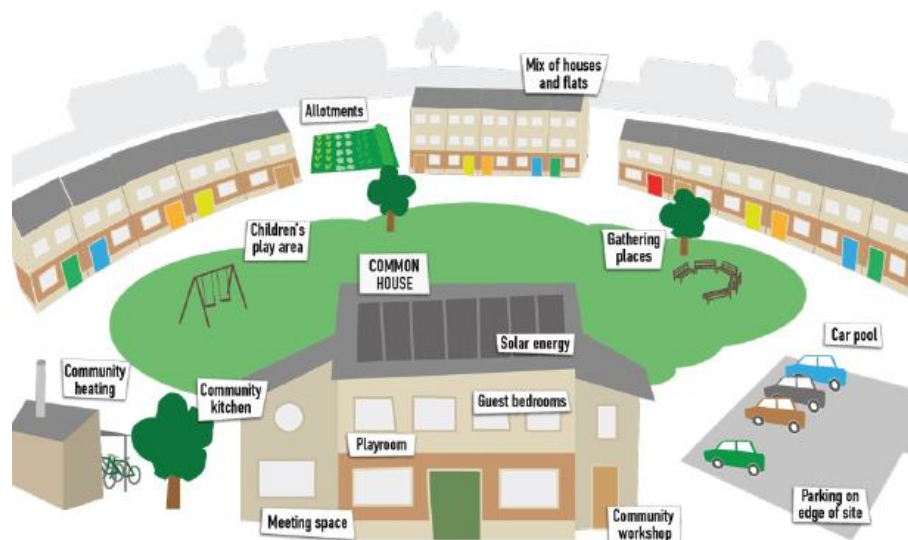
Figure 1 Typical Cohousing Model

Source: (Jarvis et al., 2016)

2.1.1 Dimensions of Cohousing

Since each cohousing initiative is unique to the community and setting it is implemented, researchers found it crucial to define some common values and characteristics for these projects as guiding principles. These principles will aid in applying the notion that the cohousing model could be an alternative to regular housing provision. For instance, Droste (2015) identified three key elements present in all cohousing projects including the idea of everyday life collaboration, self-governance, self-organization, and "spatially relational" (p. 79) approaches in a collective environment. Aside from these, cohousing may encompass a variety of tenure and ownership arrangements, daily routines, expressions of group identity and self-governance, and architectural styles (Hagbert et al., 2019). Similarly, Boyer, Leland (2018), and Tummers (2015) recognize the same elements, adding that there is always an overlap between these factors and that they're not isolated notions. They also identify the aspect of "mutualization", and the common motivation to lead "nonspeculative, often sustainable lifestyles" (Tummers, 2015, p.75), in addition to a mixed-use or mixed-income setting. There has been a reoccurrence in these elements among different scholars and Czischke et al. (2020) categorized them into four dimensions, (summarized in Table 1), that this thesis will adopt. These dimensions are:

- "Visions and values dimension
- organizational dimension,
- spatial dimension, and
- relational dimension" (p. 3).

2.1.1.1 Vision and Values Dimension

The cohousing model's vision and values dimension includes the shared ideals, values, and aspirations that direct the creation and operation of the community. It outlines a common framework for how they want to live and interact in the cohousing community and embodies the inhabitants' collective vision (Czischke et al., 2020). This dimension entails the following aspects: **shared vision, intentional communities, sustainable Lifestyles, participatory decision-making, and diversity and inclusivity.** Overall, the cohousing model's vision and values dimension captures the shared goals and principles that define the community's identity and way of life. It demonstrates a shared dedication to building an accommodating, sustainable, and inclusive community where people may thrive and develop deep relationships with one another.

2.1.1.2 Spatial Dimension

The spatial dimension encompasses the physical layout and the design of the spaces that are specifically developed to foster social interaction, collaboration, and a sense of community (Boyer & Leland, 2018). This dimension is described as follows: **social architecture, common space and outdoor areas, walkability, and pedestrian centered, private and public spaces, and adaptability.** The cohousing model's spatial component generally aims to provide a physical setting that supports social interactions, encourages group activities, and fosters a sense of community.

2.1.1.3 Relational Dimension

The cohousing model's relational component refers to the value placed on interpersonal connections and the development of a supportive and collaborative community. It places a focus on the inhabitants' interpersonal relationships, communication, and social interactions (Boyer & Leland, 2018). This dimension could entail the following: **social interaction, shared responsibilities, mutual Support, and conflict resolution.** Overall, the cohousing model's relational component emphasizes the value of building strong social bonds, cooperation, and a sense of community, hence supporting the cohousing community's general well-being and cohesiveness.

2.1.1.4 Organizational Dimension

The community's management, decision-making, and organizational structures are all addressed under the organizational dimension (Tummers, 2015; Czischke et al., 2020). The cohousing model's organizational aspect stresses resident **self-organization, self-governance, mutualization, and collaboration**. Mutualization refers to the community's capability of sharing resources and assets. It guarantees inclusive and participatory decision-making processes, supports the sharing of responsibility, and promotes **continuous learning and adaptation**. Cohousing communities build a setting that empowers people and promotes a strong sense of community ownership and engagement. The following Table 1 summarizes the different dimensions and their corresponding characteristics.

Table 1: Dimension and characteristics of Cohousing.

Dimensions	Vision and values dimension	Organizational dimension	Spatial dimension	Relational dimension
Characteristics	Shared vision	Self-organization	Social Architecture	Social Interaction
	Intentional communities	Self-governance	Common Spaces & outdoor areas	Shared Responsibility
	Sustainable lifestyles	Mutualization	Walkability & pedestrian centered	Consensus Building
	Participatory Decision-making	Collaboration	Private & Public Spaces	Mutual Support
	Diversity & Inclusivity	Continuous Learning & Adaptation	Adaptability	Conflict Resolution

Source: Author (2023), content derived from literature

2.1.2 The Cohousing Model's Potential

Based on several empirical studies and the previously defined characteristics of the cohousing model, the positive social and environmental impact of cohousing can be discerned. Thus, cohousing consequently sets high expectations for vibrant social networks and healthy settings (Tummers, 2016). Although it exists in limited numbers, cohousing is regarded as a framework for broader housing development aiming for more inclusive and sustainable growth (Krokfors, 2012).

Cohousing initiatives fit adequately with community movements including decentralization, increased self-governance, citizen involvement, and adaptable structures. It is typically considered as a way to provide services that would otherwise be unaffordable or unavailable (Jarvis, 2011), and integrate different social, economic, and environmental urban ideals into the housing provision (Tummers, 2016), see Figure 2 below. It provides gardens, playgrounds, kid-friendly settings, healthy and renewable energy sources, resource sharing, etc. (Vestbro, 2010). Cohousing is a way to create new kinds of communities to reduce isolation or highlight alternative values, as well as a tool to establish local identities in the face of globalization (Krokfors, 2012).
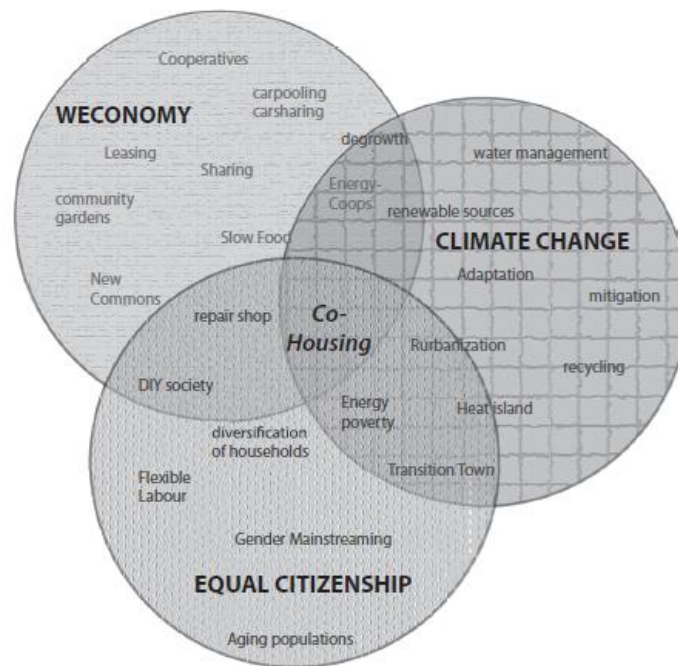
Figure 2 Cohousing as an integrative practice

Source: (Tummers, 2016, p. 2026)

The integrative approach of cohousing leads researchers to regard the experiences created by the cohousing model to be relevant to sustainable development. It is viewed by many as a societal movement that goes beyond the project level. The variety of examples cited by authors across Europe demonstrates that cohousing projects are practical solutions to society's basic needs like accessibility, everyday service, and cost- or energy-savings, instead of being utopian solutions. If properly studied, Cohousing initiatives can help planners comprehend the changing requirements for the users' needs (Tummers, 2016). However, the interconnected topics of housing and sustainable urban development still need more research (Jarvis, 2011). In addition, planners may view cohousing communities as resilient actors in the larger movement that seeks out innovative ways to mediate between common urban trends (Jarvis, 2011).

2.1.3   Tensions within the Cohousing Model

To conduct a comprehensive analysis of the cohousing model, it's essential to understand the inherent tensions, problems, and criticisms it experiences. Although the cohousing model theoretically is seen as a pragmatic solution to today's urban wicked problems, a few areas of tension emerge within the planning, designing, and decision-making processes. A few scholars have also criticized it based on multiple fronts. First, to realize cohousing projects, residents must form a variety of partnerships with multiple public and private institutions to access resources and expertise. In some cases, like in the Netherlands, they partner with housing corporations known to provide social housing. Studies demonstrate that European housing developers are starting to participate in these projects for several reasons, such as their desire to "refresh" their practice by collaborating with and learning from the community, or their desire to empower the local community. However, these partnerships have both unrealized potential and a lot of present and latent difficulties like, for instance, a long history of distrust (Czischke, 2018).

Moreover, apart from projects that include social housing, cohousing projects could be inaccessible to lower-income residents. Residents need to possess high levels of resources and capabilities to be able to establish their initiative. Commonly, the users of these projects are "wealthy upper-middle-class residents" with higher "degrees of social, cultural, and economic capital" than the less privileged groups (Czischke, 2020. p. 5). However, even projects that implement social mixing for more inclusive environments face multiple conflicts between the goals of fostering social diversity and fostering social cohesiveness within resident groups of different social classes (Bresson & Labit, 2019).

Furthermore, the cohousing model is a unique model that has drawn certain people and household types but not others. The degree of how exclusive or exclusionary cohousing is still up for debate among academics. Part of the debate was the similarity between cohousing neighborhoods and gated communities. According to Ruiu (2014), Cohousing differs from privatized gated neighborhoods mainly because it promotes security through intentional social interaction among neighbors rather than platforms for monitoring, isolation, and segregation. In addition, cohousing neighborhoods are more accessible to the public than gated communities, allowing other groups to use the amenities and spaces. However, Chiodelli (2015) argues that In the end, these distinctions are merely superficial, and gated communities and cohousing have more similarities than differences. For example, both have internal covenants and are structured as private legal bodies with procedures for accepting and rejecting new members. Chiodelli continues that most scholars exaggerate the cohousing model's advantages. However, this comparison is based on the legal and formal aspects of both housing provisions, but significant disparities exist in the day-to-day activities and design elements. To conclude this debate, a fundamental difference is that cohousing is a grassroots-based model while gate communities are a top-down "speculative scheme" (Ruiu, 2014, p. 330).

2.1.3.1 Tensions between Cohousing and Urban Planning

The term "collaborative" in theory highlights the participation between public and private stakeholders in an intertwined planning approach (Healey, 2006). However, usually, the position of residents in the planning process tends to be weak, despite that different resident classes may benefit in a contrary fashion from policy, land allocation, management, site requirements, etc. (Tummers, 2016). Who is considered the expert in a co-creation approach

poses a significant obstacle to today's top-down planning system. For instance, in a co-design practice, the planners and residents might have different priorities and views on what is considered the ideal solution for the project, which in turn could adversely impact the process efficiency. In cohousing projects, planners must be aware of certain characteristics and values to be taken into consideration, like for instance, the availability of common share spaces and the participatory, self-managed processes of the cohousing model. Many conflicts arise during the planning process, such as with housing standards, subsidy rules, zoning plans, etc. Residents are then forced to make compromises to the original model, thus underutilizing its full potential. These institutional interactions between cohousing initiatives and the local government make studying cohousing in its local governance context crucial. Moreover, it has also proved challenging to balance the different interests of collaborating stakeholders in the project in addition to the "competing top-down and bottom-up forces" (Czischke et al., 2020, p. 6). In addition, the time-consuming nature of these processes may create an unappealing environment for initiators and may cause multiple projects to be halted. The previously mentioned aspects will be addressed during the analysis of the findings.

2.2 Sustainable urban development of the Housing Sector

Different sustainability themes are prioritized according to the many definitions of sustainable development. The Brundtland Report provides the most recognized definition of sustainable development, which states it is "development which meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). The United Nations developed 17 goals for the 2030 Agenda for Sustainable Development, which focuses on achieving prosperity for all people, environmental protection, and the eradication of poverty (Hagbert et al., 2019). SDG number 11 (UN, 2015), "sustainable cities and communities," focuses on providing "adequate, safe, and affordable housing," increasing participation in management and planning decisions, and decreasing "the adverse per capita environmental impact of cities". However, sustainable urban development has been the local government's concern for the past years. It has been influenced by local government policies, planners, and policy-makers, SUD projects, and the creation and dissemination of SUD practices internationally (Marcuse, 1998; Davidson, 2010; Hult, 2015; Hagbert et al., 2013).

2.2.1 Pillars of SUD

Sustainable urban development is the process of designing technical and social systems so that the use of resources does not adversely impact social conditions, human health, the environment, or future economic opportunities (Mihelcic et al., 2003). It is frequently operationalized into three principles or "pillars": social, environmental, and economic (Waas et al., 2011). It is crucial to note that SUD occurs when there is balance and harmony between those three principles (Shaker & Sîrodoev, 2016).

The relative relationship between the three pillars has been conceptualized into three different models, see Figure 3. The first model of interlocking rings, states that each pillar exists

independently from the other, while sustainability occurs at the intersection of the three. This conceptualization runs the risk of trade-offs and quick technical fixes (Giddings et al., 2002). The second model poses a more accurate representation of the relationship between the pillars (Peponi & Morgado, 2020). It consists of three nested rings. It views the economic aspect as a social concept embedded into society, while the environment provides necessary life support for the other two. This is yet another very generalized model. Most processes exist in all three dimensions without sharp distinctions. Finally, the artificial division between society and economy is eliminated in the final model. Understanding this reliance enables a more integrated analysis of sustainability dimensions (Lombardi et al., 2010).
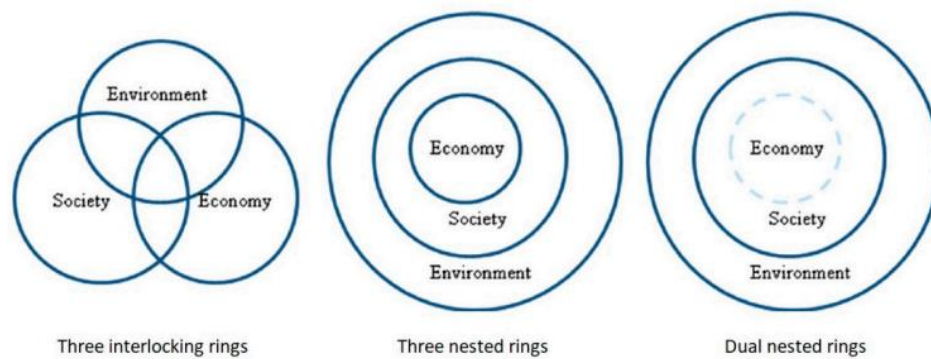
Figure 3 Conceptualization of sustainable urban development

Source: (Lombardi et al., 2010, p. 276)

2.2.1.1 Social Sustainability (SS)

The discourse on SUD is regarded by many researchers to be contradictory since reports and goals typically concentrate on the economic and environmental issues, and disregarding the social factor (Marcuse, 1998). Davidson (2010) examined both policy literature and municipal programs and found that there are numerous conceptions of SS: "social equity issues relating to access to services, facilities, and opportunities; issues to do with the sustainability of community itself; social mixing; livability; affordable housing; tolerance; street life; or a more targeted concern with homelessness, the 'under-served' or 'under-represented', such as seniors, youth and children" (Hagbert et al., 2019, p. 6). Moreover, according to Ahman (2013, p. 1156), SS could be promoted through aspects like "basic needs and equity, education, quality of life, social capital, social cohesion, integration and diversity, and sense of place", see Figure 4. According to Cheung and Leung (2011), promoting SS through social cohesion is essential in the development and vitalization of neighborhoods. In the Netherlands, the local governments are prioritizing integrating social cohesion as part of their policy derivatives. Moreover, social cohesion, as evident in the next section, encapsulates most of the aspects mentioned, hence analyzing SS based on social cohesion will be more conclusive taking into consideration the study's limited time.
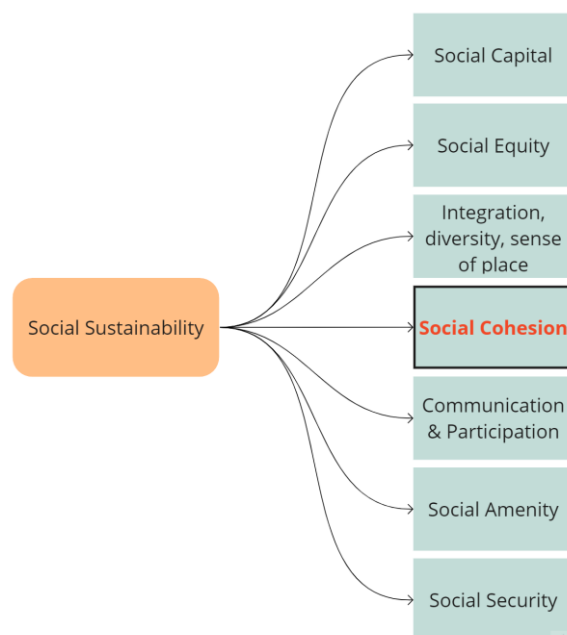
Figure 4 Conceptualization of the Social Variable

Source: Author (2023), based on literature from (Rasouli & Kumarasuriyar, 2016; Ahman, 2013)

2.2.1.1.1 Social Cohesion as a Determinant of SS

According to theory and policy, social cohesion is a grassroots approach that helps build powerful, just, and fair societies for both the present and the future (Forrest & Kearns, 2001; Morrison, 2003). Social cohesion is the binding force that holds members of a group—a family, an organization, a neighborhood, or society—together. It is important to strengthen social cohesion in neighborhoods, which is a common goal for local governments (Dekker & Bolt, 2005; Amin, 2002). In recent years, social cohesion has been a priority for policy-makers and academics focusing on urban development (De Roldán, 2012). According to Ceano-Vivas et al. (2014, p. 4), "the promotion of cohesive societies enables people to work together to address common needs in sustainable development". Social cohesion includes interpersonal interactions among community members, participation, and the existence of local collective institutions. It also includes trust levels within the community and a strong sense of community and identity (Dempsey et al., 2009). This research will analyze three factors of social cohesion: **place attachment, social networks, and common values** (Dekker & Bolt, 2005). Social networks refer to the established social connections among residents. Place attachment refers to the sense of belonging and personal and place identity. Common values refer to the "common moral principles and codes of behavior" (Dekker & Bolt, 2005, p. 2448). Those dimensions are considered to be interconnected and mutually reinforcing; However, they are not interchangeable.

2.2.1.2 Economic sustainability

Official discourses about economic sustainability, like those emphasized in the UN SDGs, contain economic growth and indicate that it is necessary for sustainable urban development. This contrasts with concerns related to the "de-growth" and "post-growth" debate (Martínez-Alier et al., 2010) identifying the presence of a significant discrepancy between equitable development and growth (Kallis, 2011). Without a clear definition, the term "economic sustainability" is frequently used in studies to mean "economic performance in terms of profits". However, for sustainable neighborhoods, profitability should not be an objective. According to Goldin and Winters (1995, p. 1), SUD refers to "an economy in which future growth is not compromised by that of the present". Similarly, it should "minimize the social costs of meeting standards for protecting environmental assets" (Morelli, 2011, p. 2). Consequently, a measure of economic sustainability could not be limited to an economic parameter (Moldan et al., 2012). Hence, an entity may only engage in sustainable environmental and social behavior if they have attained an acceptable level of financial stability and long-term financial viability (Tennakoon & Janadari, 2022).

As the economic aspect is dependent on social and environmental sustainability, its variables also integrate the three principles. Indicators of economic sustainability that will be adopted in this thesis are **affordability and housing diversity, long-term cost efficiency, and financial inclusion** (Figure 5). Affordability and housing diversity ensure that housing doesn't financially overburden residents relative to their income and ensures the availability of diverse housing forms and tenures. Long-term cost efficiency refers to minimizing daily costs by having energy and water-efficient systems and by participating in collaborative consumption, where residents share goods and services (Botsman & Rogers, 2011). In addition, financial inclusion refers to the provision of financial assistance programs to make housing more accessible to all socio-economic classes (Seguin & Germain, 2000). By taking into account these aspects of economic sustainability, the housing industry and local communities can work to build more financially stable and inclusive neighborhoods, enhancing resident well-being and supporting long-term economic stability.
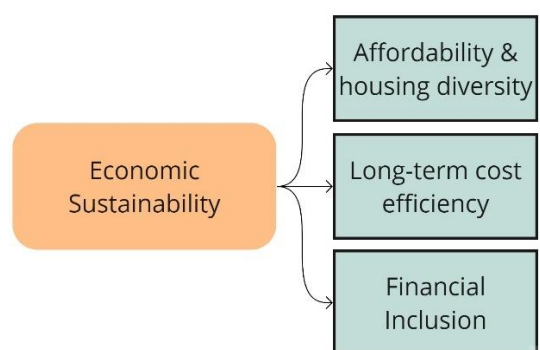
Figure 5 Indicators of Economic Sustainability

Source: Author (2023), content derived from literature

2.2.1.3 Environmental Sustainability (ES)

Environmental sustainability could be defined as environmental preservation for the long run to maintain Earth's environmental boundaries and to conserve and improve the resource base (Waas et al., 2011). Moreover, ES is "a condition of balance, resilience, and interconnectedness that allows human society to satisfy its needs while neither exceeding the capacity of its supporting ecosystems to continue to regenerate the services necessary to meet those needs nor by our actions diminishing biological diversity" (Morelli, 2011, p. 5). Buildings should minimize their impact on the environment and support resource-efficient modes of life. One strategy for doing this is by adopting an **urban sharing method**. Urban sharing could be applied by the sharing of assets, spaces, or skills among community members. This includes the sharing of transport like bike-sharing or car-pooling systems, common building facilities or tools, or common spaces in the building. This strategy decreases the consumption of resources (Grinde et al., 2017). In addition, ES can be achieved by adopting **low-impact practices** by using sustainable infrastructure and practices like sustainable transport, pedestrian-friendly neighborhoods, energy efficiency, sustainable materials, waste and water management, green spaces and biodiversity, etc. In addition to developing learning opportunities for **environmental education and awareness** (Chatterton, 2014). Moreover, cultivating a sense of community and encouraging sustainable behavior among people is a key dimension (Herdiansyah & Januari, 2021). This can include educational activities, neighborhood gardens, workshops on sustainable living, and programs that promote resource sharing and teamwork. These dimensions are summarized in Figure 6 below.
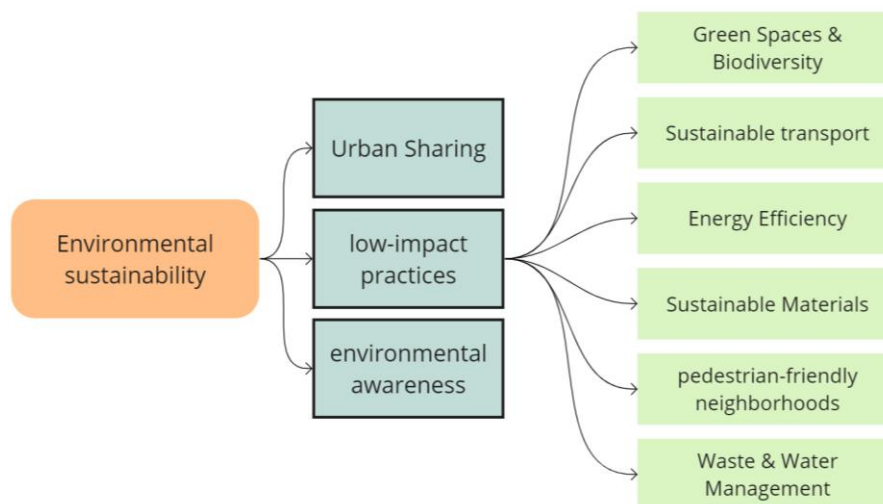
Figure 6 Conceptualization of Environmental Sustainability

Source: Author (2023), content derived from literature

2.3 Local Urban Governance (LUG)

To contextualize and understand the cohousing model, this study will establish the parameter of urban governance, which refers to the "political and economic governing of urban life by public and private institutions and actors including government agencies, private companies, and housing markets; and civic actors, such as associations and social movement organizations" (Hagbert et al., 2019, p. 7). In contemporary urban governance, a collaboration between various actors and organizations in "public-private-civic partnerships", which frequently include cohousing, has gained traction. Studying cohousing from the perspective of urban governance includes the cohousing project interactions with different actors. 'Partnership relations' with private and civic actors are also highlighted by the term 'governance'. In conclusion, aspects like **partnership relations** are used to understand the LUG context. For the scope of this study, the focus will be on the cohousing relationship with the local government, housing corporations, and intermediary organizations. This research will explore the **collaboration & co-creation, access to resources and services, and knowledge sharing & policy advocacy** that occur through those relations.

2.3.1   The Role of Local Government

Housing provision that is based on collaboration and self-governance has allowed for a more horizontal relationship with the local government (Czischke, 2017). Numerous local governments now promote the spread of cohousing as a viable housing alternative (Szemzo et al., 2019). Self-organization and resident-led neighborhood development efforts have gained prominence on the national and local political agendas over the past ten years, which has helped to lower the obstacles to these kinds of participatory urban development projects. For instance, Dutch local governments are actively promoting resident involvement in the planning and administration of neighborhoods, paving the way for shared duties between community and local government. The ability of well-funded and well-organized programs to develop appropriately operating collaborative systems and successful community empowerment is evident from several case studies (Fagotto and Fung, 2006). However, it has been claimed that increased participation and shifting of decision-making may result in a loss of accountability of elected local officials and can result in the selective empowerment of certain individuals (Sorensen & Sagaris, 2010). The local government's aspiration to implement more democratic collaborative procedures with citizens substantially influences the approach to cohousing projects (Szemzo et al., 2019).

local governments have demonstrated they are essential players in the development of cohousing initiatives (Lang & Stoeger, 2017; Mullins & Moore, 2018). First and foremost, local governments have a great opportunity to lead when it comes to local sustainability goals. Municipalities are frequently interested in finding ways to become more sustainable and share many of the same objectives as cohousing communities. Thus, an increasing number of cohousing projects are now being started in a mixed or top-down fashion, where (governmental) institutions collaborate with interested residents to achieve shared objectives. Moreover, Cohousing development can be anticipated to be significantly impacted by receiving assistance from the local government, whether this takes the form of financial

support or other forms of partnership (Scheller & Thörn, 2018). Resources allocated to cohousing projects by the local government, like for instance, a suitable land plot play a major role in the success and sustainability (eg. Economic sustainability) of the project (Lang and Stoeger, 2017). Municipalities continue to play a crucial role in shielding cohousing projects from market forces to ensure that these programs are financially viable (Mullins & Moore, 2018). Local governments can play a key facilitation role in all of these areas and be essential in assisting people in reaching consensus on decisions. In general, as collaboration and resident-led aspects increase, the demand for local government assistance for the cohousing projects grows. Without assistance, many social goals will be abandoned, and the inhabitants' planning time or financial commitment may also significantly rise.

2.3.2 The Role of Intermediaries

A global network of national organizations developed and disseminated the Cohousing model since its appearance in 1980s (Tummers, 2016). Organizations that provide infrastructure and community support for initiatives like cohousing are considered intermediaries in this context. These can take diverse forms and exist on various levels, from national advocacy groups that promote cohousing to neighborhood-level community empowerment advocates. Governmental organizations as well as autonomous, for-profit or nonprofit, commercial organizations can act as intermediaries (Moore & Mullins, 2013). To facilitate mainstreaming projects in the housing sector, intermediaries work as mediators and coordinators for connections with stakeholders (Hargreaves et al. 2013). For the development of a solid and coherent model where the institutionalization of resource sharing and knowledge aggregation across several local projects is possible, the involvement of intermediaries becomes essential (Lang et al., 2019).

Intermediaries could support this in many ways, according to literature. First, many resident-led initiatives lack the necessary technical skills required to implement their project, and intermediaries connect them with different consultants. They attempt to ensure equal access to cohousing across different income groups. Therefore, intermediaries share the goal of resolving any social, economic, practical, or political obstacles that could prevent cohousing from becoming successful (Moore & Mullins, 2013). Support from umbrella organizations can help increase the legitimacy of cohousing initiatives and their mainstreaming, which in turn assists in facilitating the legal and financial aspects. Finally, Intermediaries can serve as networking platforms that promote cohousing, and knowledge exchange, and provide freely accessible online tools for potential residents (Moore & Mullins, 2013). For this research, in the Netherlands, intermediaries are expected to have an impact on cohousing's growth and sustainability. The relationship with the local government cannot be considered without also studying the role of intermediaries.

2.4 Conceptual Framework

Various literature reviewed in this section suggests there is a relationship between the cohousing model and achieving sustainable urban development. This relationship needs to be further examined and different opportunities and challenges in the cohousing application identified. Local governments and municipalities have extensive sustainability goals, so understanding how different aspects of the cohousing model might achieve those goals will aid in the development of the housing provision.

This research will explore how the dimensions of cohousing practices (independent variable) can promote various approaches to the pillars of sustainable urban development (dependent variable) and the challenges provided within the urban governance framework focusing on the relation with the local government (moderating variable). The conceptual framework, derived from the literature review, is illustrated in Figure 7 depicting the relationship between the variables and the different constituents of each. It is anticipated that the dimensions of cohousing have varying impacts on the principles of sustainable urban development. In the analysis section, the specific relationships between the operationalized indicators will be identified.
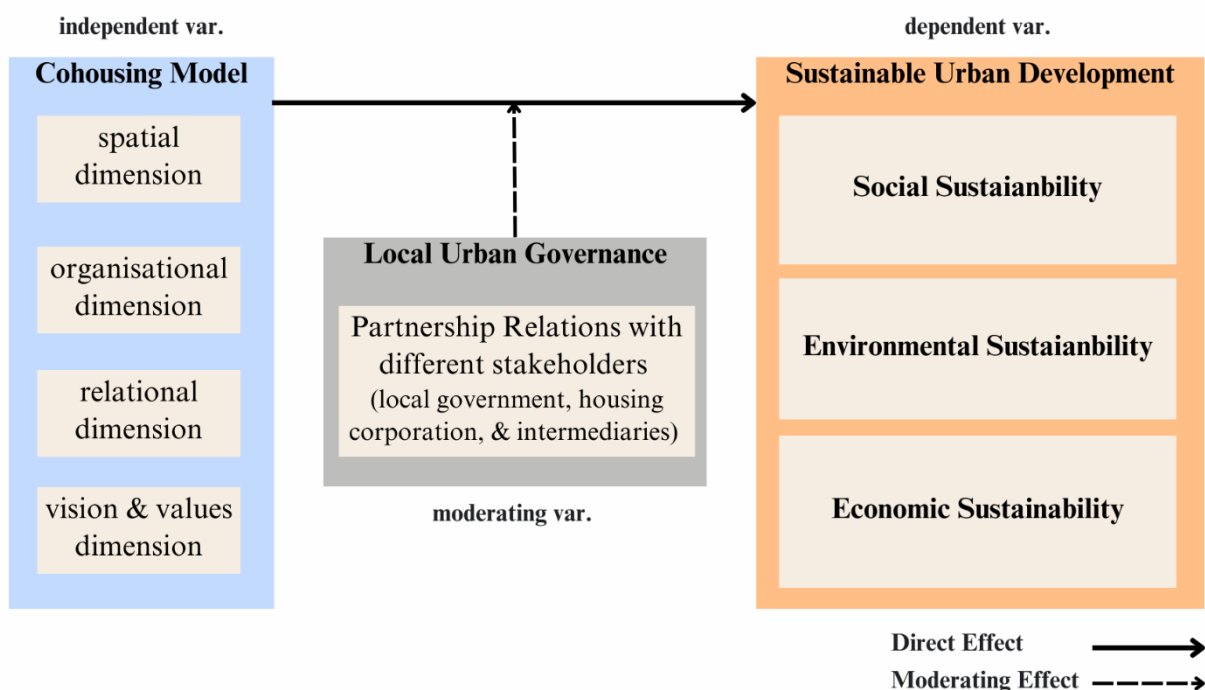
Figure 7 Research Conceptual Framework

Source: Author (2023)

Chapter 3: Research design, methodology

Throughout this chapter, theoretical concepts presented in Chapter 2 are translated into measurable variables for empirical research. The first section presents them into operationalized variables (dependent, independent, and moderating), listed in Table 2,

Table 3, and Table 4. Then, the research methodology will be discussed including the strategy adopted (case study), data collection methods, sampling size and criteria, research validity, and the expected limitations and challenges of this research. Finally, data analysis techniques will be outlined.

3.1 Operationalization: variables, indicators

This research explores how the cohousing model promotes sustainable urban development of the housing sector in the context of LUG. Based on the literature review chapter, the cohousing model, as the independent variable, is characterized into four dimensions (values & vision, organizational, spatial, and relational), which are further operationalized into indicators, listed in Table 2. Similarly, SUD, as the dependent variable, is operationalized into social, economic, and environmental variables, see

Table 3. Regarding SS, social cohesion was selected from other sub-variables mentioned in chapter 2 for two reasons. First, it is a high priority in local governments' policy agenda for sustainable development. Second, it encompasses values that relate to the other sub-variables which makes it an adequate choice of study given the limited research time. Furthermore, for the moderating variable of LUG, this research focuses on the relations with different stakeholders through collaboration, knowledge sharing and policy advocacy, and access to resources and services, see Table 4.

Table 2 Operationalization of Independent variable

CONCEPT	VARIABLES	DEFINITION	INDICATORS	DATA COLLECTION	DATA SOURCE
COHOUSING *(Czischke et al., 2020; Boyer & Leland, 2018; Hagbert et al., 2019; Tummers, 2015)*	Values and vision dimension	includes the shared ideals, values, and aspirations that direct the creation and operation of the community. It outlines a common framework for how they want to live and interact in the cohousing community and embodies the inhabitants' collective vision (Czischke et al., 2020).	**Shared vision** **Sustainable lifestyles** **Diversity & inclusivity**	Semi-structured Interviews, observation, surveys, online resources	Primary data /Secondary data
	organizational dimension	Addresses the community's management, decision-making, and organizational structures (Czischke et al., 2020).	**Self-organization & governance** **Mutualization** **Collaboration**	Semi-structured Interviews, observation, surveys, online resources	Primary data /Secondary data
	Spatial dimension	encompasses the physical layout and the design of the spaces that are specifically developed to foster social interaction, collaboration, and a sense of community (Boyer & Leland, 2018).	**Social architecture** **Adaptability** **Private & public spaces**	Semi-structured Interviews, observation, surveys, online resources, architectural documents	Primary data /Secondary data
	Relational dimension	refers to the value placed on interpersonal connections and the development of a supportive and collaborative community (Boyer & Leland, 2018).	**Social Interaction** **Shared responsibility** **Consensus Building**	Semi-structured Interviews, observation, surveys, online resources	Primary data /Secondary data

Source: Author (2023)

Table 3 Operationalization of dependent variable

CONCEPT	VARIABLES	SUB-VARIABLES	DEFINITION	INDICATORS	DATA COLLECTION	DATA SOURCE
SUSTAINABLE URBAN DEVELOPMENT *(Marcuse, 1998; Davidson, 2010; Hult, 2015; Hagbert et al., 2013; Forrest & Kearns, 2001; Morrison, 2003; Waas et al., 2011; Morelli, 2011; Goldin & Winters, 1995)*	Social Sustainability	Social Cohesion	is a bottom-up process that helps build powerful, just, and fair societies for both the present and the future (Forrest & Kearns, 2001; Morrison, 2003). Social cohesion is the binding force that holds members of a group—a family, an organization, a neighborhood, or society—together.	**Place attachment (emotional/functional):** frequency of use of common spaces, proximity of space to houses, sense of belonging. **Social networks:** daily interactions & frequency, trust, diversity, conflict resolution. **Common values:** motivations, shared lifestyle, participation in work groups & decision-making.	Semi-structured Interviews, observation, surveys, online resources	Primary data /Secondary data
	Environmental Sustainability		Environmental preservation for the long run to maintain Earth's environmental boundaries and to conserve and improve the resource base (Waas et al., 2011).	**Urban Sharing:** sharing of assets, spaces, and skills, transport sharing platforms. **Low-impact practices:** sustainable infrastructure & practices **Environmental awareness:** workshops, educational activities.	Semi-structured Interviews, observation, surveys, online resources, documents	Primary data /Secondary data
	Economic Sustainability		"economy in which future growth is not compromised by that of the present" (Goldin & Winters, 1995, p. 1). "minimize the social costs of meeting standards for protecting environmental assets" (Morelli, 2011, p. 2).	**Affordability & Housing Diversity:** cost of living, varied housing typologies & tenure forms **Long-term cost efficiency:** tools to minimize daily costs **Financial Inclusion:** financial assistance programs, access to different socio-economic classes	Semi-structured Interviews, observation, surveys, online resources, documents	Primary data /Secondary data

Source: Author (2023)

Table 4 Operationalization of moderating variable

CONCEPT	VARIABLES	DEFINITION	INDICATORS	DATA COLLECTION	DATA SOURCE
URBAN GOVERNANCE *(Hagbert et al., 2019; Czischke, 2017; Szemzo et al., 2019; Sorensen & Sagaris, 2010; Lang et al., 2019).*	Partnership Relations	"Political and economic governing of urban life by public and private institutions and actors… In contemporary urban governance we have seen an increasing significance of collaboration between different types of actors and institutions in public-private-civic partnerships" (Hagbert et al., 2019, p. 7).	**Collaboration & co-creation:** interactions, negotiations, how the design process works (success & failures)	Semi-structured Interviews, online resources	Primary data /Secondary data
			Access to resources & services: access to land, finances, and technical skills	Semi-structured Interviews, online resources, news, documents	Primary data /Secondary data
			Knowledge sharing & policy advocacy: interactions, platforms, and events to share experiences, efforts by actors to adapt policies or cohousing	Semi-structured Interviews, online resources, news, documents	Primary data /Secondary data

Source: Author (2023)

3.2 Research Strategy

This study explores how the cohousing model achieves sustainable urban development in the LUG context. To do this, a mix of qualitative and quantitative research was pursued. "Qualitative and quantitative methods give us different, complementary pictures of the things we observe" (Berg & Lune, 2017, p. 12). This type of research allows for gaining an in-depth understanding of an individual's behavior, experience, and perspective about a certain phenomenon. The sustainability of the cohousing model and its interaction with different actors were empirically analyzed through a case study strategy. This strategy provides "richly detailed and extensive descriptions of the phenomenon under study" (Van Thiel, 2014, p. 87). However, case study analysis provides a unique contextual explanation of the research question, which is not easily generalized to other situations (Van Thiel, 2014). As this research is examining multiple variables that require in-depth detailed data, the case study strategy is the most suitable. The author adopted a co-variational approach to the case study (Blatter & Blume, 2008). It depends on a covariance relationship between a causal (independent) variable and an effect (dependent variable), with a precondition of an established hypothesis through the literature reviewed for the "causal direction" (Blatter & Blume, 2008, p. 319).

Referring to the operationalization of the concepts in study, the case study of a cohousing neighborhood (de Kersentuin) in Utrecht, Netherlands, is appropriate to explore the relationship between the different variables and measure their indicators comprehensively. The case study was selected based on several criteria:

- Cohousing neighborhood with social housing
- Date of establishment (past 20 years)
- Moderate size of neighborhood/ number of households (almost 100)
- Mixed-income neighborhood
- Sustainable lifestyle
- Undergone partnerships between different stakeholders
- Existence of data & documentation of the process
- Willingness of stakeholders to cooperate

3.3 Data Collection Methods

The data collection method ensures triangulation in the sense that data from semi-structured interviews, surveys, non-participative observation, secondary resources, and case study documents were cross-verified to ensure the internal validity of the findings (Van Thiel, 2014).

3.3.1   Semi-structured interviews

The researcher conducted semi-structured interviews with municipality officials, experts, key stakeholders, residents, housing corporation representatives, intermediary actors, and founders (see section 1.4). The questions asked were developed using the indicators as a guide. The interviews were designed to allow each participant to freely share their unique perspective and guide the conversation. Follow-up prompts were asked so the interviewee could elaborate more on certain subjects (Van Thiel, 2014). The interviews, taking place in English, were either conducted in-person or online where consent was provided orally. (See appendix 1 for the interview guides and the consent letter)

3.3.2 Surveys

It is considered an efficient analysis approach since it describes, depicts, and summarizes significant data from a sample (Van Thiel, 2014). Depending on the type of variable, descriptive statistics could be presented as percentages or averages (Woodrow & Woodrow, 2014). This helps in the cross-validation of the data. Descriptive statistical analysis is used to examine the frequency of a certain indicator according to the operationalization table. A Survey is used as a tool to attain frequency analysis which includes measuring how often certain elements occur in the data to identify patterns, trends, or characteristics. As a "standardized form of measurement", Likert scale multiple-choice questions were used, making the findings easily generalized hence enhancing its external validity (Van Thiel, 2014, p. 74). The survey was distributed among the residents to understand the demographic composition, motivations, and perception toward certain aspects (see appendix 1 for survey guide). The survey provided 2 language options, English and Dutch to be more accessible to the resident. Findings are presented throughout the thesis in the form of bar charts showing percentages.

3.3.3 Non-participant observations

The researcher carried out non-participant observations to gather primary data about the social interactions, behaviors, and physical settings of the cohousing neighborhood (Given, 2008). This method helps gain insight into the residents' actual behavior in their everyday natural setting. This firsthand experience provides a deeper understanding of the context, which is crucial in case study research. In addition, non-participant observation can be used as a form of triangulation, where the observations are compared and contrasted with other data sources such as interviews, documents, and surveys. For instance, the researcher observed that the different typologies are not differentiated in the neighborhood and there is no distinction between social housing and owner-occupied homes, which corroborated the residents' statements. Field notes of observations were taken complying with the research variables and indicators. The observation took place after getting permission from the community.

3.3.4 Content Analysis of Documents

Data collected through online websites and reports were examined using content analysis methods. According to Van Thiel (2014), content analysis can be used to establish facts and understand a process from different perspectives. This applies to the chosen case study. Qualitative findings of this method, combined with the other discussed methods, ensure the triangulation of data. (see appendix 2 for the list and summary of selected resources).

3.4 Sampling Size and Selection

3.2.1 Sample selection and size for primary data collection:
- **in-depth interviews**

  Many stakeholders were identified to be involved in the case study. Key informants or a representative of each stakeholder type were selected using non-probability purposive sampling, a method of intentionally selecting a sample based on their unique expertise or knowledge on the topic (Van Theil, 2014). However, residents were selected using random sampling since it's more representative, (see chapter 4 for the respondent list). The stakeholders were classified into the following categories:

1. Cohousing project founders
2. Residents
3. Housing corporation (Portaal)
4. Intermediaries: Cohousing association (Vereniging Gemeenschappelijk Wonen), Process facilitator (BIEB - Bouwen In Eigen Beheer), COOPLINK, etc.
5. Architects (Architects and Engineering & Bureau Kristinsson)
6. Utrecht Municipality

- **Surveys**

20 households conducted the surveys. A probability sampling method was used, where residents were randomly selected. This method is preferred in surveys to ensure that the sample is representative of the larger population. According to Van Theil (2014), a sample size of 20% (19 households) is representative of the whole population (94 households). The surveys were distributed through the community's social groups and approaching respondents in the neighborhood.

3.2.2   Sample selection and size for secondary data collection

Secondary data that was analyzed included De Kersentuin website which shared their vision, motivation, facilities, community structure, sustainability features, and a project booklet. In addition to a blog developed by some founders that documented the implementation process. Moreover, Intermediary organizations' websites, news, and reports. Secondary data also included the Architectural documents. Most of these sources were translated from Dutch.

3.5 Validity and Reliability

This research used different techniques to ensure validity and reliability. According to Van Theil (2014), validity consists of internal and external validity. Internal validity refers to the effectiveness and plausibility of the research. This entails that theories were well measured and that the causal relationship between the dependent and independent variables is valid. External validity refers to the ability of the study to be generalized and applied to other contexts. Moreover, reliability pertains to the consistency of the data and the ability of the research to yield similar results if repeated.

The case study approach used is harder to generalize since the analysis is contextual, hence low levels of external validity, but high internal validity. Combining qualitative and quantitative techniques, including semi-structured interviews, surveys, non-participant observations, content analysis of documents, and case study documents, were used to achieve triangulation, hence ensuring validity and reliability (Van Theil, 2014). Semi-structured interviews were done by the researcher with a variety of stakeholders, allowing for a variety of viewpoints. Surveys were used to collect quantitative data, improving generalizability and cross-validation. The background and behavior of the cohousing community were well understood by non-participant observations, and facts from many points of view were established through content analysis of the documents. It is important to note that findings from these methods are cross-verified for internal validity (Berg & Lune, 2017).

To enhance the reliability of this research several measures were taken. First, the case study was carefully selected based on specific criteria. Second, the concepts were meticulously

operationalized to ensure clear definitions and indicators were identified for each variable. This approach ensures consistency throughout the data collection and analysis phases, hence enhancing reliability. Additionally, structured interview guides, standardized survey questions using Likert scales, and systematic coding were used to minimize analysis discrepancies. Lastly, the researcher comprehensively documented the processes of data collection and research to enhance future replicability thereby enhancing the overall reliability of the study's outcomes.

3.6 Data Analysis Strategy

Primary and secondary data were analyzed and their findings complement each other. The interviews, documents, surveys, and observations were examined around the concepts mentioned in the operationalization table. The data transcribed from the interviews were analyzed by a meticulous sentence-by-sentence open coding procedure, using *Atlas.ti* software. Overlapping codes were compacted into general axial codes, and eventually resulted in generalized categories across various distinct notions forming a coding tree (see appendix 2) that was established by an inductive thematic analysis. Emerging codes can add to or modify the code tree in an iterative process, which helps in the triangulation of data (Dubois & Gadde, 2002). Furthermore, Frequency analysis of the data from survey results was used to understand the residents' perspective and quantify the qualitative analysis. Results are presented as graphs depicting frequency as percentages.

3.7 Challenges and Limitations

One of the key limitations of case study research is its restricted generalization to other contexts. Although it offers rich insights, the use of a single cohousing neighborhood as a case study might not fully capture the diversity of other cohousing typologies and their impact on SUD. Similarly, the survey sample size might be considered small which affects the generalization of its findings. In addition, as respondents who choose to participate in surveys or interviews might have different perspectives from residents who refuse, some bias could be introduced in the findings. Moreover, especially evident when discussing sustainability and other ethical behaviors, respondents might provide answers that they perceive to be more socially desirable, hence affecting results accuracy.

Aside from those points, the researcher also faced some limitations when conducting the research. This includes the expensive and time-consuming commute to De Kersentuin neighborhood in Utrecht since the researcher is based in Rotterdam. The limited time frame and budget allowed for a limited number of site visits. Those visits were on rainy days; Hence the researcher's observations were in specific conditions. In addition, most of the stakeholders' native language is Dutch, so conducting the interviews in English was a minor challenge. Surveys had the option of being conducted in Dutch which decreases the limitation of the language barrier. In addition, stakeholders' busy schedule was hard to work around so some interviews were conducted through online platforms. Moreover, it wasn't easy to reach representatives of Portaal and municipality and most of the time people didn't respond to emails. Hence, the research was concluded without their input. The researcher attained some contact information through other respondents to ensure their relevance and willingness to participate. Some residents didn't want to participate in the surveys. Finally, the online resources were all in Dutch so the researcher had to translate before analyzing them.

Chapter 4: Case Study, Research Findings, and Discussion

This chapter presents the findings of the data gathered and provides qualitative analysis. The case study, De Kersentuin, is described in section 4.1. The Cohousing context in the Netherlands is also discussed. Second, the findings and analysis of each variable are outlined in section 4.2. Finally, section 4.3 presents a summary of the analysis and displays the relationship between the variables.

4.1 the Case Study of De Kersentuin, Utrecht

4.1.1 Background and Location

De Kersentuin or "The Cherry Garden" is a community-led cohousing initiative located in Leidsche Rijn, a district in western Utrecht, newly developed to alleviate the housing market pressures on the citizens with a target of creating 30,000 new houses by 2030 (Gemeente Utrecht, n.d.). The municipality envisioned this district as a canvas for sustainable practices and innovative housing approaches, setting a precedent for new forms of living.

Figure 8 Location of De Kersentuin in the west of Utrecht City

Source: Author (2023)

The Netherlands has long established a robust participatory framework involving citizens in the housing sector's management and development as evident in the 2015 National Housing Act (Czischke, 2018). Similarly, Utrecht Municipality, through Leidsche Rijn's development, has welcomed citizen group initiatives to contribute ideas for ideal living spaces, emphasizing ecological sustainability. However, only a select few of these initiatives materialized, including De Kersentuin. According to D05 (Gemeente Utrecht, 1997), development was centered around principles of ecological protection. Systems like rainwater harvesting, energy-efficient housing, and central heating systems were implemented. Over time, the focus shifted to social cohesion and participation. Furthermore, the municipality aimed to infuse social mixing into these new neighborhoods.

Leidsche Rijn neighborhoods, including De Kersentuin, were individually designed through a decentralized approach involving the municipality and private developers. This strategy nurtured individual identity and adaptable responses to specific local requirements, issues, and situations. Leidsche Rijn actively encouraged resident groups and individuals to experiment in their neighborhoods, resulting in several community-led initiatives. These initiatives range from privately commissioned housing to the management of social events. As the focus of this study, De Kersentuin is among those "private commissioning" projects to be implemented in the district.

4.1.1.1 CPO in the Netherlands

The Netherlands started to observe the gradual emergence of community-driven initiatives for customized collaborative and eco-conscious projects in the early 1980s (Qu and Hasselaar, 2011). Nevertheless, the housing market in the Netherlands remains heavily influenced by private developers, and these initiatives are limited in number. A national initiative aimed at promoting self-development for homeownership was introduced in 2000, which gave a fresh boost to resident-led projects. Some municipalities endorse the German "Baugruppen" (group build) model by forming partnerships between housing institutions and residents' associations, referred to as "Collective Private Commissioning" or CPOs in the Netherlands (Tummers, 2015).

Cohousing projects in the Netherlands are realized through CPOs (Collectief Particulier Opdrachtgeverschap). This method entails a group carrying out the development of their future dwellings, from acquiring a land plot to completion and ongoing maintenance (BIEB, 2021). The organizational structure of the actors involved can vary according to the unique needs of the group. In contrast to speculative housing models, CPO brings forth significant advantages such as potential affordability, enhanced customization to cater to user group requirements, and a heightened sense of community (Hamiduddin & Gallent, 2015). In most CPO cases, home ownership is the common tenure form (Czischke et al., 2020). However, in the case of Kersentuin, there is a mix between home ownership and rental housing including some social housing units.

4.1.2 The Development and Planning Process

In 1996, The Utrecht municipality encouraged locals to develop suggestions for the implementation of a sustainable residential area at the start of Leidsche Rijn area development (D05). The seven initiators of Kersentuin seized this opportunity as a chance to achieve their visions. Some of them wanted to develop a Centraal Wonen (central housing) initiative and others wanted an environmentally friendly residential neighborhood. After many negotiations, they decided to combine both visions into De Kersentuin (R01, resident, July 2023). The goal was to design and build an environmentally friendly community that would be suitable for a variety of demographic groups, including families and the elderly, and would encourage neighborly relations and a vibrant social life that was run entirely by the residents. As the project began to take shape, more people joined the group of future residents (F01, co-founder, July 2023). They develop the Kersentuin in the form of a CPO.

The future residents then planned their neighborhood in close collaboration with the municipality. The municipality has a crucial role in development in the Netherlands (A01, architect, July 2023). Utrecht municipality agreed to invest in the initiative and to work with

the initiation group because their ideas aligned with their goals and objectives for a sustainable Leidsche Rijn. They established the Kersentuin Neighborhood Association, through which the group negotiated with the involved actors.

To aid with the funding of the project to achieve all their ambitions, they partnered with Portaal, a housing corporation, that owned some of the housing units as social housing. It played a key role because of its expertise with contractors and the construction process. Portaal was also involved in the design phase as a co-owner of the project. However, according to D02, Portaal's representatives changed often which led to disruptions and extra costs. However, it was instrumental in the realization of De Kersentuin.

The development and planning process took almost seven years, with the construction alone from 2002 to 2003. According to the architect, regular projects with developers usually take 2 years while Kersentuin took 5 years in the design process (A01, architect, July 2023).

The project includes 94 housing units, 28 of which are social housing and 66 owner-occupied homes. The neighborhood spans 2 streets, the Atalantahof and the Aureliahof, shown in Figure 9. Each housing unit is customized to the resident's preferences so every house has a different layout. The houses are designed to be partially extendable, flexible, compact, and life-course resistant. There are essentially 9 different housing types that are used throughout the project. It also constitutes a common project house where social activities are held, a parking garage, and communal indoor and outdoor spaces. There is a lot of greenery and no cars, making the streets child-friendly.
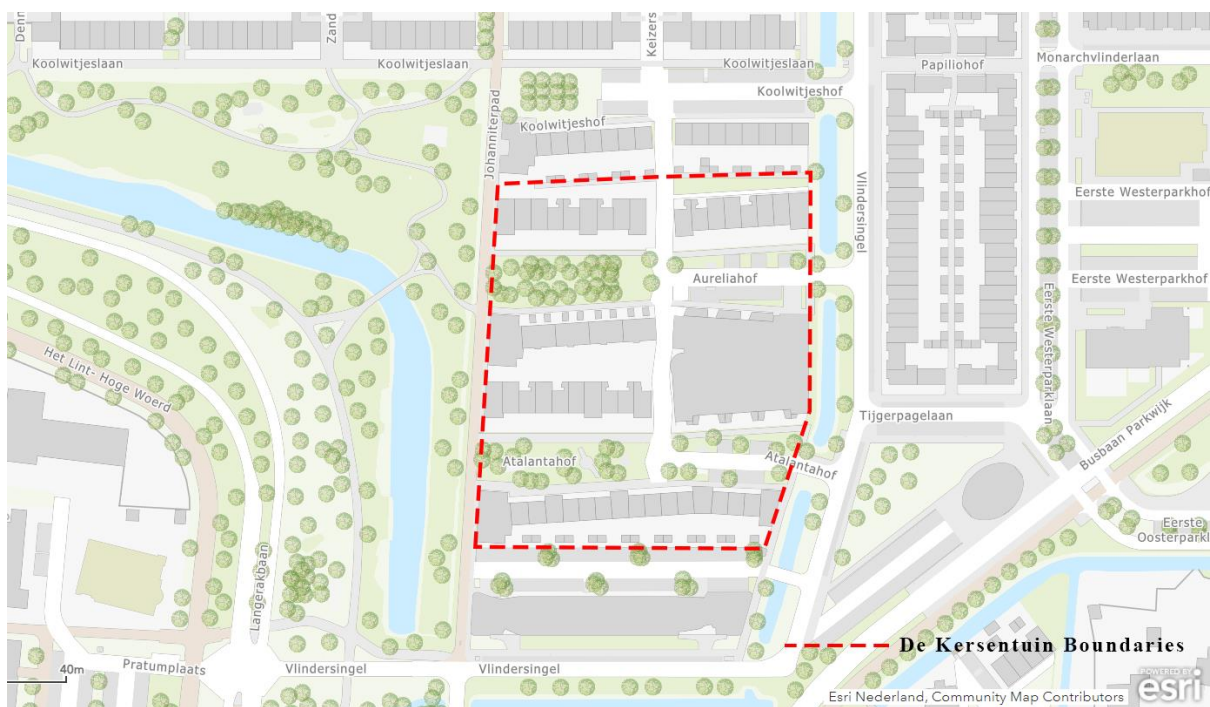
Figure 9 De Kersentuin Cohousing Neighborhood Boundaries.

Source: Author (2023)

D02 divides the project's development into five phases: the initiation, definition, design, execution, and management phases. These are illustrated in Figure 10. The various milestones in each phase are indicated under the designated phase. The development lasted 7 years, starting from 1996 to 2003.
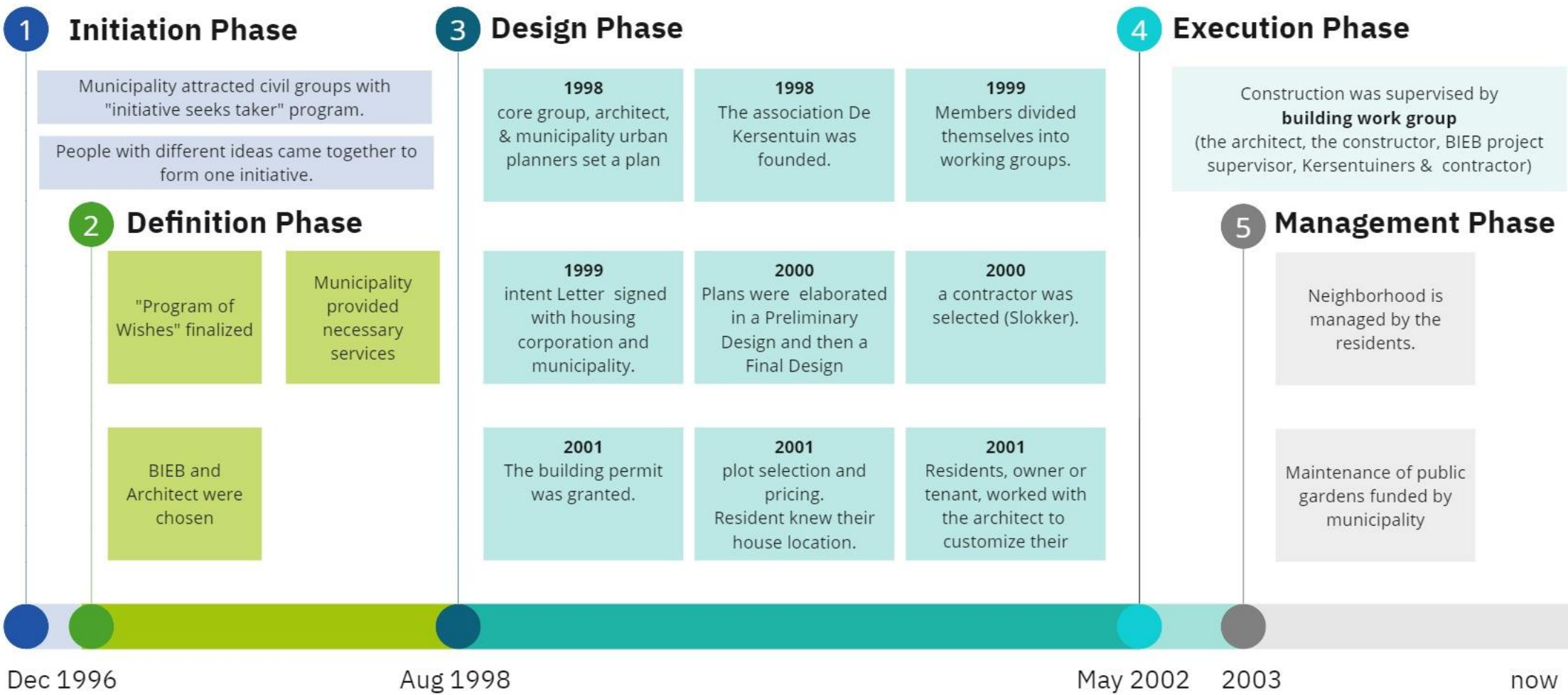
Figure 10 Timeline of De Kersentuin Development.

Source: Author (2023), content derived from De Kersentuin (2006

4.2 Data Description, Analysis, and Discussion

This section exhibits the findings of the cohousing dimensions, environmental, social, and economic sustainability, and partnership relations variables. In addition, the analysis for each variable is discussed. An interesting finding is that indicators are interlinked and intertwined as will be shown. Findings were derived from semi-structured interviews (respondents' info below), surveys (respondent info below), observations, and secondary documents (e.g. D01) (see appendix 2).

a. Semi-structured interviews:

Table 5 lists the interview respondents and their respective codes used throughout the analysis. The interviews were coded using *Atlas.ti* program (see Appendix 2 for code tree).

Table 5 Semi-structured interview respondents.

Code	Type	Sampling method	Interview Duration	Interview location	Date
I01	Intermediary- Vereniging Gemeenschappeljk Wonen & Cooplink	Purposive	54:48	Online	4th July, 2023
I02	Intermediary-Process facilitator-BIEB	Purposive	32:24	Online	21st July, 2023
A01	Architect	Purposive	33:57	Architect firm	10th July, 2023
F01	one of the founding residents	Purposive	1:00:00	De Kersentuin	12th July, 2023
R01	Resident	Stratified	48:00	De Kersentuin	15th July, 2023
R02	Resident	Stratified	16:30	De Kersentuin	15th July, 2023
R03	Resident	Stratified	23:53	De Kersentuin	15th July, 2023
R04	Resident	Stratified	22:28	De Kersentuin	15th July, 2023

Source: Author (2023)

b. Online Surveys:

20 respondents conducted the online survey. The graphs below show the group's demographic including their age composition, gender, and income level. The graphs show that the current age composition is mostly people above the age of 55. The respondents are 53% female and 47% male, with females being the majority. In addition, the income levels of residents indicate low, middle, and upper-middle classes. The survey results indicate that residents are highly educated with 41% having a master's degree. Moreover, most of the respondents have lived in De Kersentuin for over 10 years, with 76% owners and 24% tenants.

- 18 - 24 (6%)
- 25 - 34 (6%)
- 35 - 44 (12%)
- 45 - 54 (18%)
- 55 - 64 (29%)
- 65 and over (29%)
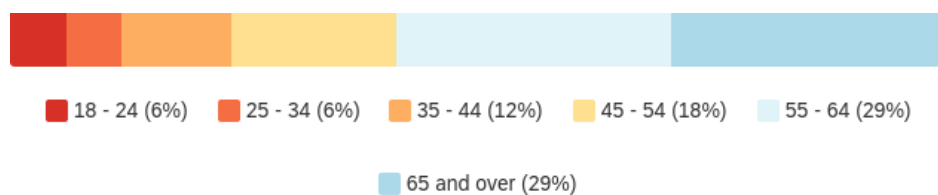
Figure 11 Age Composition of the Respondents.
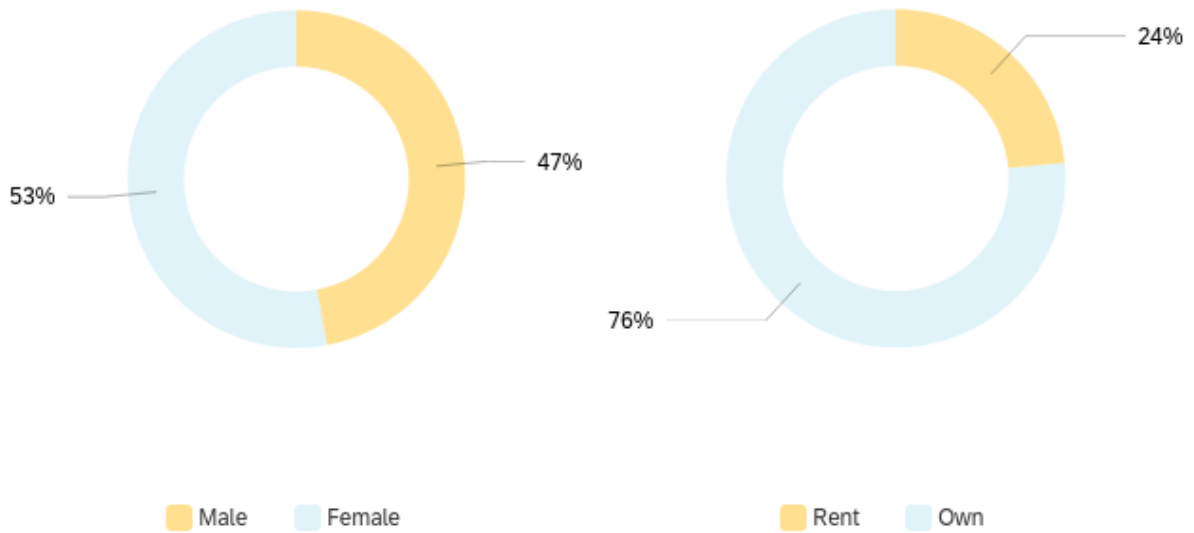
Source: Survey (2023)

Figure 12 Gender and tenure form of the respondents, Source: Survey (2023).

Figure 13 Resident's education level, income level, and duration of stay at the Kersentuin.

Source: Survey (2023).

c. Emergent relationships between indicators

Throughout this research, correlations between the different indicators became evident. Figure 14 depicts the correlations between the indicators. Two types of correlations were identified. "direct" and "intersecting" correlation. The direct correlation, explains the influence an aspect has on the other indicator, taking into consideration that they have distinct aspects and no overlap is visible between them. For instance, social architecture has a direct correlation with social networks and place attachment. On the other hand, intersecting correlation occurs when indicators have some overlapping aspects, however, it remains that the indirect variable indicator influences the direct variable indicator. For instance, the "shared vision" indicator has an intersecting correlation with the community's ability to retain "common values" that enhance social cohesion. Another example of intersecting correlations is that the "mutualization" capability (organizational dimension) of the cohousing community highly influences the ability of the residents to participate in "urban sharing" which enhances environmental sustainability. Those relationships will be further highlighted in the analysis of the data.

Figure 14 Relationships Between Indicators of Independent and Dependent Variables.

Source: Author (2023)

4.2.1 Cohousing Dimensions, findings and discussions

According to the literature review, four characteristic dimensions of cohousing were identified; Vision and values, relational, organizational, and spatial dimensions. De Kersentuin was analyzed according to these dimensions to determine its characteristics. The data from interv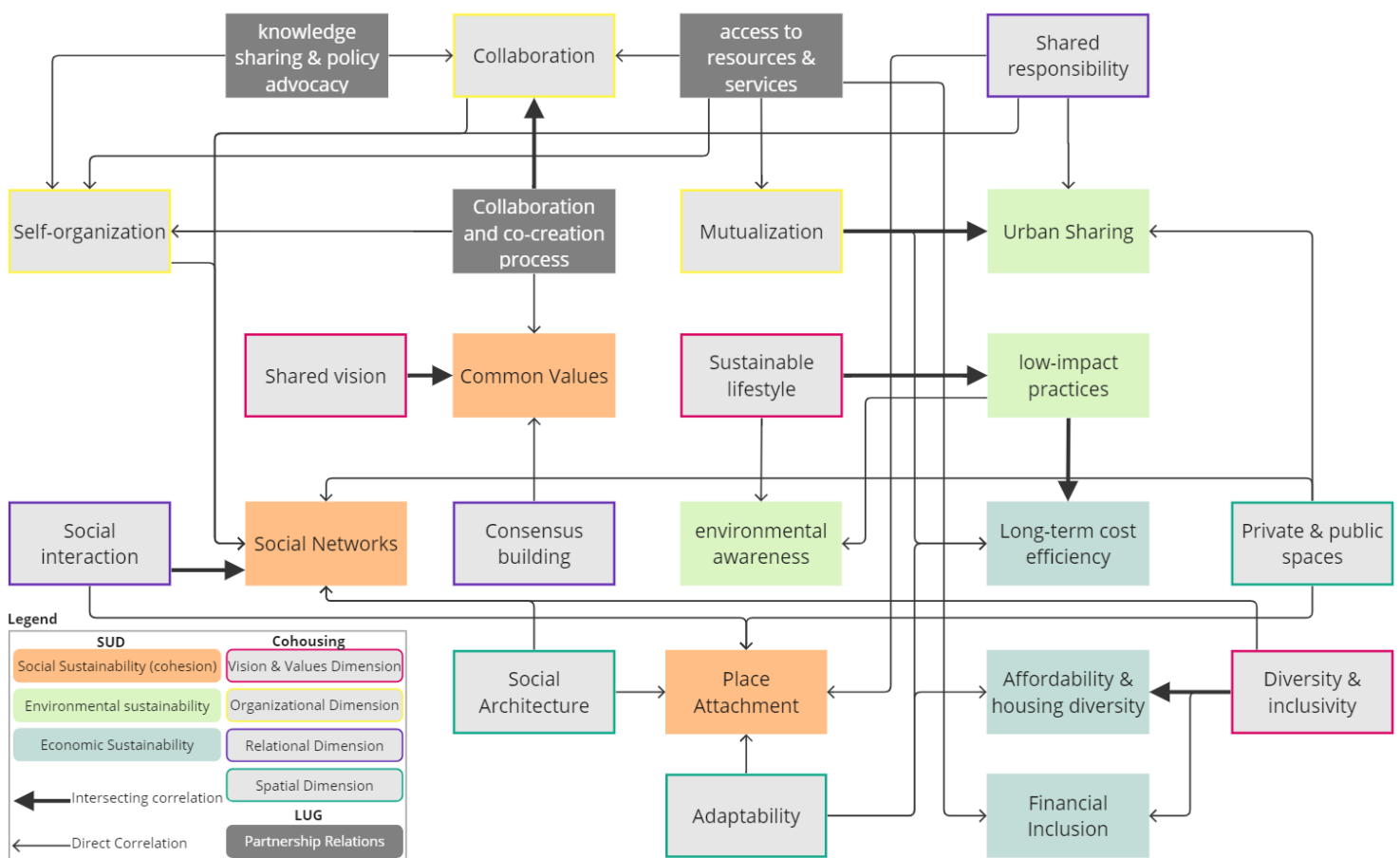iews, observations, Kersentuin website and handbook (D02 & D04), and the BIEB website were used to determine those characteristics. In this section, the findings of each dimension indicator will be presented.

4.2.1.1 Vision and Values Dimension

a. Shared vision

Cohousing communities, such as De Kersentuin, share a vision that extends beyond housing, seeking a close-knit community valuing connection, belonging, and mutual support. This vision encompasses fostering community, encouraging sustainable living, and creating inclusivity (D02). Within these large groups, diverse viewpoints and visions emerge. Thus, collaborative efforts are essential to establish a shared community foundation and way of life. The original core group, consisting of three perspectives, included those interested in an environmentally friendly lifestyle, prioritizing social values, and exploring "permaculture" or nature-oriented building (D02). While the third approach proved inapplicable, they combined their goals for eco-friendly and social living (D02; D03). Ultimately, they collectively embraced the ideals of social and ecological sustainability. These principles were formalized in a "Program of Wishes," outlining defining principles for the project, which they shared with stakeholders. As new members joined, they signed a participation agreement, committing to the program of wishes. In summary, document analysis and interviews reveal the Kersentuiners' vision: to establish a 100% resident-led, inclusive, socially and environmentally sustainable neighborhood.

b. Sustainable lifestyles/ intentional communities

Sustainable living takes center stage in cohousing communities, exemplifying a commitment to ecological practices like energy efficiency, recycling, urban farming, and reducing environmental impact. Cohousing communities, intentional neighborhoods where members choose to live according to shared ideals, prioritize these values (BIEB, 2021). Residents, driven by strong environmental awareness, align their choices with these ideals (BIEB, 2021). Simultaneously, these communities attract individuals who value communal living and joint activities (D02). As stated by R01, residents strive for intentional, sustainable living while acknowledging that convenience sometimes shapes their choices.

"Last year I had a conference in Malta. I checked if I go there by train or boat. It would take a lot of time. So, I went by airplane. I'm not clean myself, but I try. when I go to England this year on holiday, then I go by train. but I start to notice that, there's so much going on with the climate now" (R01, Resident, July 2023, 38:38)

c. Diversity & inclusivity

Cohousing neighborhoods strive for diversity and inclusivity, welcoming individuals of various ages, abilities, and backgrounds. However, most projects employ a resident selection process, potentially impacting diversity and inclusivity. In Kersentuin, it was surprising that this system didn't exist. F01, a co-founder, remarked, *"Kersentuin sells itself, attracting those genuinely interested in living here, self-selecting" (July 2023, 12:58).* Interested parties are encouraged to engage in activities and workdays to assess their fit, yet this lifestyle isn't for everyone.

Furthermore, according to the respondents, kersentuiners are usually highly educated citizens with no diverse ethnic backgrounds, limiting inclusivity. It may be a result of the high skill, awareness, and resources (chapter 2's tensions within cohousing) required to realize such projects. Further research is required to establish the connection between education ethnicity and cohousing. Conversely, the community targets inhabitants of diverse ages, genders, and income levels (D02). 59% of the Survey respondents find the community inclusive (Figure 15).
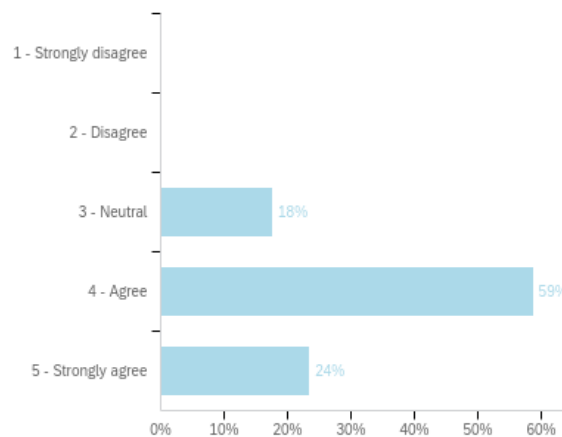
Figure 15 Resident's opinion on the community's inclusivity.

Source: Survey (2023)

Kersentuin houses a variety of residents due to versatile housing and mixed tenure—different ages, wealth levels, singles, families, and differently-abled individuals (D03). According to BIEB (2021), it is a complex of dwellings large enough to house a diverse cross-section of citizens. With 94 dwellings, Kersentuin is one of the Netherlands' largest CPOs. For comparison, I02 cites an average CPO size of "About 15 to 20 houses" (July 2023, 9:27). The municipality seeks socioeconomic balance through mixed tenure, seamlessly integrated within buildings (researcher observation). This fosters neighborhood equality and inclusivity.

4.2.1.2 Organizational Dimension

a. Self-organization & governance

Cohousing communities are built on the idea of self-organization and self-governance, where members take an active role in managing the neighborhood. As the community evolves, residents adjust organizational structures and practices, share knowledge, and engage in continuous learning. De Kersentuin's present organizational structure comprises three groups: the Homeowners Association (VvE), the Residents Association (ALV), and the Kersentuin Management Foundation (SKB), as shown in Figure 16.
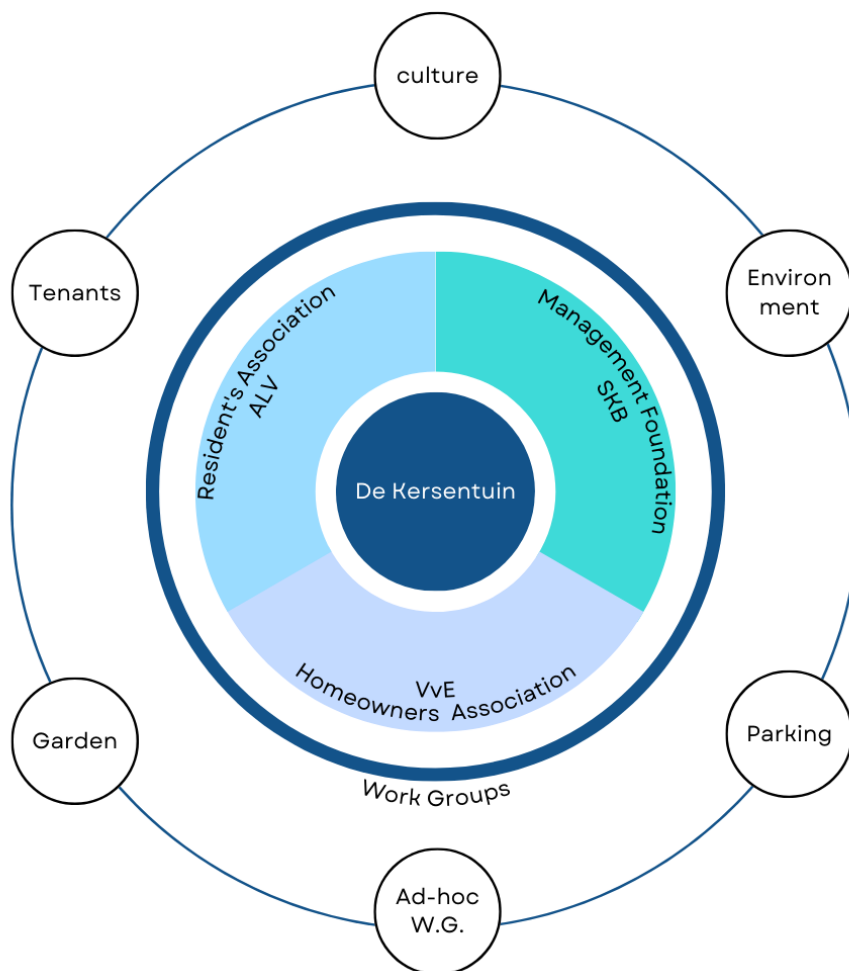
Figure 16 Organization structure of Kersentuin.

Source: Author (2023)

The VvE encompasses homeowners, including Portaal representatives (D02), pooling monthly funds for exterior building upkeep. Residents note that exterior changes require VvE approval, occasionally feeling restrictive. Approvals of changes are made collectively through meetings, which can be time-consuming. The ALV includes all Kersentuin members, regardless of ownership or tenancy, primarily managing the neighborhood. This involves organizing activities, addressing issues, parking, and conflict resolution. All members are encouraged to participate equally regardless of their tenure form. This democratic approach to decision-making encourages a sense of empowerment, inclusion, and ownership among individuals.

However, not everyone chooses to participate but the majority does (63 %), depicted in Figure 17. Multiple working groups that cross both associations were formed in these two associations. The working groups, shown in Figure 16, can handle various topics independently and more effectively. Finally, the management foundation oversees communal space finances like the project house and parking garage.
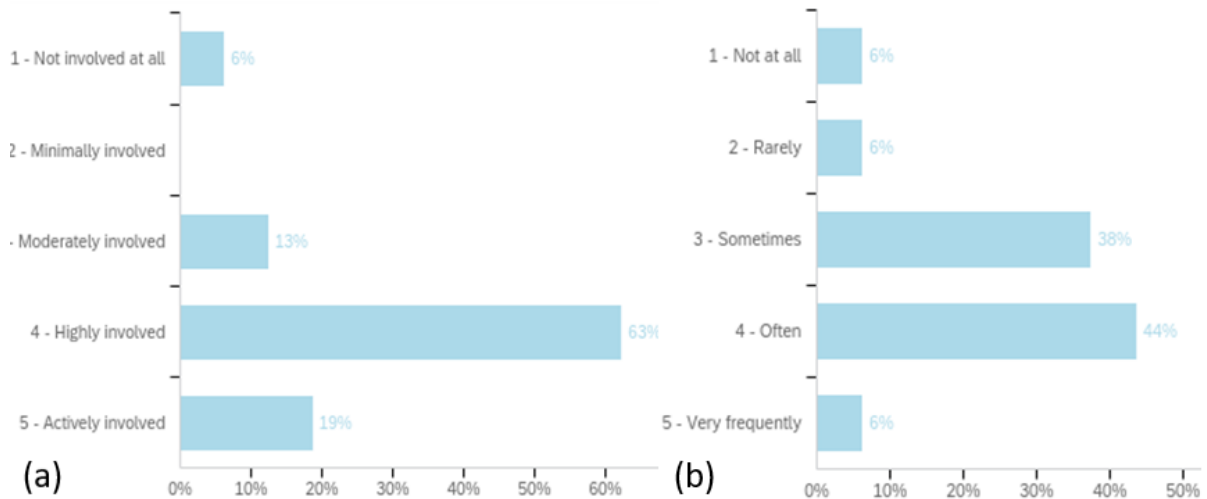
Figure 17 (a) The level of involvement in decision-making, (b) frequency of resident engagement in mutualization practices.

Source: Survey (2023)

This structure of their self-governance process ensures that everything regarding the neighborhood is taken care of by delegating tasks and responsibilities (D02). Meetings of the three associations are held regularly to discuss issues or new initiatives to discuss and decide on upcoming topics. According to F01,

"For the VvE we meet two times per year and the social part about six times a year. Those are the official meetings. But of course, there are casual interactions outside a lot. That's the nice part of a neighborhood, like the kersentuin, neighbors are getting to become friends so you meet a lot." (F01, co-founder, July 2023, 10:53)

When asked about whether residents initiate ideas, most of the respondents were hesitant to do so because it is time-consuming to get approvals from the VvE and the ALV, and the process is not facilitated. Overall, the residents are appreciative of this organizational structure since it has been successful in governing their neighborhood and delegating responsibilities.

b. Mutualization

The term "mutualization" describes the sharing of assets, resources, skills, and duties to benefit the community. The Kersentuin community frequently participates in the sharing of assets, including the project house, communal gardens, parking garage, garden tools, car sharing, and washing machines (D04). In addition, they have a social media group for giving away or borrowing products that circulate within the community (F01). According to Figure 17, 44% of the respondents often engage in sharing or borrowing items with their neighbors. In addition, any person with special skills shares them with the rest of the group through activities, workshops, or initiatives.

c. Collaboration

Cohousing communities thrive through diverse collaboration forms, including social events planning and decision-making. The residents work together to achieve a certain goal. Typically, tasks are assigned to residents based on their availability, skills, and interests (Jarvis, 2011), often working in small groups (D02). I02 notes that collaboration with a big group (94 households) is less effective than smaller groups of 5 or 6. The above-mentioned indicators strongly confirm this neighborhood's collaborative nature (75% of respondents acknowledge effective collaboration on responsibilities). Interviews highlight garden maintenance and weekly social event planning as prominent collaborative activities. While not universal, 81% actively contribute to event planning. Collaboration happens in all interaction scales, from one-to-one interactions to group collective decision-making. Furthermore, collaboration extends beyond the community, involving external stakeholders like facilitators (BIEB), municipalities, advisors, and neighboring communities. One example of external collaboration is the unique agreement with Utrecht municipality to allow residents to manage the neighborhood's public parks while the municipality funds the maintenance expenses (D02). This partnership is discussed further in section 4.2.3.1.

4.2.1.3 Relational Dimension

a. Social Interaction

Residents' social interactions are valued and given a high priority in cohousing communities. The relational dimension places a focus on the value of establishing deep connections, encouraging a sense of belonging, and establishing a strong social fabric within the neighborhood. Social support networks, fostering help, emotional backing, and shared experiences, bolster overall well-being and resilience. cohousing emphasizes respectful dialogue, mediation, and constructive problem-solving to manage conflicts.

The Kersentuin project surpasses regular neighborhoods in social interaction, driven by voluntary engagement among individuals of diverse natures and personalities (D02). Some people are more to themselves and people are extroverts in nature. People are easy to find, work together to generate ideas, solve problems, encourage and help one another, have fun together, and also respect personal space. Inevitably, occasional misunderstandings arise but according to D02 (2006, p. 11), "our experience is that it is usually resolved with compassion for each other."

As will be discussed in the social architecture section, the common public areas (gardens and pedestrian pathways) are the places where most interactions happen, either casual or planned, see Figure 18. After that, the semi-public gardens or terraces shared between adjacent dwellings have more controlled interactions. According to R02, if anyone wants to talk to someone, they'll just go and sit in the common park and many people will come and join. Private areas offer retreats for those seeking solitude. Within the large community, smaller neighbor networks emerge, allowing residents to choose their interactions.

"So, they're all places where you can gather and when you sit here and you are going to eat, some people from that house say, oh, nice, I'll join too." (R02, Resident, July 2023, 07:28)

"The nice thing is, you can choose with whom you have social interaction. But everybody knows each other and takes care of each other. But in that large web, there are smaller webs." (R02, Resident, July 2023, 12:48)

Virtual platforms complement physical interactions. Since Kersentuin's inception, an online forum and social media groups have facilitated communication. A private marketplace enables item exchange, meeting material sharing, and Q&A.

b. Shared responsibility

Residents take an active role in the management, decision-making, and maintenance of the neighborhood. This shared responsibility fosters a sense of ownership, collaboration, and common dedication to the general welfare of the community. During Kersentuin's development, members committed to weekly workgroup involvement through a participation agreement (D02). D03 notes diverse workgroup themes, spanning design, construction, energy, water, environment, legal, organization, management, and finances. Members joined these groups depending on their skill sets. However, after construction involvement became voluntary. There is a core group who are always active and engaged. Some people were less active, some participated only when their skills could be used, and others didn't participate at all. However, according to D02, there were more active members than inactive. The residents are also big on free will. Anyone who wants to participate will do that and people who don't will not be judged. Participation isn't compulsory; the neighborhood thrives when residents collectively sustain its function.

"Everybody has taken their role that fits. Every responsibility is taken by someone who fits it. The freedom that you don't have to do things with the neighborhood is what I love too. Nobody will be mad because you don't do that." (R02, Resident, July 2023, 13:45)

c. Consensus Building

Residents typically pursue consensus-based decision-making, fostering inclusivity, accountability, and responsibility for their decisions. During general meetings (ALV), diverse viewpoints and deviating opinions are discussed to establish consensus. If a member disagrees, they're encouraged to suggest alternatives (D02). This process ensures equal treatment and involvement of all members but is time-intensive. R03 finds this process time-consuming and potentially discouraging, while R01 notes conservatism in the board inhibiting initiatives:

"I like it when people have their vision on their house and they change things. But VvE is a bit conservative. I do have ideas to make changes to my house, but the thought is that you then have to go to the VVE and the local government because then you also have to have permission. That's a lot. So many steps." (R01, Resident, July 2023, 28:24)

According to respondents and D02, a few compromises maintain neighborhood functionality. Occasionally, Individual interests must be balanced for the community's overall good. D02 states that residents trust each other to choose what's right for their community and that too many disruptions might slow down or halt the development process of the cohousing project.

4.2.1.4 Spatial Dimension

a. Social architecture

In cohousing communities, social architecture is prioritized, which implies that the layout of buildings and communal areas is intended to promote social connectivity and interaction among inhabitants. The spatial aspect tries to encourage regular meetings, impromptu exchanges, and opportunities for neighbors to interact (researcher observation). According to the masterplan (D06), private housing units link directly to communal green spaces or high-interaction areas (Figure 18), enhancing opportunities for social engagement.
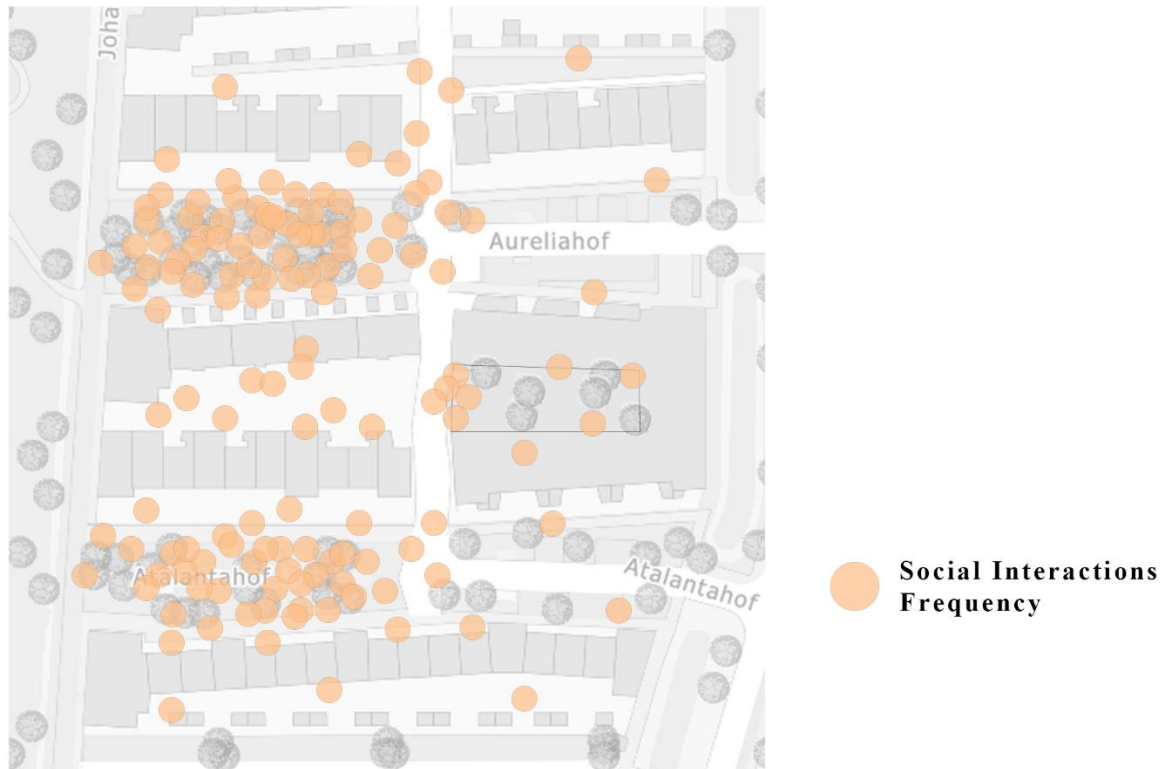
Figure 18 Frequency of social interactions in De Kersentuin neighborhood.

Source: Author (2023)

Furthermore, communal gardens are strategically designed to enhance social engagement. For instance, there is an amphitheater designed to hold events or performances, Figure 19. There are also child-friendly spaces with a sand pit enclosed with hedges to secure the children. The communal spaces are also outfitted with group-friendly urban furniture like benches that facilitate eating together outside, which is where the interviews with the respondents took place.

Figure 19 Amphitheater design in the communal gardens.

Source: (BIEB, 2021)

There is also a project house, shown in Figure 20, designed specifically to host meetings, events, and social activities or gatherings, comprising a small meeting room, laundry facilities, and a spacious meeting area with a kitchen (researcher observation). External groups can also rent it for a fee, sometimes for municipality events. De Kersentuin's spatial design prioritizes walkability and pedestrian-friendliness, with a car-free policy. Observations revealed spontaneous conversations on pedestrian pathways. Buildings are structured to encourage walking, reduce car dependency, and facilitate social encounters. Notably, the original plan (D06) aimed for an organic design to expand social spaces, but municipal urban planners insisted on straight pedestrian pathways.

"Well, we had to build streets like this. That was from the local government. We would rather have done squares or things with gardens a bit more sheltered off by the houses, but this had to be open. So, we decided that all the houses have a very small private garden and the other space is just communal gardens and that helps a lot." (R01, Resident, July 2023, 19:20)

Figure 20 The Project House located in De Kersentuin for social activities.

Source: Kersentuin (n.d.)

b. Adaptability

The flexibility and customization offered by Kersentuin cohousing project frequently enable participants' unique requirements and preferences to be met. Whether it is the organizational structure or the physical environment, all aspects adapt to the changing needs of the residents. Kersentuin started with the idea that the residents want a customizable environment that will meet their future needs environmentally and socially (D02). Initially, members personalized their homes and designed municipally-owned public gardens to suit social activities. Furthermore, regarding the management of the cohousing project, when in need, an ad-hoc working group might be established to take care of a certain issue.

The spatial dimension includes adaptable spaces that may be rearranged or repurposed in response to changing community needs. They changed some physical features of the community garden like adding a sand pit and growing hedges to make the area more child-friendly. Also, they use movable urban furniture that they built to suit different activities. Moreover, when a family grows, there is a possibility of extending the house and increasing the ground floor and the first floor, depending on how much extra space the residents need (D06). However, respondents note that it is costly and the process is long. Hence, only a few opted for this option.

"The Architect had the vision that most of the houses are, you can make them three meters larger quite easily. But it takes a lot of money. So some people did it at the building. but only a few did it afterward because it takes a lot of money and time. the idea was to have houses if you want to stay here and when you're old, you can make a bedroom downstairs." (R01, Resident, July 2023, 25:56)

Despite this limitation, they feel it is good to know that they have this possibility. Moreover, the architect ensured that the house width is 6 meters minimum so that when the inhabitant gets old and cannot use the stairs anymore, they could add a bedroom on the ground floor, hence making it "life-resistant".

c. Private & public spaces

Cohousing neighborhoods strike a balance between individual living spaces and communal gathering areas, fostering privacy while promoting social engagement (Ache & Fedrowitz, 2012). De Kersentuin features a mix of public, semi-public, and private spaces, illustrated in Figure 21 showcasing their interrelationships. As can be seen, the private spaces (individual homes) have direct access to either a public space (communal gardens) or a semi-public space (shared gardens with adjacent neighbors). homes are often clustered around shared open areas. This, according to the residents, creates a balance between what's public and what's private and gives the inhabitants the freedom to choose the level of socializing they desire.

"For us, the balance is good because we have gardens on the back of the house. And there are no fences, but we have our place where we can sit privately. And you see, now we can sit here and nobody's disturbing us. So, we have privacy here in the open." (R02, Resident, July 2023, 10:52)

"If I don't want to talk, then I go sit there (private garden). And not there (communal garden). So, that's a decision I can make. And if you go sit on the bench, then you know there will come someone very probably. For me, the balance is very okay." (R03, Resident, July 2023, 14:30)

However, R01 claims that the reason some people leave the Kersentuin is because they need more private spaces:

"Well, if people leave and decide to go somewhere else, they often say it's because I want to have more space of my own, more garden. I can understand that after a few years, you want more private space because you don't have that here. And everybody knows where everybody is. So sometimes people say, I want more freedom or space and I can understand it because your garden is extremely small. So if your neighbors are making a bit of noise, you can't go sit in another part of the garden because it's so small. So, it is very limited. There are always positive and negative." (R01, Resident, July 2023, 24:00)

The roof garden on top of the garage building also acts as a semi-public space for the housing units located above the garage. Moreover, a central common house (The Project House) that serves as the hub for social events and shared amenities is a common feature of cohousing communities. This is a semi-public space that is only accessible to current residents. Larger gatherings, communal meals, meetings, and activities can all be held here (Ache & Fedrowitz, 2012). Although communal gardens are open to the public, very few people from outside of Kersentuin use them. R01 states that the communal garden is:

"This is just a street. Everybody can sit here. and because this has a special feel, not a lot of people who don't live here, sit here. In fact, they are welcome to do it. This is a public space." (R01, Resident, July 2023, 20:33)

Figure 21 Balance between public, private, and semi-public spaces in De Kersentuin.

Source: Author (2023

4.2.2 Sustainable Urban Development, findings and discussions

As evident from the findings of De Kersentuin Cohousing neighborhood characteristics, the main theme of the Kersentuin is sustainability. 20 years ago, the initiators had futuristic goals for neighborhood sustainability that still apply today. Urban developments strive to achieve this level of integration between sustainability principles. This integrated sustainability approach is unique in the Netherlands, encompassing ecological and social features within a single project. This section presents and discusses how De Kersentuin cohousing initiative achieves social, economic, and environmental sustainability. Relationships depicted in Figure 14 between indicators will be emphasized. The findings stem from interviews, documents, surveys, observations, and architectural plans.

4.2.2.1 Social Sustainability: Social Cohesion

The Kersentuin, as a neighborhood and as a community, is greatly appreciated by the residents. There is a heightened sense of belonging and ownership towards its distinctive character. From a social standpoint, there are many efforts made in the neighborhood to foster social cohesion among residents.
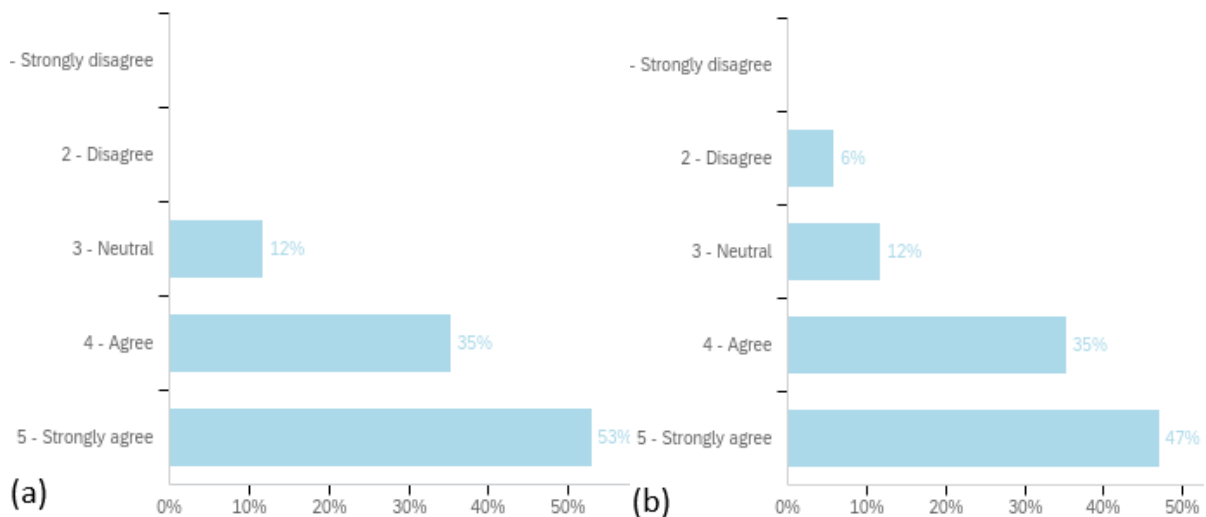
a. **Place Attachment**

Place attachment is the emotional and functional bond to the place. Characteristics of De Kersentuin Chousing project discussed above allow for residents to form bonds with their surroundings. Indicator of cohousing that impacts place attachment are summarized in Figure 23. Those aspects include the inclusion of the residents in all decision-making and activities related to the neighborhood. In addition, *managing their environment* gives them a sense of ownership and belonging to the place. the *mutualization* of the common gardens and their *shared responsibility* in maintaining it also enhance place attachment. Finally, being able to utilize the spaces for *social interactions* and activities, as the *social architecture* aspect, allows the users to make memories bonding them with the place. The idea that their housing units are designed to *accommodate their individual needs* also enhances their place attachment, thus strengthening social cohesion.

To showcase the resident's sense of belonging and ownership of the place, R01 said:

"you can see that everybody is careful with materials like this, or in a project house, Also the kitchen, everybody is careful with it. Everybody cleans the streets also. The streets are like your own house. If I see something, it's very rare, but sometimes there's dog poo when I walk here, I always have plastic bags and then I pick it up and throw it away. But I don't do that outside the kersentuin. I only do this, but because this is ours. Then you feel a sense of ownership." (R01, Resident, July 2023, 34:22)

According to the survey, the majority strongly agree that they feel a sense of belonging to the community (53%) and to the common areas (47%), as shown in Figure 22.

Figure 22 Sense of belonging (a) to the Kersentuin community, (b) to the common areas.

Source: Survey (2023)
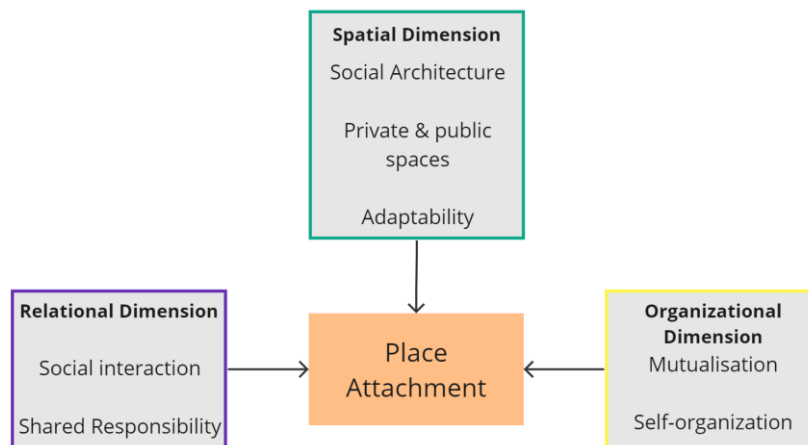
Figure 23 Relationship between the Cohousing dimensions indicators and Place Attachment.

Source: Author (2023)

b. **Social Networks**

To achieve social cohesion, the community needs to have strong social networks. This is demonstrated by De Kersentuin community in many ways, relating to the cohousing dimensions mentioned earlier (Figure 26). The relational dimension has a strong impact on the quality of social networks created in the community. Clear communication through a transparent *organizational network structure* will undoubtedly strengthen the social networks within the community. Moreover, the *diversity* achieved by social mixing and the size of the neighborhood gives people the freedom to choose their close network. According to R04:

"One of the best things about this project is that it isn't too small and it isn't too big. You practically know everybody. But there are enough people to choose between. Because you can't be social with everybody. And I don't want to be restricted in my choices." (R04, Resident, July 2023, 02:48)

Moreover, the act of *sharing assets* and resources and *collaborating* effectively in work groups enhances the quality of their social networks.

"there are a lot of elements in this project which we have to maintain ourselves. And we have a shared responsibility for it. And because of that, we met. And because of that, social cohesion grows. there are also a lot of events organized by ourselves or by others here in which we participate. And that increases social cohesion. But also at the beginning of the whole design period, social cohesion started because we knew each other before we lived here." (F01, Co-founder, July 2023, 09:24)

In addition, it is also strengthened by the *social architecture* of the neighborhood and the *interactions* that occur within, see Figure 25. Moreover, collective decision-making within a *consensus-based system* allows them to trust their neighbor's judgment, hence establishing a strong network within the community. In those situations, conflicts within the community may occur as misunderstandings happen, however, the majority of the residents (56%) agree that conflicts are effectively resolved and 44% strongly agree that it is done fairly and respectfully. Additionally, the act of collectively sustaining the communal spaces together fosters cohesion.
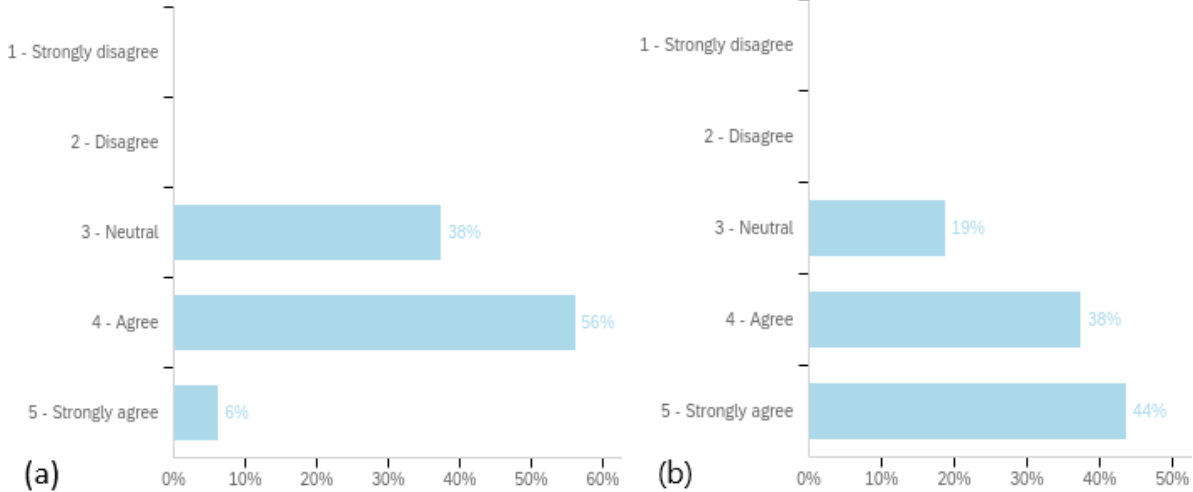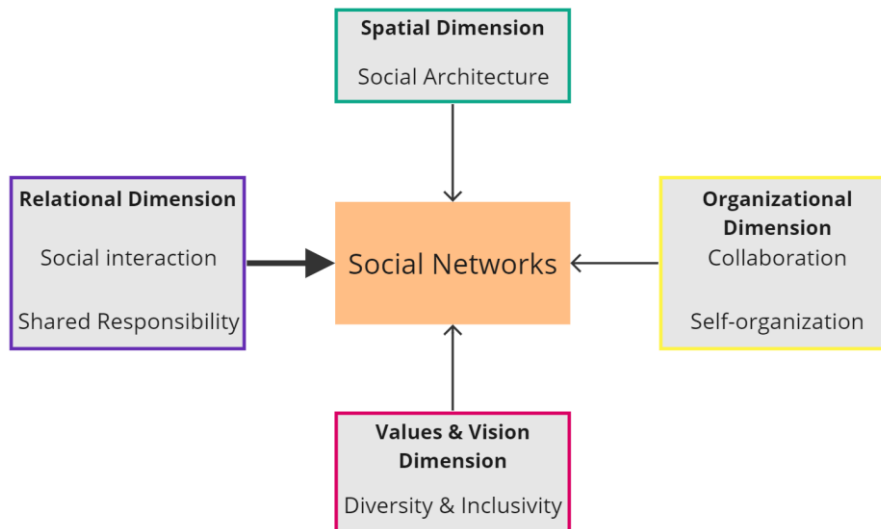

Figure 24 Conflicts are (a) effectively resolved among residents & (b) fairly and respectfully.

Source: Survey (2023)

Figure 25 Residents of all ages socializing together in common gardens.
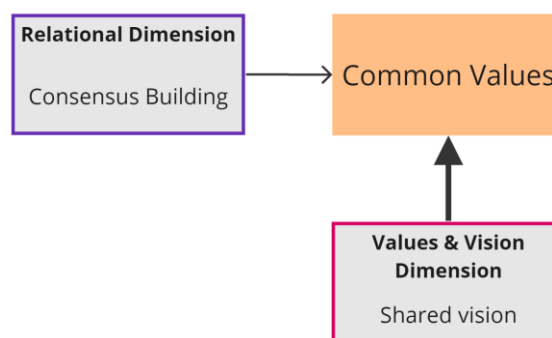
Source: Kersentuin (n.d.)

Figure 26 Relationship between the Cohousing dimensions indicators and Social Networks.

Source: Author (2023)

c. **Common values**:

Social Cohesion occurs when the community shares certain values. It includes sharing the same *sustainable lifestyle* and ideology, motivation to live there, and the desire to have close *social interactions*. Common values also apply to Kersentuin's responsibility and resource-sharing aspect. The ability to find common ground as what happened in the early negotiations to merge the two groups and *reach a consensus*, in the beginning, was one of the bonding activities (D02). In addition, collective decision-making highlights the common values that the residents share. R01 mentioned that by the time they lived there, they already knew everybody and were friends. Most importantly, the values and vision dimension including shared vision indicator have a strong impact on the community sharing common values (Figure 27). It is an example of the intersecting correlation mentioned earlier.

Figure 27 Relationship between the Cohousing dimensions indicators and Common Values.

Source: Author (2023)

4.2.2.2 Environmental Sustainability

De Kersentuin had a futuristic vision 20 years ago in approaching ES by applying ecologically friendly practices that weren't mainstream yet at that time. This section will analyze how De Kersentuin utilizes aspects like urban sharing, low-impact practices, and environmental awareness to achieve ecological sustainability. Their approach is not only based on the use of technology but also behavioral practices.

a. **Urban Sharing**:

As implied in the Kersentuin characteristics, sharing is a fundamental part of their lifestyle. They share communal facilities such as a community center, washing machine rooms, and meeting rooms. These shared facilities have a lower environmental impact than individually operated ones (D01). Additionally, the community shares urban spaces like gardens that vary in privacy levels. Moreover, to reduce car ownership and use, they partnered with a care-sharing platform (MyWheels) (D04). This is considered best practice when aiming for sustainable neighborhoods. Moreover, they also share cargo bikes (Figure 28) to encourage the use of sustainable transport and reduce car dependence. The Cohousing dimension that strongly impacts urban sharing and shares an intersecting relationship with it is the mutualization feature of the community (Figure 29). It promotes the ability and the opportunity for urban sharing to happen. Other dimensions also directly impacting are the shared responsibility and private and public spaces.

Figure 28 Shared cargo bikes in De Kersentuin.
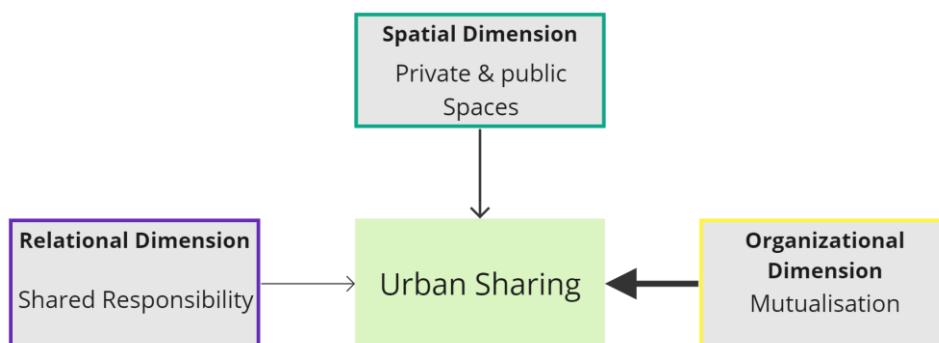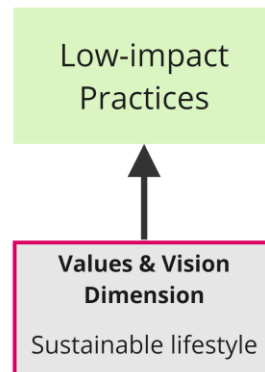
Source: Kersentuin (n.d.)

Figure 29 Relationship between the Cohousing dimensions indicators and Urban Sharing.

Source: Author (2023)

b. **Low-impact practices**:

De Kersentuin has implemented several practices that decrease resource consumption and protect the environment. The sustainable infrastructures and approaches used were ahead of their time in 1996 and are still considered efficient today. The facts and figures mentioned in this point were taken from D01. The sustainable lifestyle indicator from the values and vision dimension has a strong and intersecting relationship with low-impact practices (Figure 30) since their dedication to maintaining a sustainable lifestyle motivates them to invest in low-impact practices.

Figure 30 Relationship between the Cohousing dimensions indicators and Low-impact practices.

Source: Author (2023)

Low-impact practices cover the following aspects:

Green Spaces and Biodiversity. When initiating the Kersentuin neighborhood, the residents aimed to create a green oasis that offers a suitable environment for many species in the ecosystem (D03). During construction, the architect made sure there were bird and bat houses in the façade. They also added a few birdhouses after living there (F01). There are diverse insect species including butterflies and bees, which took one of the birdhouses as a place for their beehive. In addition, the hedges provide a suitable environment for hedgehogs. De Kersentuin hosts more diverse species compared to other neighborhoods (D01). The carefully chosen vegetation provides a habitat for small animals and birds. Moreover, there are many plant species, including edible vegetation and fruits, like the famous cherry trees that it's known for. This was achieved by ensuring there were adequate green spaces during the design phase. To increase the green areas, the sunken parking garage was built with a green roof on top and to replace the designated outside parking lots with greenery (D06), see Figure 31. In addition, façade vegetation could be spotted on some buildings (Figure 32).

Figure 31 Allocated parking plots transformed into green areas.

Source: Kersentuin (n.d.)

Figure 32 Green walls covering some buildings act as insulation.

Source: Kersentuin (n.d.)

Sustainable transport. During the design phase, the residents were determined to reduce the dependence on privately-owned cars and were negotiating with Utrecht municipality to change the parking standards for this neighborhood to be 0.75 car/household instead of 1.4 (F01, co-founder, July 2023) which they succeeded to do (D01). Moreover, Due to the creation and implementation of a parking garage, a car-sharing program, and shared cargo bikes, the neighborhood has a low level of traffic. The location of de Kersentuin is also next to a public transportation stop and a nearby train station, decreasing the dependence on privately-owned cars.

Energy Efficiency. Kersentuin is known for its distinctive solar panels on the roof, see Figure 33. According to F01, they make more energy than they consume and balance off their bills.

"When you walk through the kersentuin, you see a lot of panels. And so a few households will be zero when you talk about electricity. I am producing more electricity than I use." (F01, co-founder, July 2023, 21:55)

Moreover, De Kersentuin ensures energy efficiency by implementing good insulation materials, south orientation of the houses, and a low-temperature heating system. They used innovative technology that made them pioneers in the sustainable construction field in 2003 (D01). In addition, the buildings are designed in a way to maximize daylight with skylights and by playing with the sizes and placement of the windows taking into consideration the direction of the sun (D06). This decreases electricity consumption due to lighting. According to D01, the neighborhood's energy performance coefficient (EPC) was 0.4 in 2015 compared to 1.2 for new construction.

Figure 33 Aerial view of De Kersentuin showing solar panels on the roof.

Source: Kersentuin (n.d.)

Sustainable Materials. De Kersentuin is constructed using sustainable materials like sustainable wood (FSC quality mark), cellulose insulation, and recyclable roof tiles (D01). Moreover, it was important for de Kersentuin to use materials that are demountable and reusable in case of future extensions of the houses (D02; F01). They also used demolition waste materials in their landscape design (D01).

Pedestrian-friendly: The neighborhood is car-free and depends on pedestrian pathways and cycling. It has a human-centric design rather than the car-centered design, typical of most neighborhoods. Walking through thick greenery also makes the experience more enjoyable, see Figure 34.

Figure 34 Pedestrian pathway through the neighborhood.

Source: (BIEB, 2021)

Water management. Rainwater in De Kersentuin is not discharged into the sewage system, instead, it is used for vegetation. Moreover, the community partnered with the water company in Utrecht to implement their water purification project which was taken into consideration in the design and construction. However, after a lot of effort by the residents, the government stopped this project before implementation (D03).

"We wanted to have our water system. But it stopped. About 20 years ago. during the design period of our project, we had a special project together with the water company to make our grey drinking water here in the kersentuin. But with the decision to stop the systems in Leidsche Rijn, our project stopped as well. it was a pity." (F01, co-founder, July 2023, 23:26)

c. Environmental Awareness

Residents of Kersentuin have a high level of environmental awareness, evident through their determination to protect the environment and implement as many sustainable practices as they can. Most of the people choosing to live in De Kersentuin have the environment high on their agenda (R02). The cohousing indicator, sustainable lifestyle, influences the level of environmental awareness of the residents (Figure 35). Their investment in such techniques has influenced their behavior to be even more sustainable. 56% of respondents agree that the neighborhood fosters a sense of environmental consciousness. Moreover, they hold occasional meetings to discuss new sustainability themes and share knowledge (F01). According to R01, the low-impact practices mentioned earlier also increase the environmental awareness of the residents.

"I try to live sustainably I think from child on. I see here flowers, the bees, and all the insects. And I see in other places that there are no insects and you read in the paper that we could get

in huge trouble if we don't have bees. I think living here gave me that greater sense of urgency, how important it is. I think if I had not lived here, I might not have experienced it so deeply. I think that that's a big change." (F01, co-founder, July 2023, 36:45)
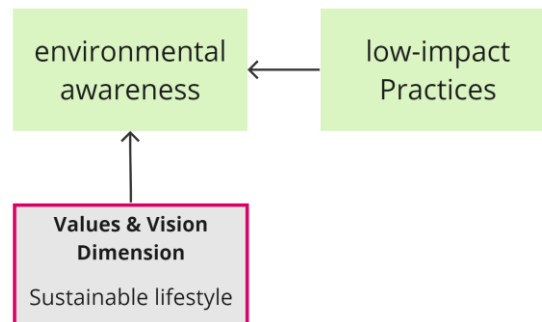
Figure 35 Relationship between the Cohousing dimensions indicators, low-impact practices, and Environmental Awareness.

Source: Author (2023)

4.2.2.3 Economic Sustainability

Economic impacts may be less obvious than those on social and ecological sustainability. The economic benefits influenced by the cohousing dimension will be discussed in this section.

a. **Affordability & Housing Diversity**

The integration of social housing in the Kersentuin project makes it a very affordable option for the residents. The rent is the lowest category in social housing, targeting low-income households and ensuring diversity in the neighborhood (D02). The availability of different tenure forms also has the same effect on diversity. It is evident that the diversity and inclusivity indicator of the cohousing project impacts and has an intersection relationship with affordability and housing diversity (Figure 37). In theory, the decreased cost mentioned above should make living in Kersentuin more affordable than other neighborhoods. However, 44% of the respondents think that it is almost the same (Figure 36-b). Moreover, various types of housing types cater to the different needs of the community. Among the 94 housing units available in de Kersentuin (D03), the types are as follows:

- 47 single-family homes (35 owner-occupied and 12 rented),
- 14 maisonettes, (4 owner-occupied, 10 rented)
- 7 single-story double-wide ground-floor apartments (owner-occupied)
- 15 single-story apartments (9 owner-occupied, 6 rented)
- 6 two-story apartments, penthouse (owner-occupied)
- 4 large living-work homes (owner-occupied)

These types provide various price ranges that target a diverse group. Figure 36-a shows the different types of the respondents' housing.
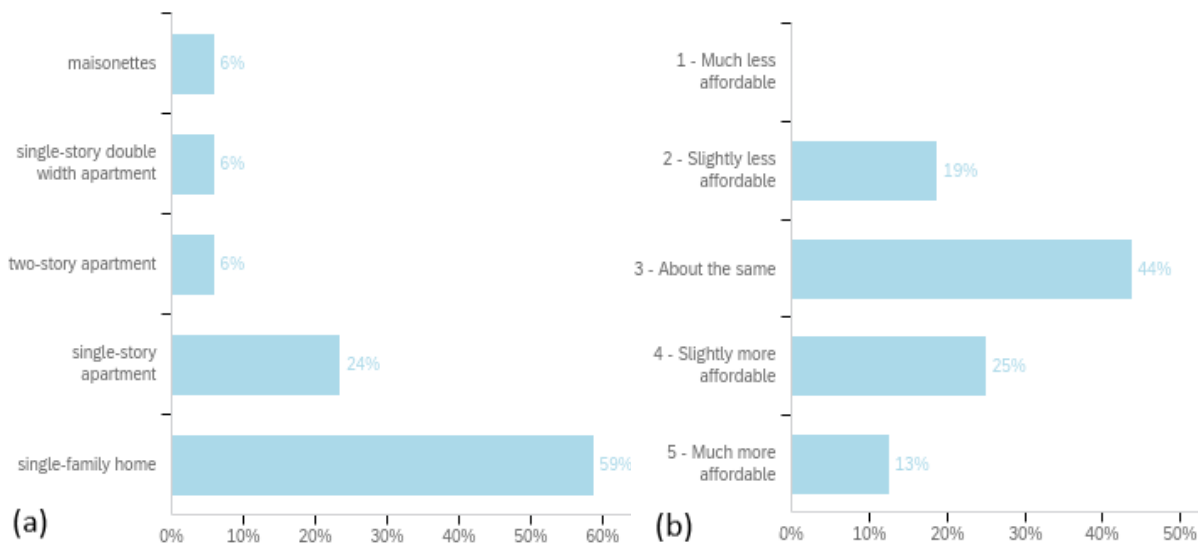
Figure 36 (a) respondent's housing types, (b) level of affordability according to residents.

Source: Survey (2023)

Moreover, the adaptability features of the spatial dimension influence affordability by making the houses "life-resistant", hence decreasing the costs of moving out when circumstances change.
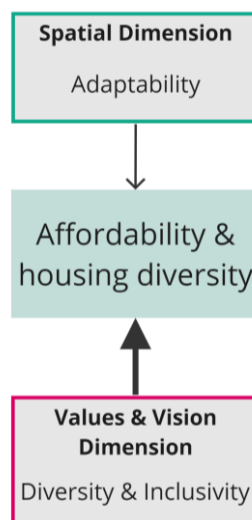
Figure 37 Relationship between the Cohousing dimensions indicators and Affordability and Housing Diversity.

Source: Author (2023)

b. **Long-term cost efficiency**:

The ES measures mentioned above, along with the sharing culture that the Kersentuiners adopt, help reduce daily costs greatly. In addition, the neighborhood maintenance fee is divided among the owners which decreases the individual amount. According to F01, the fee paid for the owner association is so small (8 euros/month), yet they benefit greatly from it. The online marketplace group allows the residents to give away items that someone might need for free. As mentioned, the energy bill is low or almost zero due to the energy-efficient solar panels. It is apparent that the low-impact practices indicator of ES highly impacts and intersects the

neighborhood's long-term efficiency. Moreover, mutualization practices and the adaptability feature also directly influence it (Figure 38).
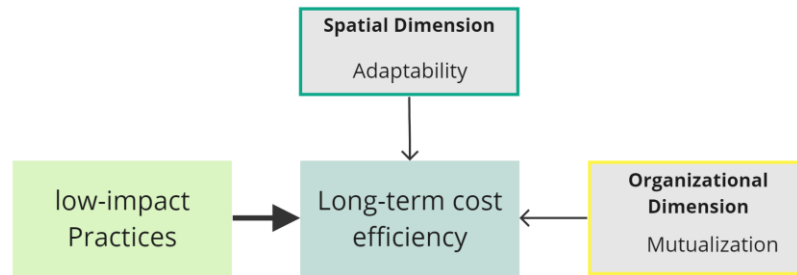
Figure 38 Relationship between the Cohousing dimensions indicators and Long-term cost efficiency.

Source: Author (2023)

c. **Financial Inclusion**:

There are no special financial assistance programs available for the residents of De Kersentuin project. According to F01, the government and banks treat community groups as private developers, which makes it sometimes hard for civil groups' initiatives to take off ground. Regular mortgage applies for residents planning to own their homes. The degree of financial inclusion is affected by the availability of "access to resources and services" from the partnership relations (moderating variable) that the project encounters, see Figure 39. However, social housing provides affordable options to low and middle-income groups. The housing diversity and availability of different tenure forms provide financial inclusion to different socio-economic classes.
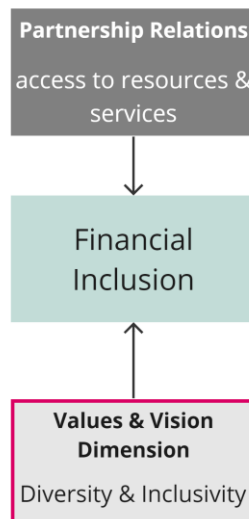
Figure 39 Relationship between Cohousing, LUG indicators, and Financial Inclusion.

Source: Author (2023)

4.2.3 Local Urban Governance, findings and discussions

As the moderating variable, LUG, especially partnership relations between different stakeholders, affects the success of the cohousing project and to what extent it achieves sustainability. In addition to D02, analysis in this section is derived from key informant interviews of founders, BIEB, and other intermediary organizations.

4.2.3.1 Partnership relations

To develop cohousing projects like De Kersentuin, it is vital to form various partnerships and work alongside them to achieve the group's ambitious visions for their sustainable environment. They work in collaboration and co-creation processes to achieve that. In addition to analyzing the stakeholders' collaboration process, their access to resources and services and knowledge sharing and advocacy will also be analyzed in this section.

a. Collaboration & co-creation:

Collaboration and interactions between the various stakeholders involved in De Kersentuin will be assessed using the stakeholder onion analysis, which helps identify involved actors and visualize how they relate to a project's objective. This diagram allows the understanding of each stakeholder's role along with the relationship between them (Czischke, 2017). The concentric circles represent three different actor positions/roles: Key, Primary, and Secondary, based on legitimacy, veto power, and resource provision. The proximity to the center "indicates direct operational involvement" (Czischke, 2017, p. 10), with the project located in the center. In addition, the stakeholders are divided into three domains (divided by the dashed lines in the diagram), civil society, state, and private sector, see Figure 40. Some actors like BIEB could be in 2 domains (Private and civil society) since they are a private entity but they constitute civil actors.

The relevant actors are divided into three types (Table 6). First, Key stakeholders are actors with power or influence over the project or those with considerable authority over vital resources. This gives them veto power too. Those include the Kersentuin resident group, the Housing Corporation (Portaal) as co-owner, and Utrecht municipality. second, primary stakeholders are those who are most involved in collaborations with the key stakeholders. They play an important role in project development but are not involved in day-to-day meetings. Those actors include the architecture firm (Kristinsson Architecten), process facilitator (BIEB), contractor, and municipality urban planner. Lastly, secondary stakeholders are those who indirectly influence the project. They could aid in the development of the project by affecting the wider environment of the cohousing projects. These include civil society and intermediary organizations, banks, advisors, and subsidy providers.

Table 6 Types of Stakeholders involved

Key stakeholders	Primary Stakeholders	Secondary stakeholders
Kersentuin neighborhood association	Bouwen in eigen Beheer (BIEB)	Process Advisors (Adviesbureau De Regie, KUUB, Steunpunt wonen)
Portaal Housing Corporation	Architect (Kristinsson Architecten)	Technical advisors
Utrecht Municipality	Contractor (Slokker Vastgoed Groep)	Intermediary organizations
		Bank
		Subsidy providers (Gemeente Utrecht, Provincie Utrecht, Nederlandse Onderneming voor Energie en Milieu (NOVEM), Stuurgroep Experimenten Volkshuisvesting (SEV), VSB-fonds, Stichting Doen, Prins Bernard Cultuur Fonds, K.F. Heinfonds, KNHM (Koninklijke Nederlandse Heidemaatschappij), Elise Mathilde Fonds)

Source: Author (2023), content derived from De Kersentuin (2006)

The relationships between the stakeholders are visualized by the arrows shown in the diagram and are categorized into three types:

1. Strong collaboration relationship: highly frequent, interconnected, and connected to the project's daily operational features.
2. Ad-hoc collaboration relationship: only happens when a certain service or assistance is needed, e.g., technical or financial aspects.
3. Indirect relationship: Implied influence, e.g., policy or regulations.

Collaboration relationships happening among key actors are usually strong. Moreover, the relationship between key and primary stakeholders is either strong or ad-hoc collaboration. Finally, the relationships of the secondary stakeholders are either ad-hoc or indirect. The diagram below visualizes these relationships and identifies the different stakeholders involved and the nature of their respective roles.

The Kersentuin stakeholder analysis diagram indicates that:

- The Kersentuin was possible due to the various collaborative processes occurring with different stakeholders
- The development of Kersentuin, or cohousing projects in general, is dependent on the complementing roles of their actors; They complement what the residents lack in skills.
- The residents are the most important actors in this process, while the rest are supporting actors to aid the residents in achieving their vision.
- The local government plays a vital role in the realization of the cohousing project.
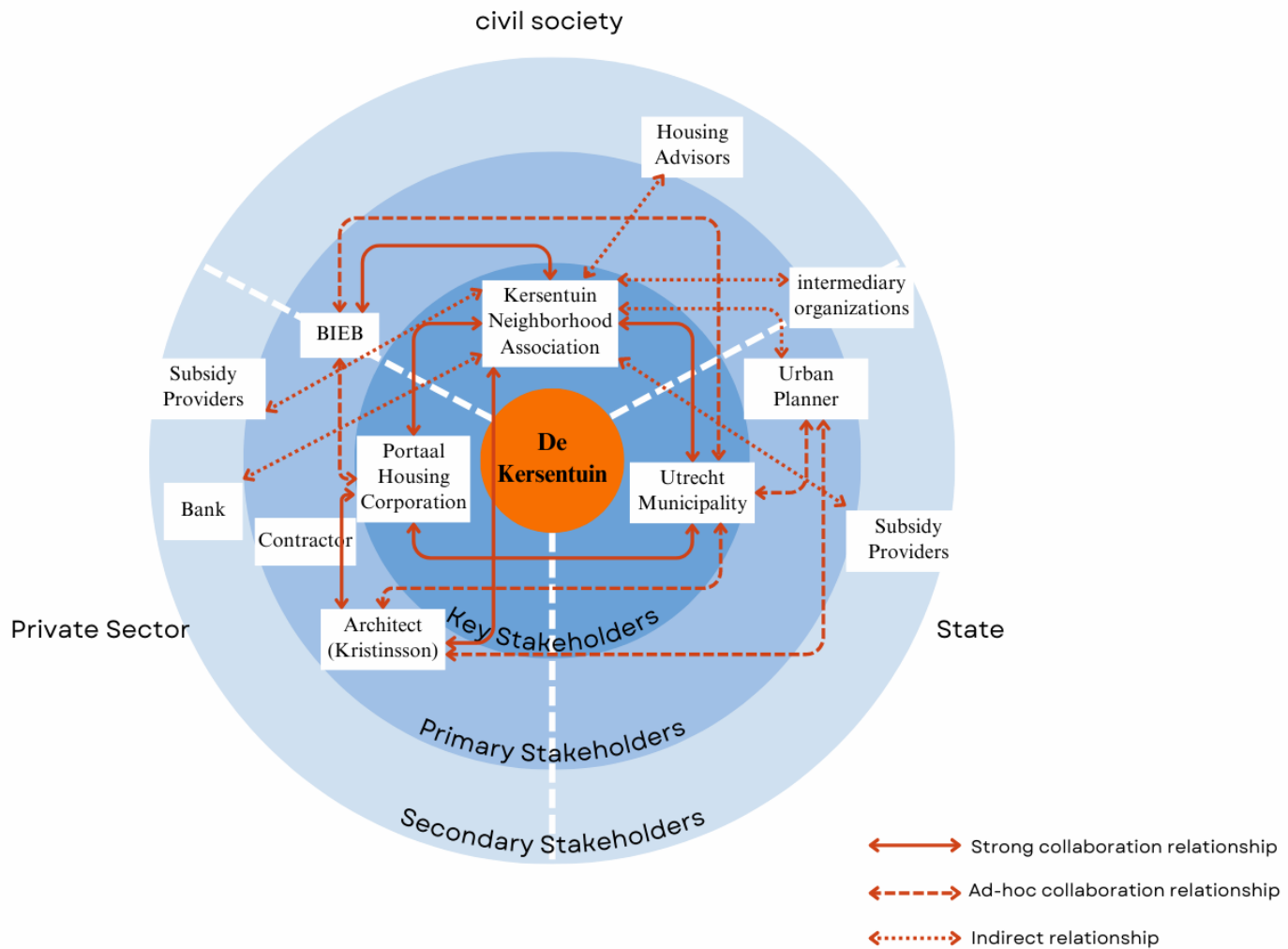
Figure 40 Stakeholder analysis diagram of the Kersentuin Project.

Source: Author (2023)

- **Role of the Key Stakeholders:**

***The municipality*.** The local government's initiative program is intended to assist community organizations that may contribute to a diversified, sustainable, and inclusive Leidsche Rijn. It helped the Kersentuin in the early phases by advancing the process facilitator fees and moderating the first meetings (D02). However, as priorities and agendas shifted, the municipality's enthusiasm for de Kersentuin diminished. As that happened the project faced many objections to their "Program of Wishes" and their high ambitions. However, the residents had many negotiations with the municipality and were perseverant in achieving their goals, which turned out well in the end (I02). They managed to form a unique relationship with the local government. For instance, according to F01, they reached an agreement where the De Kersentuin maintains the municipality-owned gardens and pedestrian pathways while the municipality provides the funds.

***The housing corporation*.** The housing corporation was crucial as a source of funding, experience in choosing a builder and contractor, supervisor, manager of the construction project, and owner of the rental units (D02). The project wouldn't have been possible without it. However, Portaal's involvement in the design phase was very limited. In addition, just like the municipality, as the company grew, their attention to de Kersentuin diminished (F01).

Role of the Primary Stakeholders:

process supervisor. De Kersentuin received both content and operational guidance from BIEB during the whole project. There was always a facilitator at the member meetings. They could also serve as an impartial mediator between parties and make up for the resident's lack of manpower. However, hiring process facilitators cost money that wasn't available to the residents in the beginning, which the municipality advanced and was later incorporated into the housing prices (D02).

Architect. According to the residents, collaboration with the architect generally went well. However, the architect's position was stranded between realizing the residents' ambitions while also abiding by the urban planner's plans (A01). This sometimes seemed that the architect was more inclined to trade the resident's wishes with the urban planner's (D02).

Urban Planners of the Municipality. According to A01, the municipality's urban planners were very conservative regarding a resident-led neighborhood. Future occupants with their ideas didn't fit in well since the urban planners preferred to dictate precise building methods. The architect played an important role in making the resident's wishes more presentable to the urban planners and advocating for their goals. However, certain things were compromised to accommodate the planner's plans (F01). According to A01, the municipality sometimes acted as a mediator between the residents and the urban planner.

Contractor. The contractor was selected based on experience in sustainable construction (D02). However, during construction, the contractor preferred not to deviate from the norm in sustainable materials and construction. It was evident to the residents that the market was still not ready for projects like Kersentuin (D02). According to the handbook, the contractor didn't take the residents' wishes seriously and made decisions without getting back to them.

- **Tensions within the collaboration process:**

To ensure residents invest their efforts into the whole project, the step of assigning each their own house is delayed as much as possible. According to D0, when people get assigned their homes early, they lose sight of the collective project and only focus on their individual property. The project as a whole then suffers from the emphasis on individual interests.

During the collaboration process, compromises must be made to keep the process going. However, the residents choose what is acceptable to compromise and what is not. According to D02, this has caused some people to drop out of the Kersentuin association. Moreover, since housing is a pressing matter, not everyone can afford to wait 7 years till they get to live in it, which made a lot of people drop out too. In the process of development, many people leave and others replace them (A01). The challenge this poses is that new people mean new ideals and desires that weren't communicated in the initiation phase. However, newcomers must be informed of the program of wishes and accept it. To formalize this, residents need to sign an agreement form to avoid future complications and conflicts (D02). This also saves some time in avoiding repeating the same discussions already done in the past. However, it was not easy for some and conflicts were inevitable.

To manage the collaborations between different stakeholders, the Kersentuin neighborhood association was divided into work groups, each responsible for a certain aspect. The work groups consisted of other relevant stakeholders to the task, like Portaal or the contractor in the building team. According to D02, all other stakeholders, even if they are supportive of this form of housing, weren't ready for a project like Kersentuin where continuous collaboration is important. This made the exchange of knowledge and agreements an issue. The residents recorded agreements between parties to avoid future conflicts (D02). This was particularly crucial when communicating with stakeholders that have high turnover rates and representatives regularly change. One of the things that added to the time was that representatives of the housing corporation and the municipality changed very often and the association had to train new contact persons. Moreover, the residents also found that they have to be perseverant in convincing other stakeholders of their goals since most stakeholders don't like change. It was hard to keep stakeholders enthusiastic about the projects since it is a long time-consuming project and people's agendas and priorities change.

b. Access to resources & services

Having access to resources and services is one of the fundamental aspects in the realization of a cohousing project and achieving its sustainability. As a cohousing project, the residents don't have the necessary skills, funds, and resources required for realization. Hence, they partnered with stakeholders like the housing corporation which acted as a financial backstop for the project and provided the pre-financing. Unfortunately, banks find it risky to loan resident groups before concrete plans. Moreover, In De Kersentuin's case, it was crucial to get subsidies since sustainable materials and technologies can be expensive. De Kersentuin has raised a total of € 600,000 – € 700,000 in subsidies (D02). Some of this amount also went to the architect's expenses. In addition, it was also used for publicity which was necessary to get more subsidies (on advice of BIEB).

The process facilitators and technical advisors provided the resident group with the skills needed. However, one of the issues in the project, and any cohousing project, is the price of land. In the Netherlands, the municipality owns the land and leases it to developers. There was no special consideration when leasing land to the residents. They were treated just like big developers which can be hindering to starting groups. The same goes for banks and mortgages. However, according to D02, they didn't think special mortgages were necessary since by the time a bank accepts the loan the project is in an advanced stage. Moreover, the community also faces financial setbacks during the construction process as the specification budget might increase, by 5% in the case of de Kersentuin. This led the group to compromise on some sustainable features they intended to implement.

c. Knowledge sharing & policy advocacy

The project itself acts as a knowledge-sharing platform since after this experience the residents became experts in CPOs. The residents conduct organized tours for other community groups who want to implement a cohousing project similar to Kersentuin. In addition, they published reports including a detailed description of the development processes, sustainability (social, environmental, and economic) features, and some facts and figures about the project. They also conduct presentations to other interested parties. F01 stated that the local government sometimes uses the Kersentuin project as publicity for their community-led initiatives. This indirectly influences other governments to do the same.

One of the important actors in knowledge sharing and policy advocacy is the intermediary organizations. Interviews with intermediary organizations (I01; I02) described situations where they influence a certain policy or regulation. They also elaborated that due to some of their efforts, there are plans that facilitate the cohousing development process.

"our work and other organizations are trying to influence politics. Now it's underway national funds. the government has now 10 million euros that can be lent to initiatives. They are now talking if banks will be involved in that, putting money in that, and who will support this. But we hope that the community movement, Cooplink, or some organization together have a big role in that because we know what a real community is to prevent developers from extorting this money. We hope that it will be functional next year." (I01, intermediary representative, July 2023, 02:45)

The success of a cohousing project in its realization and the integration of sustainability concepts is highly dependent on the co-creation, access to resources, and knowledge-sharing processes that occur along the way. Some indicator aspects are directly affected by the local governance indicators. The dimensions affected most include the organizational dimension of cohousing, social cohesion, and economic sustainability of SUD. The relationship is depicted in Figure 41.
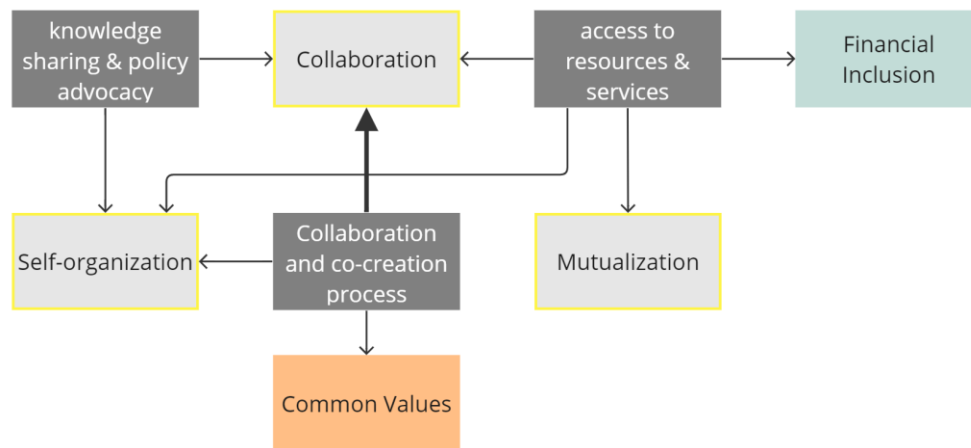
Figure 41 Relationship between the moderating variable indicators, Cohousing, and SUD.

Source: Author (2023)

4.3 Main Discussion, Analysis Summary

As discussed in the previous sections, a cohousing project like de Kersentuin can achieve SUD in many ways. The cohousing dimensions are a fundamental aspect of reaching social, environmental, and economic sustainability in neighborhood development.

The residents have demonstrated high social cohesion in all their interactions together, although it comes at some costs. Those include the time-consuming nature of social interaction, collective decision-making, consensus building, and collaboration. Moreover, it consumes more effort than a normal development which not everyone can afford. Moreover, as in any group dynamics, the core group or the most active may dominate the discussions, initiative, and decision-making, while others may feel left out or that they have little voice. On another note, the residents may have achieved good social cohesion within the community, but this may cause some "negative" social cohesion effects. They may seem closed off to other neighborhoods, which might isolate them from others despite their best efforts. Hence social

cohesion may be achieved in the neighborhood but not within the bigger society. As R01 said that most people living outside the Kersentuin may not approach it since it has a "special feel". Also, their strong shared beliefs might depict them as "idealists or radicals".

Regarding environmental sustainability, the community's shared vision of having communal assets and initiatives has aided in achieving the desired environmentally friendly neighborhood. It has indirectly affected aspects of low-impact practices whether it is a balanced biodiversity or energy-efficient homes. Their decision to increase shared gardens, remove street parking, and collectively maintain the environment had a direct impact on ecological preservation. Moreover, sharing resources, collaboration, and collective efforts has allowed them indirectly to reach the funds necessary to implement the technology for energy-efficiency. Although the cohousing dimensions don't have a direct impact on environmental sustainability, they achieve it indirectly through other aspects.

As communicated in the literature review, economic sustainability is achieved through social and environmental aspects. It is evident from the relationship diagram that only a few indicators of cohousing dimensions directly impact economic sustainability, however, it is achieved indirectly through other aspects as well. De Kersentuin is a special case where they tried to achieve everything and they succeeded to a certain extent. The idea of social and tenure mixing, the compact building, and the availability of multiple housing types that are accessible to a wider audience have enhanced the affordability and financial inclusion of the project. Moreover, the resource-sharing aspect and the energy-efficient strategies have reduced the daily costs, hence enhancing affordability in the long run, which in turn enhances its economic sustainability.

The Kersentuin residents, as the main actor in the projects, has made an exceptional effort to make their envisioned environment real. However, it wouldn't have been possible without the help of other actors. The municipality's role in the realization of the Kersentuin is undeniable. From providing the opportunity for civil groups to have their initiative to their investment in the success of this experimentation, the municipality paved the way for the Kersentuin's success and helped it avoid the hurdles that most cohousing projects face. Moreover, having a social housing corporation as a partner in this project, not only acted as a financial backstop but also ensured that the resident group had a "development & market" expert within. In addition, the process facilitator's role, as an intermediary actor, has guided the group and trained and equipped them with the necessary skills in how to internally and externally organize themselves. They also sometimes acted as a mediator between the residents and other stakeholders. According to I02, the size of the Kersentuin was a big problem at the beginning so they decided it was best to divide them into small workgroups that decrease time consumed and eliminate unnecessary and long discussions that don't lead anywhere.

"It's very different challenges you get. In Kersentuin the scale of the project was very large. We had to organize so that everybody could play their part. But you can't discuss it with a large group. You have to discuss it in small groups. So we have small different work groups on different items. And with those, we examine all the possibilities. We try to make a few scenarios. Then we put those scenarios into the large meetings and they decide. But the preparation in the time before is with a small group of individuals who indicate that they like to try and get as much information about that subject. They try to make it clear to the other members what there is to decide and how to decide upon." (I02, BIEB, July 2023, 05:05)

Moreover, aside from working with the resident groups, intermediary organizations also advise municipalities and the national government regarding cohousing development in the

Netherlands. They act as policy advocates, they try to influence the greater market into accepting the model and facilitating its development.

"We advise municipalities, the province, and also, on the scale of the whole country, we have advised policymakers about CPO. We have many subsidies that have been implemented in the last few years which come from discussions with policymakers. So I think we have been a little bit influential on CPO in Holland." (I02, BIEB, July 2023, 17:29)

However, cohousing development in the Netherlands faces multiple challenges:

- Regarding Time:

The different opinions of the residents may make decision-making a time-consuming practice. According to A01,

"For my role as an architect, you have to be patient and a good listener. You have to make a lot of variations so they can choose. So, it costs you more time because there are a lot of people. You have hundreds of opinions. And not everything works out when not everything makes sense." (A01, Architect, July 2023, 24:52)

- Regarding self-organization and collaboration:

Occasionally, residents face problems with their organizational structure and the ability to communicate efficiently with other stakeholders. Moreover, sometimes stakeholders are conservative which results in many negotiations (A01).

"Well, in every project it is different. So sometimes your internal organization doesn't function well. Sometimes your external organization doesn't function well. Sometimes it's difficult to get the architect on the right track. Sometimes it's difficult to get the right price with the right contractor, etc." (I02, BIEB, July 2023, 04:47)

- Regarding sustainability:

Achieving sustainability can be costly and sometimes the market doesn't accept experimentation in this regard, hence the residents need to find suitable strategies or compromise on certain items.

"The main objective was to make it as sustainable as possible. In climate, energy, but also social sustainability. So they had to work together. They want to make a community where they all live in their separate houses, but they want to do all sorts of things together. And those sustainability items on a matter of installations, etc., are about getting as energy-sufficient houses as possible. That always costs money. You have different installations than usual. It was a long time, it was 20 years ago, but they were quite far ahead on the medium installation of a house at that time. So they built houses there that were comparable to the standards of this time. So that was a huge problem they had to solve during the process. But it worked." (I02, BIEB, July 2023, 07:46)

- Regarding finances:

The residents don't have the resources to finance the project in the beginning since banks don't provide mortgages to fund the project upfront. This limits the cohousing development. Moreover, cohousing projects often find challenges in finding suitable land to build on.

" Now we only get projects where we can buy land from the municipality, but not from private owners. Because we cannot finance buying that land. All the individual parties of the CPO organization get their finance when they have the mortgage. And the mortgage is only given when you start the building. But in the two, three years which lay ahead of that, you can't pay everyone you hire because you don't get a mortgage for that." (I02, BIEB, July 2023, 25:51)

"It's often big issues are to find ground. The Netherlands is a full country, so it's very difficult and when there is, it is expensive. Often when the ground is from a municipality, they earn money by selling the ground.. the government needs always money and by that, the houses are very expensive." (I01, Intermediary representative, July 2023, 7:56)

- Regarding the housing market and private developers:

Cohousing projects in the Netherlands often find themselves in competition with big market actors like private developers. limited resources and skills usually put civil society at a disadvantage. This is one of the reasons CPOs are only a few numbers right now.

"There are so many big project developers who hire people to get land from municipalities, farmers, and other people. And they own about 90-95% of the building of new projects. That's grown in the last 100 years and you can't beat them. You have to beat them by getting land from a housing corporation, municipality, or from other individuals who want to give that to you." (I02, BIEB, July 2023, 27:12)

Chapter 5: Conclusion

The final chapter presents a concluding discussion of research findings, where each research question is answered in Section 5.1. Moreover, recommendations and prospects for future research are presented in Section 5.2.

5.1 Conclusions

This research explores the role of the cohousing model in promoting SUD within the context of LUG. To achieve this, an analysis was conducted on the dimensions of the cohousing model to discern its constitutive framework. Furthermore, this analysis aimed to identify the factors that influence social, economic, and environmental sustainability. Additionally, partnership relations were examined to understand the challenges and opportunities that a cohousing development faces in its realization. This study was implemented on a case study, De Kersentuin, a cohousing neighborhood In Utrecht. De Kersentuin proved to be a unique model that aspired to achieve sustainable urban development. Despite the encountered challenges, this project managed to realize its vision, yielding valuable insights. The following question was used: **How does the cohousing model contribute to the sustainable urban development of the housing sector in the context of local urban governance?** It is subdivided into four questions, each of which will be individually addressed, culminating in suggestions for future research.

5.1.1 RQ1: How does the cohousing model address social sustainability?

Literature suggests that cohousing has the potential to enhance social cohesion and resilience (Daly, 2017). Attributes of the cohousing model contribute significantly to SS, positively impacting social cohesion, fostering shared visions, and enhancing residents' sense of belonging. The physical layout of the neighborhood (**spatial dimension**) provides opportunities for the formation of social networks and place attachment. Housing units, often slightly smaller due to the presence of communal spaces, not only foster social cohesion but also promote energy and land conservation, thereby encouraging sustainable living. Strategically positioned common houses and gardens, directly accessible to all units, further facilitate social cohesion (Garciano, 2011). The **relational dimension**, encompassing shared responsibility, consensus building, and social interaction, improves social well-being and reinforces community cohesion. Social organization and mutualization (**organizational dimension**), inherent in cohousing initiatives, enhance residents' sense of belonging and attachment. The collaborative process allows individuals to cultivate ownership and nurture group cohesion and belonging (Brenton, 2008). Shared vision (**vision and values dimension**) strengthens bonds between community members and empowers them to achieve their sustainability goals. Cohousing projects like De Kersentuin stand as unique models that may be challenging to replicate, as their success depends significantly on the residents themselves. Nonetheless, when successful, they offer substantial benefits to the community.

5.1.2 RQ2: How does the cohousing model address environmental sustainability?

Cohousing, as indicated by the literature, has a lower environmental impact compared to traditional housing schemes due to reduced consumption, thoughtful design, and pro-environmental behavior (Marckmann et al., 2012). As evident in the research, when a cohousing community shares a common environmentally friendly goal, the cohousing model substantially supports this aspiration in various ways. The most influential factor within the cohousing model for ES is the residents' commitment to a sustainable lifestyle (**values and vision dimension**). This is corroborated by Daly (2017), who asserts that the community's intentions for stronger ecological sustainability manifest in tangible actions, such as adopting low-impact practices. Multiple studies indicate that cohousing typically yields lower environmental footprints compared to "mainstream" neighborhoods (Daly, 2017). However, the extent of impact relies heavily on the residents' deep understanding and desire for this lifestyle. Additional factors, such as the presence of open green spaces (**spatial dimension**), shared responsibilities, and mutualization (**organizational dimension**), create a suitable setting for environmentally friendly practices. According to Marckmann et al. (2012), the high density of cohousing, facilitated by the sharing of communal spaces, directly contributes to environmental sustainability. Nevertheless, Moos et al. (2006) stipulate that the effectiveness of this contribution is partially dependent on the individual's behavior and consumption patterns. Finally, the social and spatial structures of the cohousing model foster environmental awareness (Marckmann et al., 2012), evident through the analysis.

5.1.3 RQ3: How does the cohousing model address economic sustainability?

According to the literature, the factors that contribute to social and ecological sustainability also play a significant role in achieving economic sustainability. For instance, the cohousing model's influence on low-impact practices partly contributes to long-term cost efficiency. Additionally, urban sharing helps in decreasing living costs. Moreover, Adaptability functions (**spatial dimension**) allow the neighborhood to be life-resistant and enhance its affordability and long-term cost efficiency. Furthermore, the community's capacity for mutualization reduces long-term costs by facilitating the circulation of materials and resources within the community. Garciano (2011) points out that community collaboration and resource sharing lower living expenses by leveraging communal resources, skills, and labor. Similarly, Wang et al. (2020) indicate that cohousing attributes lead to reduced living costs, encompassing aspects like rent, transportation, and energy consumption. Finally, the diversity and inclusivity (**vision and values dimension**) achieved through social and tenure mixing, enhances members' financial inclusion and housing affordability, as supported by Carrere et al. (2020). However, achieving economic sustainability is also influenced by partnership relations with external actors who possess certain resources like land and funding that could impact the inclusion of the various members.

5.1.4 RQ4: What factors hinder/realize the cohousing model in context of local urban governance?

The cohousing model involves collaborative efforts between community groups and various actors, both public and private, to acquire essential information and resources (Czischke, 2018). Partnership relations in cohousing development present both opportunities and challenges to its realization (Widener, 2017). These opportunities encompass gaining access to skills and resources that residents may lack. Furthermore, residents benefit from the expertise of stakeholders such as housing associations, contractors, and process facilitators. In the case of Kersentuin, partnerships with other stakeholders played a pivotal role in achieving their sustainability ambitions. Guided by process facilitators, they secured funding and subsidies from organizations and governments. Kersentuin's objectives for a socially and environmentally conscious neighborhood aligned with the municipality's goals, contributing significantly to its success (Czischke, 2018). Additionally, the advocacy role assumed by various stakeholders has facilitated project realization and future cohousing development (Hagbert et al., 2019). However, cohousing development also faces obstacles. This includes prolonged negotiations with stakeholders like municipalities and urban planners who might be conservative toward certain cohousing characteristics. This could be overcome through resident group perseverance and unity in their goals. Furthermore, both internal and external self-organization structures can hinder the process if not implemented effectively (Hagbert et al., 2019). Moreover, Financial constraints could impede sustainability efforts, making funding crucial. However, funding sources like banks typically lack specialized programs for resident-led initiatives, posing potential obstacles.

5.1.5 Main Research Question: How does the cohousing model contribute to the sustainable urban development of the housing sector in the context of local urban governance?

Researchers assert that Cohousing offers several advantages for social, economic, and environmental sustainability (Lang et al., 2019). These benefits became evident through the study's integrated approach to SUD and cohousing analysis. Cohousing initiatives can be guided by diverse economic, social, and environmental objectives. The effective achievement of these objectives relies on community cohesion, shared values, and the deliberate utilization of cost-effective, environmentally conscious housing designs and construction methods (Marckmann et al., 2012). Through the establishment of social networks and engaged citizens, cohousing can offer "affordable, low-impact, and socially cohesive housing that empowers communities" (Lang et al., 2019, p. 59). Contrary to the misconception that cohousing is a radical model, it serves as a practical solution for individuals seeking empowerment and active responsibility within their environment. A recurring sentiment from various stakeholder interviews is that *"it was worth it"*. According to A01, *"It's an inspiring project for people to see. Kersentuin embodies numerous ambitious aspects and promotes similar projects on a larger scale in the Netherlands"* (A01, Architect, July 2023, 29:25).

Cohousing is advocated as an alternative to traditional housing, aiming to reduce ecological impact and enhance social welfare (Tummers & MacGregor, 2019). However, the cohousing model, while offering significant benefits to residents, is not intended to fully replace conventional housing. Rather, it can serve as one of the housing provision models integrated within the sector. While it's a housing solution that aligns with SUD goals, it's challenging to

solely depend on it. Not everyone will embrace this lifestyle, and some stakeholders might not willingly participate. Unfortunately, governments seek rapid solutions to housing crises, and many affected individuals cannot afford the time-consuming nature of cohousing projects.

Despite its growth, the cohousing model is expected to remain a niche within the larger housing market. I02 projects that it will likely constitute "not more than 5-10% of the total market" (I02, BIEB, July 2023, 30:14). This projection can be attributed to the complex and time-intensive nature of cohousing development, a factor that might discourage municipalities from pursuing it during housing shortages that require rapid solutions. In the Netherlands, the goal is to construct a million houses in the coming decade, potentially making the cohousing model less suitable for such urgent requirements. Municipalities may opt to delegate this task to private developers for greater efficiency. Nonetheless, the introduction of cohousing within the housing market for interested parties could contribute to improving the overall situation.

5.2 Recommendations and Future Research

For future cohousing development, the government should eliminate competition between civil society and major housing developers. This could be achieved through several policy actions. First, the government could designate specific land plots exclusively for cohousing projects. Second, they could offer financing options for expenses preceding construction. Finally, banks could establish dedicated programs to facilitate financing during this phase. Implementing incentive programs, including subsidies and bank guarantees, would enhance accessibility of this housing form to lower-income citizens. In recent years, policymakers, governments, and housing market actors have gained a deeper understanding of the cohousing model, no longer regarding it as purely idealistic. Local governments could institute specialized programs for citizen empowerment through cohousing, aligning with participative planning goals.

In conclusion, the cohousing model harbors significant potential to positively influence urban development and neighborhood dynamics. Its capacity to promote sustainability spans various dimensions, as outlined throughout this study. Investigating partnership relations and collaborations among stakeholders was essential in comprehending the project's realization process. However, during this research, some of the actors like the municipality or the housing corporation were unapproachable. Additionally, a case study is a unique prototype and cannot be used as resembling all cohousing projects. Given the study's limited time and resources, this approach was optimal. Future research, however, could benefit from conducting a comparative analysis encompassing diverse cohousing projects in various contexts. This might explore how the size of CPO projects impacts social cohesion. Expanding beyond social cohesion as the sole determinant of SS could further highlight the various aspects of cohousing's social sustainability. Understanding the reasons for limited inhabitant diversity within Dutch cohousing projects could enhance its accessibility to broader societal groups. De Kersentuin's integration of social housing presents an intriguing aspect for further research, possibly through a comparative analysis with conventional social housing. Moreover, could cohousing attributes be integrated into conventional neighborhoods post-development? How does that compare with cohousing projects? Finally, research could examine the diffusion of the cohousing model as a grassroots innovation into the broader housing regime.

For some, the Cohousing model is considered a viable alternative to the traditional housing market, as it circumvents many of the complexities contributing to today's housing crisis. Exploring how the model operates, its defining characteristics, and its potential for promoting sustainability could provide insights into improving current housing strategies, even if the primary goal isn't developing cohousing projects.

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Appendix 1: Research Instruments

1.1   Consent Letter

Introduction:
My name is Shahenda Wahib and I am an Urban Management and Development Master's student at IHS, Erasmus University Rotterdam.

Purpose of the Interview
I am conducting this in-depth interview as part of my master's thesis research. It will be focused on analyzing how the cohousing model promotes sustainable urban development in the context of local governance. So, this interview aims to learn more about how social, environmental, and economic sustainability is achieved through cohousing initiatives in addition to examining the relationship of the cohousing project with other stakeholders.

Duration of the interview, types of questions, and plan of the interview
The interview's duration will be about 30 mins. This timeframe is only a guide, but it should not be constraining if you feel you have more to add or if, at any point, you want to stop the interview. Please feel free to tell me how you feel. At the beginning of the interview, I will ask a few background questions, which will be followed by a combination of open-ended and close-ended questions. Just bear in mind that there is no right or wrong answer. I'm interested in hearing your perspective on the topic and learning from you as you guide me through your experience. I hope this interview will be enlightening and enjoyable for both of us. If you feel uncomfortable answering any of the questions, please let me know.

Privacy and Ethics
It is important to note that the interview's outcomes will be completely anonymous and confidential. It will only be used for research purposes. You can, however, indicate your chosen reference name at the end of this letter for my citation. The outcome will be uploaded to a secure cloud that only my supervisor and I can view. Before I submit my work (at the end of August), you are welcome to check the interview analysis if you would like.

Informed Consent to participate and record the interview
Before moving forward with the interview and after knowing the process, purpose, and confidentiality of the interview, I would appreciate your signature below to give me official permission to conduct this interview and record it. As I said, it will only be used in aiding the interview analysis and will not be shared with anyone except my tutors. It will also maintain your anonymity. It is important to know that, if at any point you change your mind, we will stop immediately and erase the recording. You will receive an email with a digital copy of this consent letter. Therefore, you might include your email address in the letter's closing. My contact information will also be added if you have any further questions about my research.

Name of Participant: _____

Contact (phone/email):   _____

Date: _____

Signature: _____

1.2 Interview Guide for Residents

Opening question:

How long have you lived here?

Can you please share with me your overall experience of living in De Kersentuin?

What has been your impression of the cohousing project and its impact on your daily life?

Cohousing characteristics:

Shared Vision

How would you describe the shared vision or common goals that guide the residents of De Kersentuin cohousing project?

How does it influence your daily life and decision-making within the community?

Diversity & Inclusivity

How would you describe the diversity within the De Kersentuin community, both in terms of demographics and backgrounds?

What measures or initiatives are in place to ensure inclusivity and create a welcoming environment for residents with diverse backgrounds?

Self-Organization & Governance

How is decision-making organized within the community?

Can you explain the role of residents in shaping the policies and rules of De Kersentuin?

Follow-up: What mechanisms or structures are in place to facilitate self-organization and ensure smooth governance within the community?

Consensus Building

How do residents engage in the process of consensus building when making decisions that impact the community as a whole?

Can you share some examples of consensus building?

Mutualization

Can you provide examples of shared resources or services among the residents of De Kersentuin?

How do they contribute to a sense of community and support?

Collaboration

Can you share any specific collaborative initiatives or events that have strengthened the community bonds?

Social Architecture

How does the physical design of the cohousing units and common spaces contribute to social interactions and community engagement within De Kersentuin?

Follow-up: Are there any unique architectural features or arrangements that foster social connections among residents?

Adaptability

How does the cohousing project demonstrate adaptability to changing needs and circumstances over time?

Follow-up: Can you provide examples of how the community has evolved or adapted in response to challenges or new opportunities?

Private & Public Spaces

How are private and public spaces balanced within De Kersentuin?

Can you describe the interplay between individual privacy and communal interaction in the community?

Follow-up: Do you feel that the allocation of private and public spaces supports a sense of belonging and community connection?

Social Interaction

How would you describe the level of social interaction among residents within De Kersentuin?

Are there any specific activities or events that facilitate social engagement?

Follow-up: In what ways do residents actively foster social connections and promote a sense of community among themselves?

Shared Responsibility

How is the concept of shared responsibility embedded within De Kersentuin?

Can you provide examples of how residents collectively contribute to the well-being and maintenance of the community?

Follow-up: How does the shared responsibility aspect enhance the overall quality of life within De Kersentuin?

Environmental Sustainability:

How has the cohousing project influenced your behaviors and choices regarding sustainability, such as energy conservation or waste management?

Closing question:

In your opinion, what is the most valuable aspect or benefit of living in De Kersentuin cohousing project?

Do you have anything to add?

1.3   Interview Guide for Founders

Opening question:

What was your motivation to start this cohousing initiative?

Who were the different stakeholders involved in the development of de Kersentuin?

Local Governance:

Collaboration & Planning Process (Co-Creation)

How did various stakeholders, such as residents, architects, local authorities, and housing associations, collaborate in the co-creation process?

Follow-up: What were the key benefits and challenges encountered in fostering collaboration among different stakeholders, and how were they addressed?

Stakeholder Engagement

How were the different stakeholders engaged and involved in decision-making processes related to De Kersentuin?

What strategies or mechanisms were implemented to ensure active participation and representation from all relevant parties?

Follow-up: Can you describe any specific instances where stakeholder engagement played a crucial role in shaping the development, sustainability, or success of the cohousing project?

Partnerships & Collaboration Outcomes

What are some notable partnerships or collaborations that have been established as part of De Kersentuin?

How have these partnerships contributed to the project's overall success or impact?

Follow-up: Have there been any challenges in maintaining or strengthening partnerships over time, and how have they been addressed?

Access to Resources & Services

How was access to resources and services ensured for the residents of De Kersentuin?

What partnerships or arrangements were established to provide essential amenities, utilities, or shared facilities within the cohousing community?

Follow-up: Were there any innovative approaches or partnerships that enabled residents to access resources or services that might not have been feasible individually?

Do you feel that the cohousing project receives equitable treatment and consideration in terms of resource allocation and service provision from the local government?

Knowledge Sharing & Policy Advocacy

How has knowledge sharing been facilitated among the various stakeholders involved in De Kersentuin?

Can you provide examples of initiatives or platforms that have promoted the exchange of ideas, best practices, and lessons learned?

Follow-up: Have there been instances where the cohousing project engaged in policy advocacy or influenced local regulations or urban planning practices? If so, could you share any successful experiences or outcomes?

Lessons Learned & Recommendations

Based on your experiences in fostering partnership relations within the cohousing project, what are some valuable lessons learned that could benefit other cohousing initiatives or similar collaborative projects?

Follow-up: What recommendations or advice would you give to other stakeholders interested in establishing effective partnerships and collaborations in cohousing or sustainable community development?

Closing question:

Do you have anything that you want to add?

1.4   Interview Guide for Architect

Sustainable Urban Development:

Social Sustainability

Can you describe specific design elements or features that were incorporated to foster social interaction, community engagement, and a sense of belonging among residents?

How was the design adaptable to the community's needs? What strategies were used? Who initiated this feature?

Environmental Sustainability

Are there specific sustainability features, technologies, or practices incorporated into the project to reduce energy consumption, promote waste reduction, or enhance ecological resilience? Did the building materials have any special considerations? Recycled or local?

Economic Sustainability

Are there specific aspects of the design or management approach that have helped lower costs, enhanced affordability, or support shared resources among residents?

Local Urban Governance:
Collaboration & Planning Process (Co-Creation)

During meetings, who were the stakeholders involved? What was their level of interaction?

How has the cohousing project interacted with the local government and engaged in decision-making processes related to urban sustainability and community development?

How would you describe the role of the municipality in the realization of the cohousing project?

What challenges or opportunities did you face when dealing with other stakeholders?

How long did this process take?

Lessons Learned and Future Perspectives

Based on your experience with De Kersentuin, what are some key lessons learned regarding the promotion of social, economic, and environmental urban sustainability through the cohousing model?

How do you envision the role of cohousing projects like De Kersentuin in shaping future urban development and fostering sustainable communities?

Are there any recommendations or insights you would like to share with other architects, planners, or policymakers interested in implementing cohousing models for urban sustainability?

Closing Question:
In your opinion, what made the project work in your case?

1.5 Interview Guide for Intermediary Organizations

Interview with Vereniging Gemeenschappelijk Wonen (Association for Cohousing) or COOPLINK, BIEB. The association name will be represented as "X" in this guide.

Introduction and Role

Can you provide an overview of X's mission and role in supporting cohousing initiatives?

How does the association contribute to developing, promoting, and advocating cohousing projects?

How does X support the collaboration and planning process of cohousing projects? Can you explain your organization's role in facilitating co-creation among stakeholders?

During the realization of Kersentuin cohousing project, how did X support the collaborative process between different stakeholders, such as residents, architects, and contractors? Can you explain your organization's role in facilitating effective communication and coordination among these parties?

How did you address any challenges or obstacles that arose during the realization phase?

Can you describe any innovative or unique approaches that X employed during the realization of Kersentuin cohousing project to enhance sustainability, efficiency, or community engagement?

Support Services

What support services does X offer to individuals or groups interested in starting cohousing projects?

How does the association assist in navigating the various stages of cohousing development, such as finding suitable locations, legal and financial considerations, and community-building processes? How did you do this in Kersentuin?

Knowledge Sharing and Networking

How does X facilitate knowledge sharing and networking among cohousing projects and individuals?

Are there any specific platforms, events, or resources provided to foster exchange of experiences, best practices, and lessons learned?

Advocacy and Policy Influence

How does X engage with policymakers and advocate for supportive policies and regulations for cohousing projects?

In what ways does X engage in policy advocacy to promote the development and sustainability of cohousing projects? Can you provide examples of instances where your organization has influenced local policies or regulations to support cohousing initiatives?

Collaboration with Stakeholders

How does X collaborate with other stakeholders, such as housing associations, municipalities, or architects, to support the implementation of cohousing projects?

How would you describe the municipality's role in the implementation of cohousing initiatives?

Are there any examples of successful partnerships or joint projects that have contributed to the growth and success of cohousing in the Netherlands?

Who were the stakeholders involved?

Challenges and Solutions

What are some common challenges that have been observed in the implementation of cohousing projects, and how does the association support the group in overcoming them?

Are there any innovative solutions or strategies that have been developed to address specific challenges related to financing, legal frameworks, or community dynamics in cohousing projects?

How does X evaluate the success or impact of the realization phase of cohousing projects like Kersentuin?

Future Vision and Goals

How does X envision the future of cohousing in the Netherlands?

What are the association's goals and aspirations for supporting the growth, diversity, and sustainability of cohousing communities in the coming years?

Closing Question:

Do you have anything else to add?

1.6 De Kersentuin Resident Survey

Dear Resident of De Kersentuin Cohousing Project,

My name is Shahenda Wahib, and I am a Master's student at Erasmus University Rotterdam. As part of my research project, I am surveying to explore and analyze various aspects of social, environmental, and economic sustainability within De Kersentuin neighborhood. Your unique experiences and insights as a resident play a crucial role in shedding light on the dynamics and strengths of your community.

By participating in this survey, you will contribute to advancing knowledge in the field of cohousing and supporting the development of sustainable and inclusive living environments. Please be assured that all responses will remain strictly confidential and anonymous. The data collected will be used for research purposes only and following the ethical guidelines set by Erasmus University Rotterdam. Your participation in this study is voluntary, and you may choose to withdraw at any time without any negative consequences. Your honest and thoughtful responses will greatly contribute to the validity and richness of the research findings.

The survey will take approximately 10 minutes to complete. Your time and input are highly valued and deeply appreciated. Should you have any questions or concerns regarding the survey or the research project, please do not hesitate to contact me at Shahindataher@gmail.com. I am more than happy to provide any clarification or assistance you may require.

Thank you in advance for your participation and for being an integral part of the De Kersentuin cohousing research.

Warm regards,

Shahenda Wahib

Start of Block: Personal Information & Demographics

Q2 Please indicate your age

○ 18 - 24

○ 25 - 34

○ 35 - 44

○ 45 - 54

○ 55 - 64

○ 65 and over

Q3 Please indicate your gender identity

○ Male

○ Female

○ Prefer not to say

Q4 What is your highest education level

○ High school graduate

○ HBO Diploma

○ MBO Diploma

○ Bachelor's Degree

○ Master's Degree

○ Doctorate Degree

Q5 What is your current profession or occupation?

_____

Q6 Annual income level:

○ Less than €15,000

○ €15,000 - €29,999

○ €30,000 - €49,999

○ €50,000 - €99,999

○ €100,000 - €199,999

○ €200,000 or more

Q7 Please select the option that best represents your ethnicity or cultural background:

○ Dutch

○ Surinamese

○ Moroccan

○ Turkish

○ Antillean/Aruban

○ other: _____

○ Prefer not to answer

Q8 How long have you been living in De Kersentuin?

○ 6 months or less

○ 6 months - 1 year

○ Over 1 year, up to 3 years

○ Over 3 years, up to 5 years

○ Over 5 years, up to 10 years

○ over 10 years

Q9 Do you rent or own your housing unit in the De Kersentuin?

○ Rent

○ Own

Q10 What best describes your housing unit?

○ single-family home

○ maisonettes

○ Single-story double-width apartment

○ single-story apartment

○ two-story apartment

○ penthouse

○ living-work home

○ other: _____

Q11 Why did you choose to live in De Kersentuin? Which best describes your motivation:
(You can choose more than one option)

☐   To be part of a close-knit community

☐   To live in a community with similar values

☐   to benefit from shared resources

☐   To live in an environmentally sustainable community

☐   To find more affordable housing options

☐   To live closer to amenities such as schools, parks, etc.

☐   To live in housing units with specific design features

☐   other: _____

Start of Block: Sense of Belonging

Please indicate to what extent do you agree with the following statements on a scale of 1 to 5:

Q12 I feel a sense of belonging to the De Kersentuin community.

○ 1 - Strongly disagree

○ 2 - Disagree

○ 3 - Neutral

○ 4 - Agree

○ 5 - Strongly agree

Q13 I feel a sense of belonging to the shared gardens and common areas within De Kersentuin.

○ 1 - Strongly disagree

○ 2 - Disagree

○ 3 - Neutral

○ 4 - Agree

○ 5 - Strongly agree

Q14 My neighbors and I share a strong bond.

○ 1 - Strongly disagree

○ 2 - Disagree

○ 3 - Neutral

○ 4 - Agree

○ 5 - Strongly agree

Q15 I consider my community to be inclusive.

○ 1 - Strongly disagree

○ 2 - Disagree

○ 3 - Neutral

○ 4 - Agree

○ 5 - Strongly agree

Start of Block: Social Interaction

Q16 How frequently do you interact with your neighbors on a social level on a scale of 1 to 5?

○ 1 - Not at all

○ 2 - Rarely

○ 3 - Sometimes

○ 4 - Often

○ 5 - Very frequently

Q17 How often do you engage in shared activities or events specifically organized for De Kersentuin residents on a scale of 1 to 5?

○ 1 - Not at all

○ 2 - Rarely

○ 3 - Sometimes

○ 4 - Often

○ 5 - Very frequently

Q18 How frequently do you utilize the common areas and shared facilities in De Kersentuin for social interactions with your neighbors on a scale of 1 to 5?

○ 1 - Not at all

○ 2 - Rarely

○ 3 - Sometimes

○ 4 - Often

○ 5 - Very frequently

Q19 To what extent do you agree with the following statement on a scale of 1 to 5:
The spatial design of your cohousing unit allows for both privacy and shared living.

○ 1 - Strongly disagree

○ 2 - Somewhat disagree

○ 3 - Neither agree nor disagree

○ 4 - Somewhat agree

○ 5 - Strongly agree

Q20 To what extent do you agree with the following statement on a scale of 1 to 5:
The spatial arrangement of the cohousing units facilitates social interactions.

○ 1 - Strongly disagree

○ 2 - Somewhat disagree

○ 3 - Neither agree nor disagree

○ 4 - Somewhat agree

○ 5 - Strongly agree

Q21 Please rate the accessibility of the common areas and shared facilities within De
Kersentuin from your cohousing unit on a scale of 1 to 5.

○ 1 - Very inaccessible

○ 2 - slightly Inaccessible

○ 3 - Neutral

○ 4 - slightly Accessible

○ 5 - Very accessible

Q22 Please rate your level of comfort in asking your De Kersentuin neighbors for help or
support when needed on a scale of 1 to 5.

○ 1 - Very uncomfortable

○ 2 - Uncomfortable

○ 3 - Neutral

○ 4 - Comfortable

○ 5 - Very comfortable

Q23 How frequently do you experience instances of mutual support or assistance from your
neighbors on a scale of 1 to 5?

○ 1 - Not at all

○ 2 - Rarely

○ 3 - Sometimes

○ 4 - Often

○ 5 - Very frequently

Start of Block: Collaboration and decision-making

Q24 Please indicate your level of involvement in decision-making processes within the community on a scale of 1 to 5.

○ 1 - Not involved at all

○ 2 - Minimally involved

○ 3 - Moderately involved

○ 4 - Highly involved

○ 5 - Actively involved

Q25 To what extent do you agree with the following statement on a scale of 1 to 5:
De kersentuin residents collaborate well on shared responsibilities, such as maintenance, finances, or community activities.

○ 1 - Strongly disagree

○ 2 - Disagree

○ 3 - Neutral

○ 4 - Agree

○ 5 - Strongly agree

Q26 To what extent do you agree with the following statement on a scale of 1 to 5:
I feel that my opinions and ideas are valued and taken into account in community decisions specific to De Kersentuin.

○ 1 - Strongly disagree

○ 2 - Disagree

○ 3 - Neutral

○ 4 - Agree

○ 5 - Strongly agree

Start of Block: Participation and Engagement

Please indicate to what extent do you agree with the following statements on a scale of 1 to 5:
Q27 I actively participate in De Kersentuin community meetings, gatherings, or working groups.

○ 1 - Strongly disagree

○ 2 - Disagree

○ 3 - Neutral

○ 4 - Agree

○ 5 - Strongly agree

Q28 I actively engage in the planning and organization of community events or initiatives.

○ 1 - Strongly disagree

○ 2 - Disagree

○ 3 - Neutral

○ 4 - Agree

○ 5 - Strongly agree

Q29 I feel I have a voice in shaping the direction and activities of De kersentuin.

○ 1 - Strongly disagree

○ 2 - Disagree

○ 3 - Neutral

○ 4 - Agree

○ 5 - Strongly agree

Q30 Conflicts and tensions are effectively addressed and resolved among the residents.

○ 1 - Strongly disagree

○ 2 - Disagree

○ 3 - Neutral

○ 4 - Agree

○ 5 - Strongly agree

Q31 Conflicts within De Kersentuin are handled fairly and respectfully.

○ 1 - Strongly disagree

○ 2 - Disagree

○ 3 - Neutral

○ 4 - Agree

○ 5 - Strongly agree

Start of Block: Sustainable Practices and Infrastructure

Q32 How aware are you of the sustainable practices implemented within De Kersentuin, such as energy efficiency, waste management, or water conservation on a scale of 1 to 5?

○ 1 - Not at all aware

○ 2 - Slightly aware

○ 3 - Moderately aware

○ 4 - Very aware

○ 5 - Extremely aware

Q33 Please indicate the extent to which you engage in sustainable behaviors encouraged by De Kersentuin on a scale of 1 to 5.

○ 1 - Not at all

○ 2 - Rarely

○ 3 - Sometimes

○ 4 - Often

○ 5 - Very frequently

Q34 How often do you use sustainable modes of transportation, such as walking, biking, or public transit, for your daily commuting needs on a scale of 1 to 5?

○ 1 - Not at all

○ 2 - Rarely

○ 3 - Sometimes

○ 4 - Often

○ 5 - Very frequently

Q35 To what extent do you agree with the following statement on a scale of 1 to 5:
The location and connectivity of De Kersentuin encourage reduced reliance on private vehicles and promote sustainable mobility.

○ 1 - Strongly disagree

○ 2 - Disagree

○ 3 - Neutral

○ 4 - Agree

○ 5 - Strongly agree

Q36 How often do you engage in collaborative consumption practices, such as sharing or borrowing items from your neighbors on a scale of 1 to 5?

○ 1 - Not at all

○ 2 - Rarely

○ 3 - Sometimes

○ 4 - Often

○ 5 - Very frequently

Q37 How often do you engage in shared resource initiatives, such as car sharing or collective maintenance to optimize economic efficiency on a scale of 1 to 5?

○ 1 - Not at all

○ 2 - Rarely

○ 3 - Sometimes

○ 4 - Often

○ 5 - Very frequently

Q38 How would you rate the affordability of housing within De Kersentuin compared to the broader housing market in the area on a scale of 1 to 5?

○ 1 - Much less affordable

○ 2 - Slightly less affordable

○ 3 - About the same

○ 4 - Slightly more affordable

○ 5 - Much more affordable

Q39 To what extent do you agree with the following statement on a scale of 1 to 5:
The project fosters a sense of environmental consciousness and responsibility among its residents.

○ 1 - Strongly disagree

○ 2 - Disagree

○ 3 - Neutral

○ 4 - Agree

○ 5 - Strongly agree

End of Survey.

Appendix 2: Data Samples

2.1 Code Tree

Source: Author (2023), developed through Atlas.ti

2.2 Variable Network
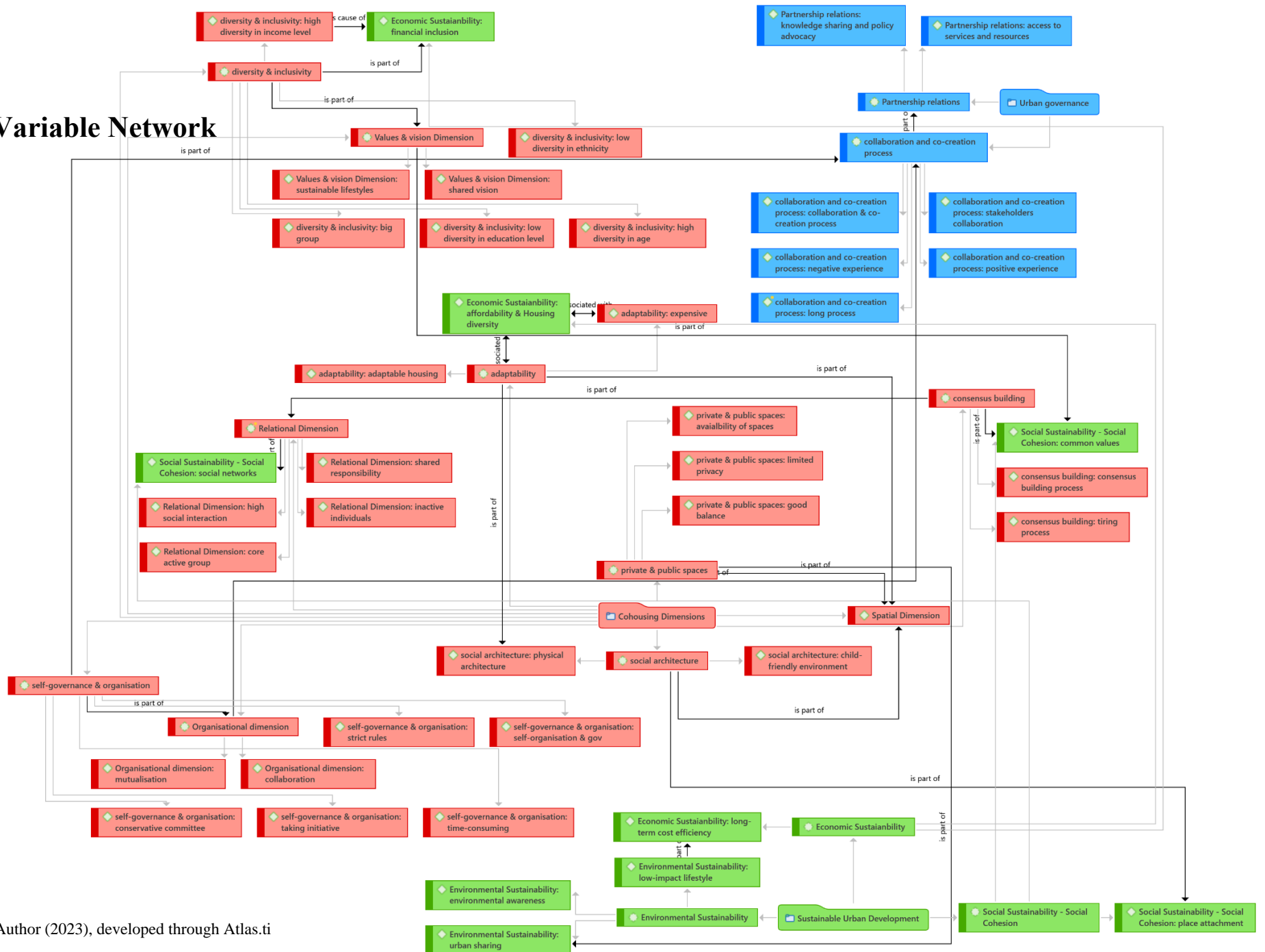
Source: Author (2023), developed through Atlas.ti

2.3 Survey Results

Block 1: Personal information & Demographics

Q2 Please indicate your age

18 - 24 (6%) 25 - 34 (6%) 35 - 44 (12%) 45 - 54 (18%) 55 - 64 (29%)

65 and over (29%)

Q3 Please indicate your gender identity

53%   47%

Male   Female

Q4 What is your highest education level?

Education Level	Percentage
High school graduate	6%
HBO Diploma	35%
MBO Diploma	6%
Bachelor's Degree	6%
Master's Degree	41%
Doctorate Degree	6%

Q5 What is your current profession or occupation?

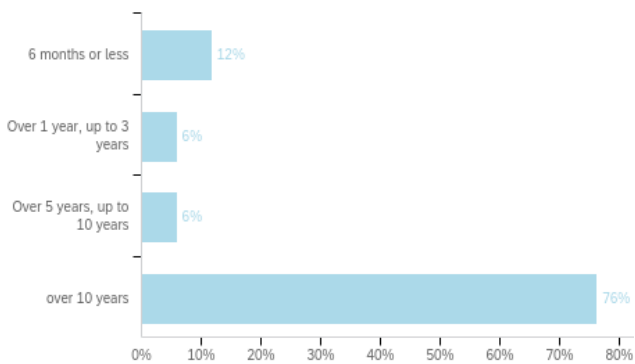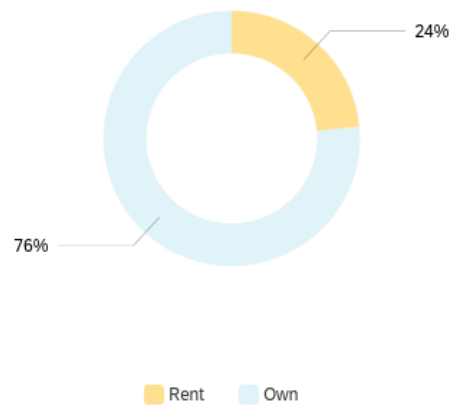| Answers (in Dutch)	English Translation
Begeleider nah	Supervisor nah
Data-analyst	Data analyst
Gepensioneerd	Retired
Gepensioneerd arts	Retired doctor
Gepensioneerd musicus	Retired musician
International NGO Team Lead	International NGO Team Lead
Leerkracht basisonderwijs	Elementary teacher
Software Developer	Software developers
Student	Student
Universitair docent	professor
beleidsadviseur mobiliteit bij gemeente	policy adviser mobility at municipality
geen, studeer nog	None, still studying
geluidstechnicus	sound engineer
huishoudkundige voor inrichtingen (bestaat niet meer)	homemaker for institutions (no longer exists)
pensionado	retiree
werkzaam in internationale samenwerking	working in international cooperation
zzp-er	self-employed person

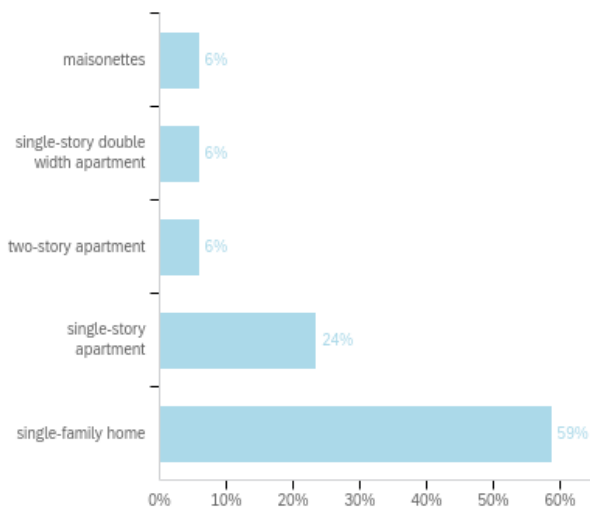| Q6 **Annual income level**	Q7 **Please select the option that best represents your ethnicity or cultural background:**
Less than €15,000 — 17.65% €15,000 - €29,999 — 29.41% €30,000 - €49,999 — 29.41% €50,000 - €99,999 — 23.53%	Dutch — 100%

Q8 **How long have you been living in De Kersentuin?**	Q9 **Do you rent or own your housing unit in the De Kersentuin?**
6 months or less — 12% Over 1 year, up to 3 years — 6% Over 5 years, up to 10 years — 6% over 10 years — 76%	24% Rent 76% Own

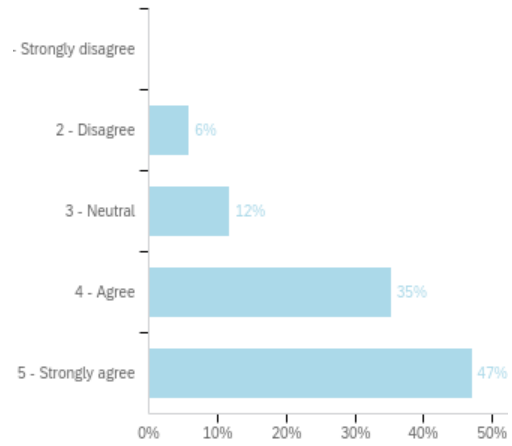| Q10 **What best describes your housing unit?**	Q11 **Why did you choose to live in De Kersentuin? Which best describes your motivation: (You can choose more than one option)**
maisonettes — 6% single-story double width apartment — 6% two-story apartment — 6% single-story apartment — 24% single-family home — 59%	To live in an environmentally sustainable community — 82% To live in a community with similar values — 41% To be part of a close-knit community — 35% other: — 24% to benefit form shared resources — 18% To live in housing units with specific design features — 18%
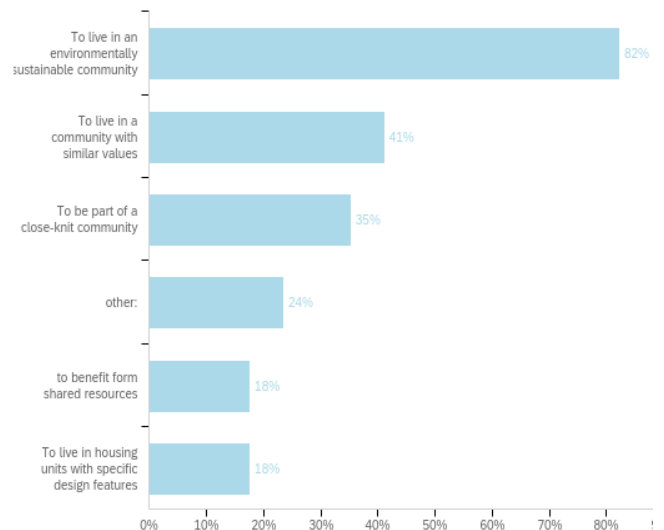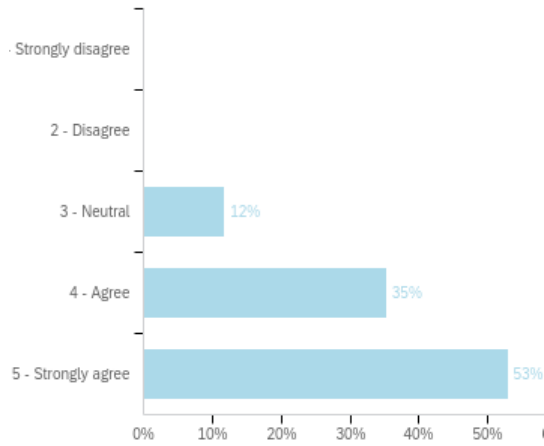
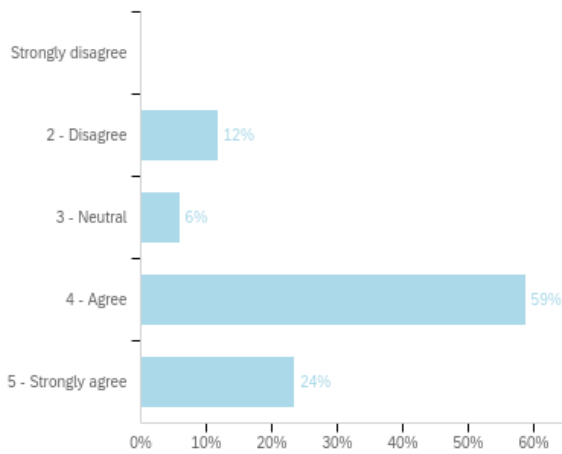| Block 2: Sense of Belonging |
|---|
| **Please indicate to what extent do you agree with the following statements on a scale of 1 to 5:** |

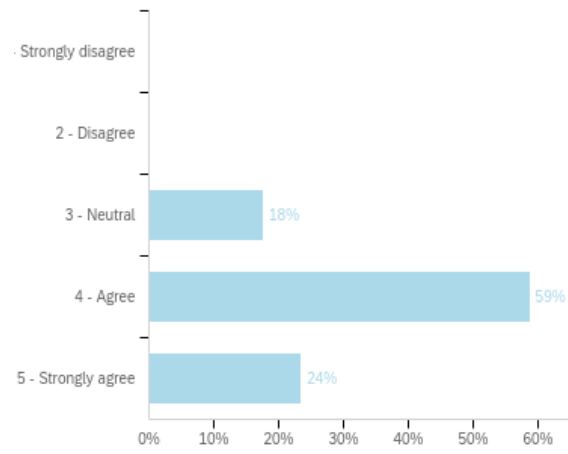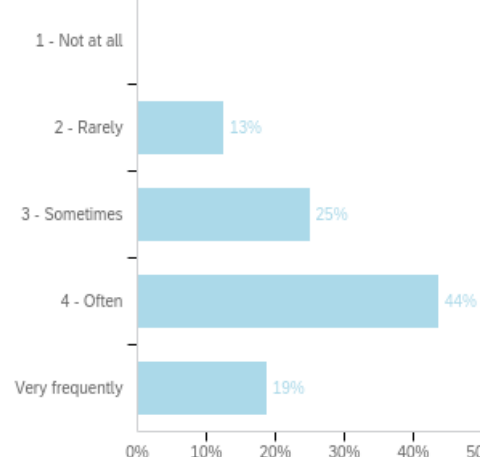| Q12 **I feel a sense of belonging to the De Kersentuin community.**	Q13 **I feel a sense of belonging to the shared gardens and common areas within De Kersentuin.**
Strongly disagree 2 - Disagree 3 - Neutral 12% 4 - Agree 35% 5 - Strongly agree 53%	Strongly disagree 2 - Disagree 6% 3 - Neutral 12% 4 - Agree 35% 5 - Strongly agree 47%
Q14 **My neighbors and I share a strong bond.**	Q15 **I consider my community to be inclusive.**
Strongly disagree 2 - Disagree 12% 3 - Neutral 6% 4 - Agree 59% 5 - Strongly agree 24%	Strongly disagree 2 - Disagree 3 - Neutral 18% 4 - Agree 59% 5 - Strongly agree 24%

Block 3: Social Interaction

| Q16 **How frequently do you interact with your neighbors on a social level on a scale of 1 to 5?**	Q17 **How often do you engage in shared activities or events specifically organized for De Kersentuin residents on a scale of 1 to 5?**
1 - Not at all 2 - Rarely 13% 3 - Sometimes 13% 4 - Often 56% Very frequently 19%	1 - Not at all 2 - Rarely 13% 3 - Sometimes 25% 4 - Often 44% Very frequently 19%
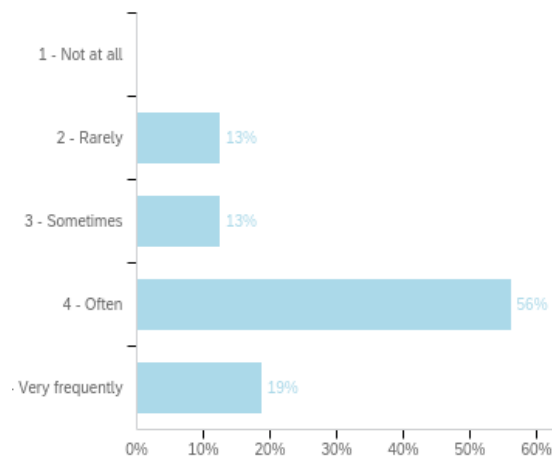
Q18 How frequently do you utilize the common areas and shared facilities in De Kersentuin for social interactions with your neighbors on a scale of 1 to 5?
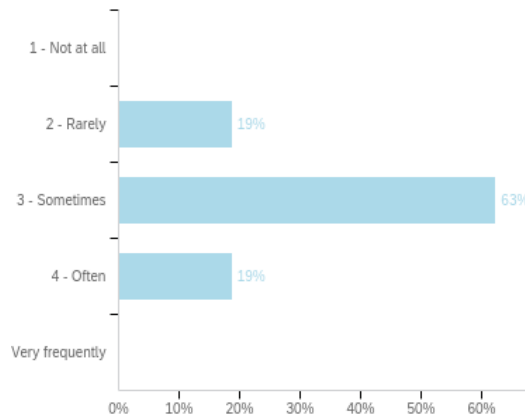

Q19 To what extent do you agree with the following statement on a scale of 1 to 5: Does the spatial design of your cohousing unit allow for both privacy and shared living?
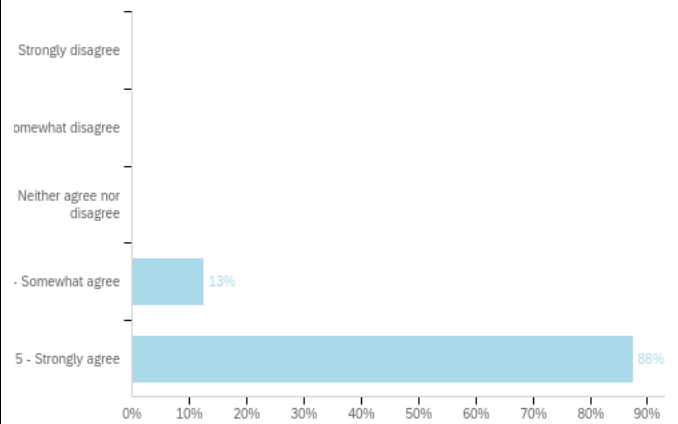

Q20 To what extent do you agree with the following statement on a scale of 1 to 5: The spatial arrangement of the cohousing units facilitates social interactions?
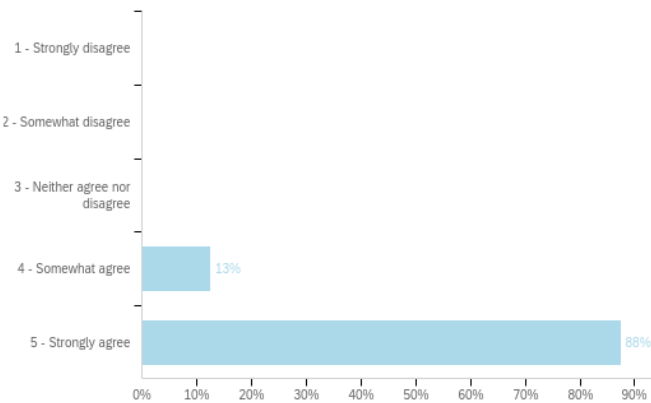

Q21 Please rate the accessibility of the common areas and shared facilities within De Kersentuin from your cohousing unit on a scale of 1 to 5.
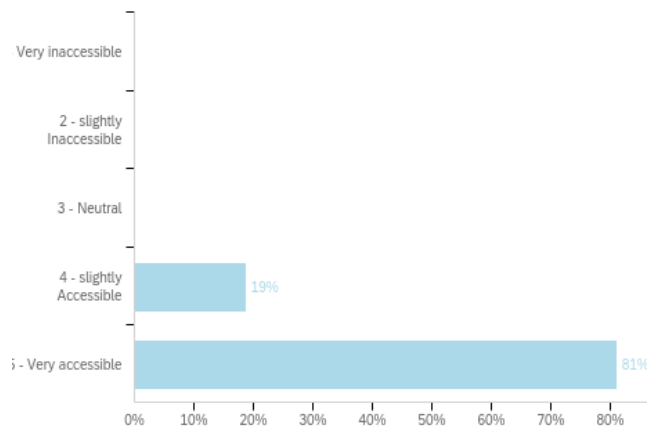
Q22 Please rate your level of comfort in asking your De Kersentuin neighbors for help or support when needed on a scale of 1 to 5.
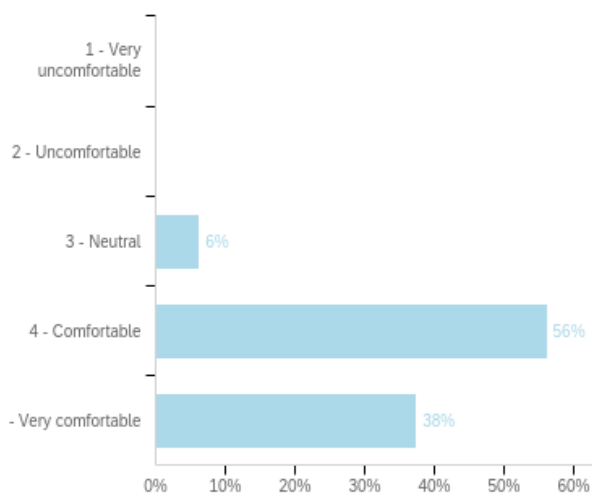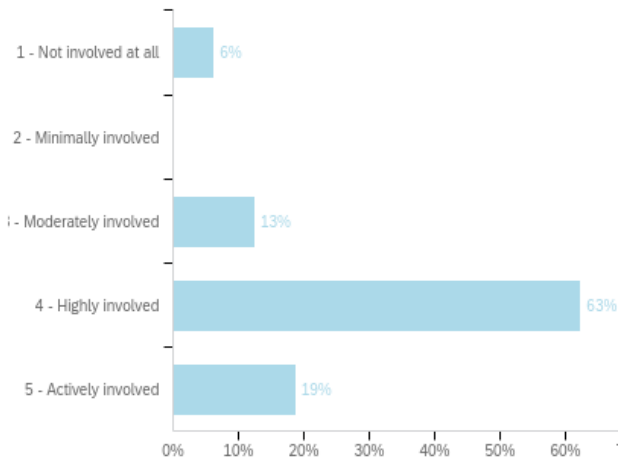

Q23 How frequently do you experience instances of mutual support or assistance from your neighbors on a scale of 1 to 5?
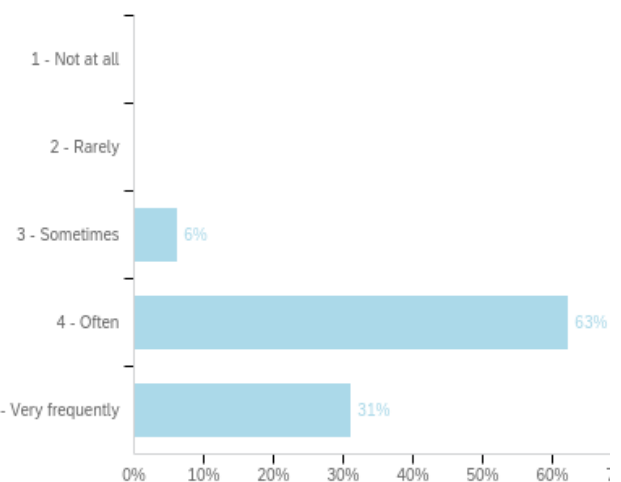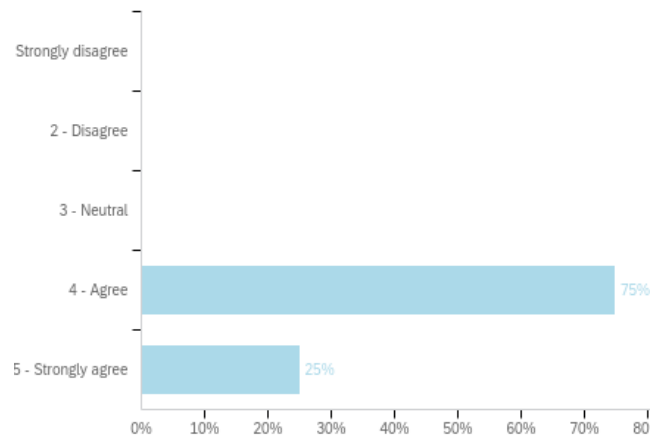
Block 4: Collaboration and decision-making

Q24 Please indicate your level of involvement in decision-making processes within the community on a scale of 1 to 5.

1 - Not involved at all	6%
2 - Minimally involved	
3 - Moderately involved	13%
4 - Highly involved	63%
5 - Actively involved	19%

Q25 To what extent do you agree with the following statement on a scale of 1 to 5: De kersentuin residents collaborate well on shared responsibilities?

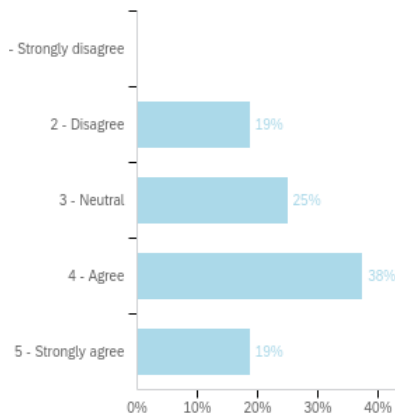|	
Strongly disagree	
2 - Disagree	
3 - Neutral	
4 - Agree	75%
5 - Strongly agree	25%

Q26 To what extent do you agree with the following statement on a scale of 1 to 5: I feel that my opinions and ideas are valued and taken into account in community decisions specific to De Kersentuin.
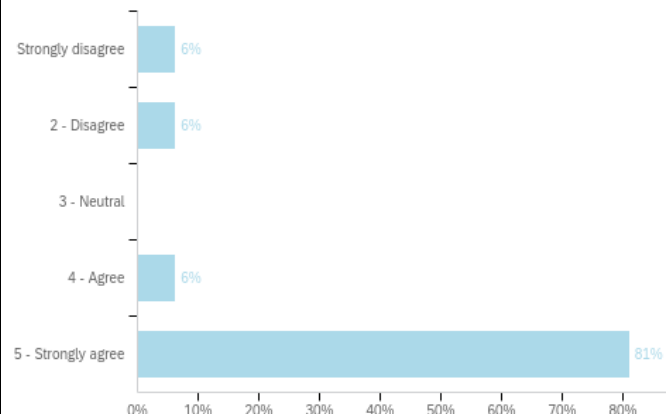
Strongly disagree	
2 - Disagree	
3 - Neutral	19%
4 - Agree	50%
5 - Strongly agree	31%
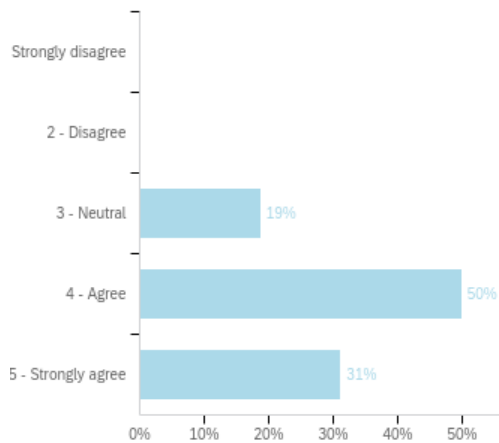
Block 5: participation and Engagement

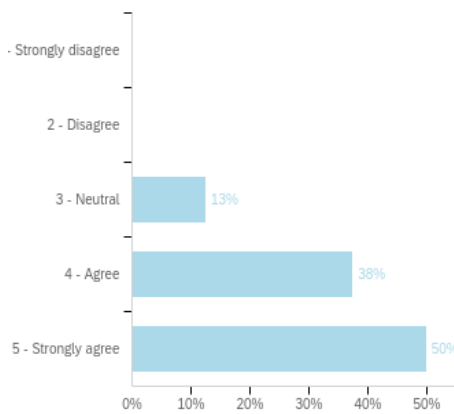**Please indicate to what extent do you agree with the following statements on a scale of 1 to 5:**

Q27 I actively participate in De Kersentuin community meetings, gatherings, or working groups.

- Strongly disagree	
2 - Disagree	19%
3 - Neutral	25%
4 - Agree	38%
5 - Strongly agree	19%

Q28 I actively engage in the planning and organization of community events or initiatives.

Strongly disagree	6%
2 - Disagree	6%
3 - Neutral	
4 - Agree	6%
5 - Strongly agree	81%

Q29 I feel I have a voice in shaping the direction and activities of De kersentuin.

Response	Percentage
1 - Strongly disagree	
2 - Disagree	
3 - Neutral	13%
4 - Agree	38%
5 - Strongly agree	50%

Q30 Conflicts and tensions are effectively addressed and resolved among the residents.

Response	Percentage
Strongly disagree	
2 - Disagree	
3 - Neutral	38%
4 - Agree	56%
5 - Strongly agree	6%

Q31 Conflicts within De Kersentuin are handled fairly and respectfully.

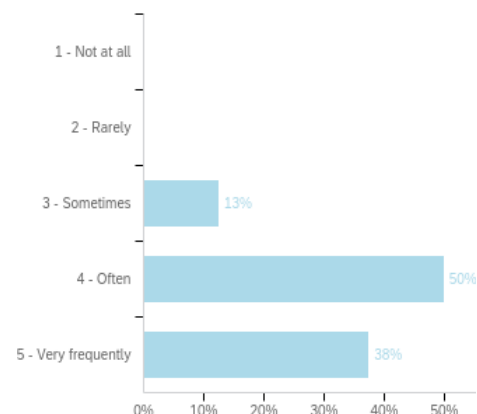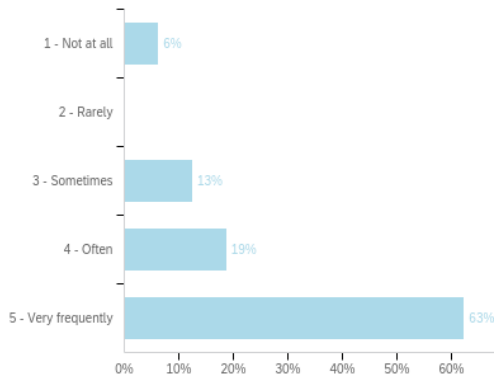| Response	Percentage
Strongly disagree	
2 - Disagree	
3 - Neutral	19%
4 - Agree	38%
5 - Strongly agree	44%
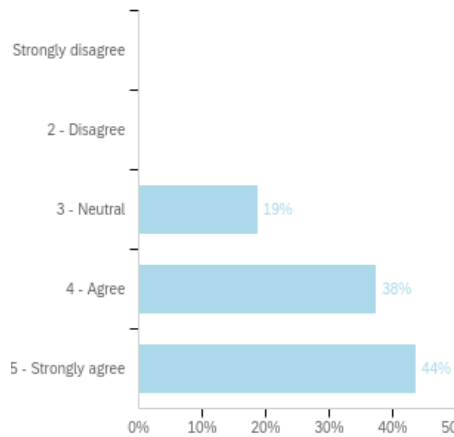
Block 5: Sustainable Practices and Infrastructure

Q32 How aware are you of the sustainable practices implemented within De Kersentuin, such as energy efficiency, waste management, or water conservation on a scale of 1 to 5?

Response	Percentage
1 - Not at all aware	
2 - Slightly aware	
3 - Moderately aware	13%
4 - Very aware	56%
5 - Extremely aware	31%

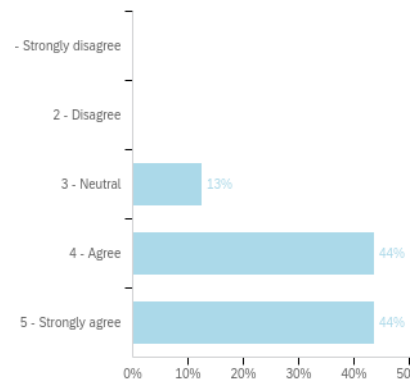**Q33 Please indicate the extent to which you engage in sustainable behaviors encouraged by De Kersentuin on a scale of 1 to 5.**

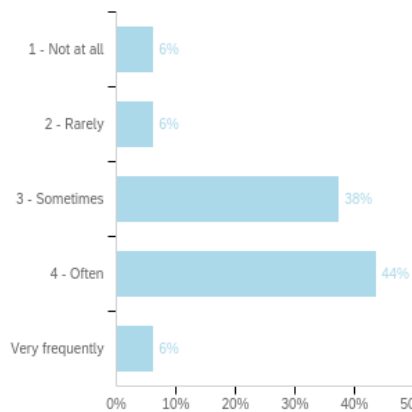| Response	Percentage
1 - Not at all	
2 - Rarely	
3 - Sometimes	13%
4 - Often	50%
5 - Very frequently	38%

Q34 How often do you use sustainable modes of transportation, such as walking, biking, or public transit, for your daily commuting needs on a scale of 1 to 5?

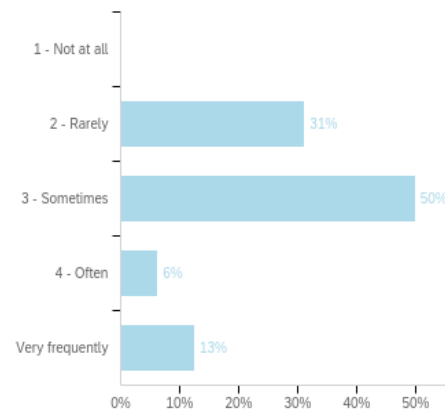| Rating	Percentage
1 - Not at all	6%
2 - Rarely	
3 - Sometimes	13%
4 - Often	19%
5 - Very frequently	63%

Q35 To what extent do you agree with the following statement on a scale of 1 to 5: The location and connectivity of De Kersentuin reduced reliance on private vehicles.
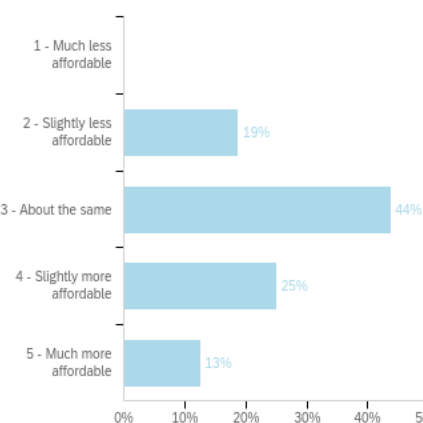
Rating	Percentage
- Strongly disagree	
2 - Disagree	
3 - Neutral	13%
4 - Agree	44%
5 - Strongly agree	44%

Q36 How often do you engage in collaborative consumption practices, such as sharing or borrowing items from your neighbors on a scale of 1 to 5?

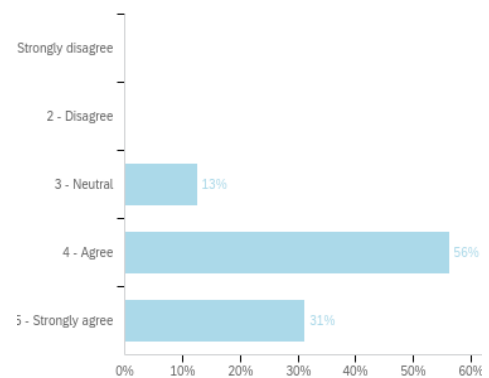| Rating	Percentage
1 - Not at all	6%
2 - Rarely	6%
3 - Sometimes	38%
4 - Often	44%
Very frequently	6%

Q37 How often do you engage in shared resource initiatives, such as car sharing or collective maintenance to optimize economic efficiency on a scale of 1 to 5?

Rating	Percentage
1 - Not at all	
2 - Rarely	31%
3 - Sometimes	50%
4 - Often	6%
Very frequently	13%

Q38 How would you rate the affordability of housing within De Kersentuin compared to the broader housing market in the area on a scale of 1 to 5?

Rating	Percentage
1 - Much less affordable	
2 - Slightly less affordable	19%
3 - About the same	44%
4 - Slightly more affordable	25%
5 - Much more affordable	13%

Q39 To what extent do you agree with the following statement on a scale of 1 to 5: The project fosters a sense of environmental consciousness and responsibility among its residents.

Rating	Percentage
Strongly disagree	
2 - Disagree	
3 - Neutral	13%
4 - Agree	56%
5 - Strongly agree	31%

2.4 Secondary Data Summary

Code	Document name	Source	Summary
D01	De Kersentuin: kenmerken en milieumaatregelen op een rijtje translated from dutch: (De kersentuin: characteristics and environmental measures at a glance)	https://kersentuin.nl/wp-content/uploads/180129-Kenmerken-en-milieumaatregelen-op-een-rijtje.pdf	This report published by de kersentuin residents mentions the environmental considerations undertaken by the kersentuin structures and practices: shows energy performance, material selection and design measures, etc.
D02	Handreiking Particulier Opdrachtgeverschap-De Kersentuin, translated from dutch (guide to private commissioning- De kersentuin)	https://kersentuin.nl/wp-content/uploads/handreiking_particulier_opdrachtgeverschap.pdf	This guide is published by the kersentuin residents to document their process and help other groups learn from their experience in private commissioning.
D03	online blog: documentation of the development process:	https://www.miridian.nl/kt/rubrieken/projectontwikkeli1ng.htm	Provides detailed experiences during the implementation process and stakeholder interactions. Also documents main events that happened in the project's lifetime.
D04	De Kersentuin website	https://kersentuin.nl/	The website shares its vision, motivation, facilities, community structure, sustainability features, and project details.
D05	Leidsche Rijn development vision	https://omgevingsvisie.utrecht.nl/gebiedsbeleid/gebiedsbeleid-wijk-leidsche-rijn/	This document states the development vision. It shows the district's goals and master plan. The master plan broadly describes how the district should be created and how many homes, businesses, and other functions should be built. The goal is less housing shortage in the Utrecht region. The concepts of 'compactness, sustainability, and identity' play a leading role.
D06	Architectural & Landscape Drawings	Shared with the researcher by one of the founders.	Detailed drawings of the design of the outdoor areas and the master plan of the neighborhood. Also presents the initial designs.

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