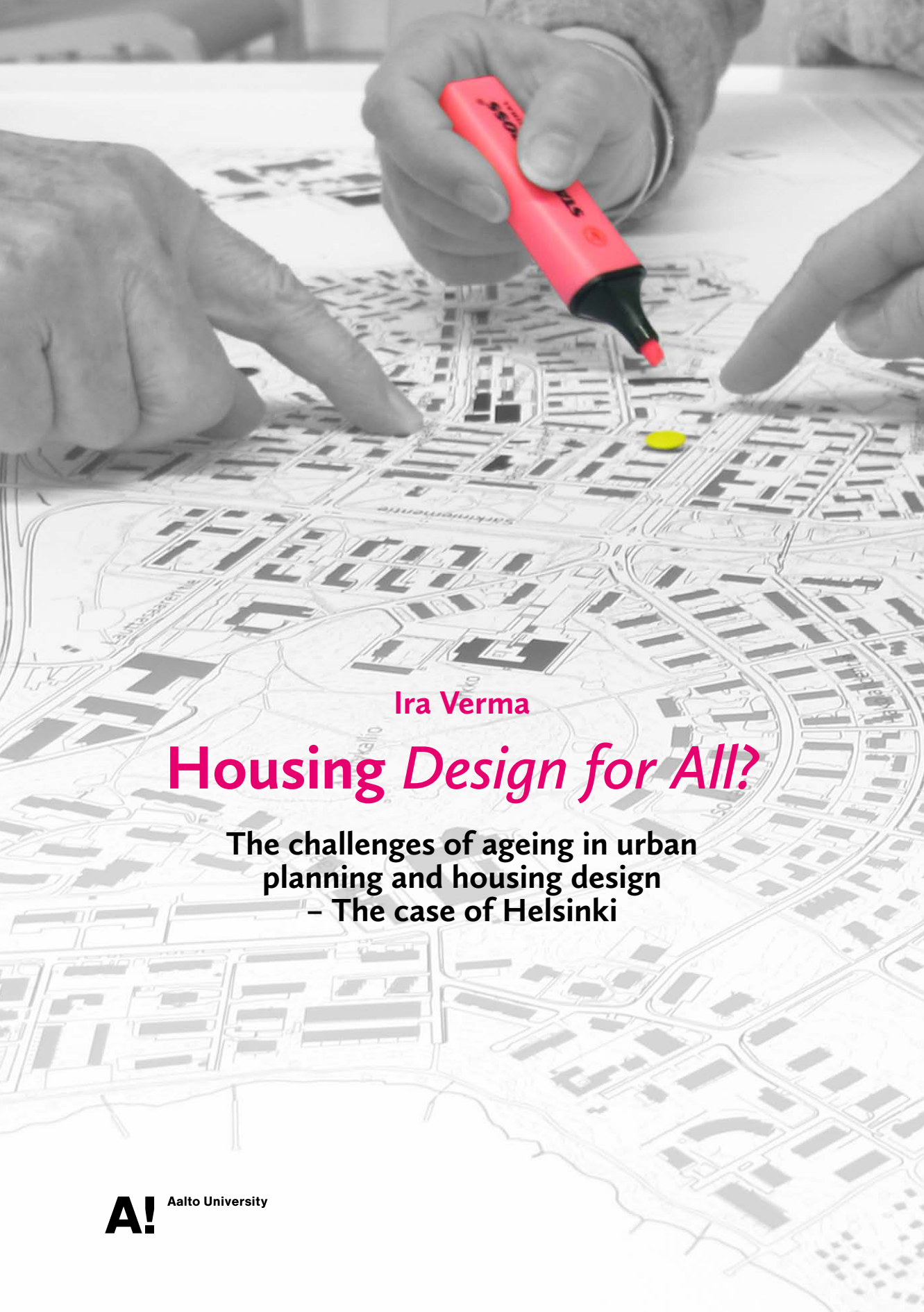

Ira Verma

Housing *Design for All?*

The challenges of ageing in urban planning and housing design – The case of Helsinki

Aalto University

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Photo, Anne Kinnunen

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Abstract

The objective of this study was to gain knowledge on housing design that supports older people in their daily living. Housing design and neighbourhood planning can enhance social and physical activities of persons who live in their own homes at old age or with disabilities. The aim of the study was to explore the design features supporting general wellbeing and independence of older people. The research questions were: Which features of the built environment support activities of daily living, and how urban planning and housing design can support the older population?

Three case studies were carried out on the perimeter of Helsinki city centre in a real-life context. The case study areas varied from a standard residential neighbourhood and sheltered housing, to a group home for people with memory decline. The study used qualitative and mixed methods: workshops, observational walking tours, interviews and questionnaires. The participation of older residents was emphasised in all three case studies. They were main informants to gain further knowledge on housing design supporting independent coping during different stages of life.

The results indicate that the neighbourhood design, public transport network and proximity of green environments influence mobility and the sense of integration within a community. Moreover, the length of residency was related to the familiarity of the living environment, which gave residents a sense of security, and supported their activities of daily life. Furthermore, the results show that older residents preferred the local services that were the most accessible ones.

Comprehensive design and a versatile environment with various activities may promote Ageing in Place policies and enhance cross-generational social encounters. Moreover, many obstacles caused by reduced physical and sensory functioning capacities can be lessened by applying Universal Design of the built environment. Architects and ur-

ban planners have a major role in designing the city and ensuring that it does not exclude any resident groups. Mainstream housing developments with attention to a variety of resident groups will enhance living at home at old age. Moreover, frail people with high care needs should experience being part of community life. Collaboration with local service providers, schools, cafés and restaurants may enable to providing a variety of activities to the residents in sheltered housing.

Tiivistelmä

Tämän tutkimuksen tavoitteena oli syventää tietoa arjen ympäristön suunnitteluratkaisuista ikääntyneen väestön näkökulmasta. Asuntosuunnittelun ja yhdyskuntasuunnittelun avulla voidaan vaikuttaa ikääntyneiden mahdollisuuksiin asua omassa kodissaan ja olla aktiivisesti osallisina asuinalueellaan. Tavoitteena oli tarkastella suunnitteluratkaisuja, jotka vaikuttavat asukkaiden hyvinvointiin ja itsenäiseen asumiseen toimintakyvyn heiketessä. Tutkimuskysymykset olivat: Mitkä rakennetun ympäristön ominaisuudet edistävät arjen toimintoja, ja miten asuntosuunnittelun ja yhdyskuntasuunnittelun keinoin voidaan tukea ikääntyvää väestöä?

Tutkimus käsittää kolme tapaustutkimusta Helsingin alueella. Tapaustutkimukset sijoittuvat normaalille asuinalueelle, tavalliseen palveluasumiseen ja muistioireisten ryhmäkotiin. Tutkimuksessa käytettiin laadullisia tutkimusmenetelmiä, asukas työpajoja, havainnointia sekä haastatteluita ja kyselyitä. Ikääntyneet asukkaat osallistuivat tutkimukseen jakaen tietoa ja kokemuksiaan asuinalueensa ominaisuuksista. Näin tuotettiin tietoa rakennetun ympäristön tuomista haasteista ikääntymisen eri vaiheissa.

Tulokset osoittavat, että asuinalueen suunnittelun, julkisen liikenteen sekä viheralueiden läheisyyden avulla voidaan tukea ikääntyneiden liikkumista ja osallisuutta omaan asuinyhteisöönsä. Asuinalueen tuttuus vaikutti siihen, kuinka turvalliseksi liikkuminen asuinalueella koettiin. Turvallisuuden tunne puolestaan tuki asukkaiden omatoimisuutta ja arjen asiointia alueella. Tulokset myös osoittavat, että ikääntyneet valitsivat ne palvelut, jotka olivat helposti saavutettavia ja esteettömiä.

Asuinalueen kokonaisvaltaisella suunnittelulla voidaan tukea omassa kodissa ikääntymistä ja eri-ikäisten asukkaiden kohtaamisia asuinalueella. Kaikille soveltuva asuntoalueiden suunnittelu edistää ikääntymistä omassa kodissa sekä vähentää ulkopuolisen avun tarvetta.

Paljon tukea arjessaan tarvitsevat ikääntyneet henkilöt tulee myös ottaa mukaan asuinyhteisöihin. Asumispalveluiden piirissä olevien henkilöiden osallisuutta voidaan tukea yhteistyöllä paikallisten toimijoiden ja palveluntuottajien kanssa. Arkkitehdit, kaupunki- ja liikennesuunnittelija ovat tärkeässä asemassa luomassa kaupunkiympäristöä, joka ei sulje pois mitään asukasryhmiä. Tämä tutkimus tuo uutta tietoa siitä, miten suunnittelussa voidaan huomioida myös ikääntyneet asukkaat.

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Foreword

The current demographic development has an effect on all aspects of society. The population ageing will change the way people live and use urban spaces. This development provides architects and urban planners with the opportunity to promote qualitative aspects of design in order to create a more user-friendly living environment. They face the challenge of providing spatial designs that enhance the inclusion of all residents and reduce segregation. Housing and access to local services are basic needs at any age. Therefore, it is important to have a holistic view of housing design in the neighbourhood context. The proportion of the senior population, people who 65 years old and over is growing faster than all younger age groups. Currently in Europe this group represents one-fourth of the population, and it is not conceivable to provide special housing solutions for the entire age group. Therefore, mainstream housing design should support independent coping by the older population. The title of the thesis "Housing Design for All" refers to aspects of the housing environment that take into account the principles of Universal Design and Design for All.

Several studies on housing for the older population have been conducted at the Sotera Institute at Aalto University. This dissertation presents three case studies from 2010 to 2015 dealing with different aspects related to housing for the older population: 1) living independently at home, 2) living in ordinary sheltered housing and 3) living in a group home for people suffering from memory decline. These case studies address the residents' daily challenges in the built environment during the different phases of ageing. This dissertation elaborates the perspective of the older population in an urban context. Each case study involved older residents as key informants, who shared their experiences and knowledge about their own living environment. The aim of the dissertation was to contribute to the design and planning of living environments that provide support to older age groups.

The research projects have been carried out at the Research Institute for Health Care Facilities (Sotera) at the Department of Architecture of Aalto University. The case studies were carried out in collaboration with the City of Helsinki as a joint initiative between the city and academia called the Innovative City® programme.

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Introduction

Population ageing is a global trend. In Europe, the low birth rate and increasing number of older people has been seen as a challenge for future economic development and for the entire welfare system. However, the number of older people is increasing even faster in Asia and the developing countries than it is in Europe. Globally, the number of people over 60 years old is projected to exceed the number of children aged 0 to 9 already by 2030 (UN, 2015). At the same time, the number of people 80 years old and over is growing rapidly. By 2050, it is projected to be more than three times the present number in the world (UN, 2015). The number of people 80 years old and older is rising especially in Asian countries (Table 1). However, the percentage of that age group is projected to be the highest in Europe, due to decreasing birth rates (Table 2).

The demographic change has an impact in all European countries. The number of people with limited mobility and declining functional capacities is expected to grow due to increased longevity. The size of the older population in itself is not such a problem, however, as people are living longer and at the same time having fewer children, the dependency ratio (the proportion of people aged 0–15 years and 65 years old or over compared to working-age people) is increasing (Figure 1). Moreover, as the working age population decreases, the human and economic resources in public services are also expected to diminish. As a consequence, fewer people will provide services for a larger number of people than today. According to Howdon and Rice (2018), a longer lifespan of the population may also generate cumulative care costs. However, they argue that the substantial increase in health care expenditure concerns only the final year of life. The challenge is to allocate the available resources efficiently and accurately to meet the care needs of the population. In the coming decades, twice as many people will have to be taken care of with the same economic and human resources as

Table 1. Population prognostics for the population 80 years old and over in the world (millions) (UN, 2015).

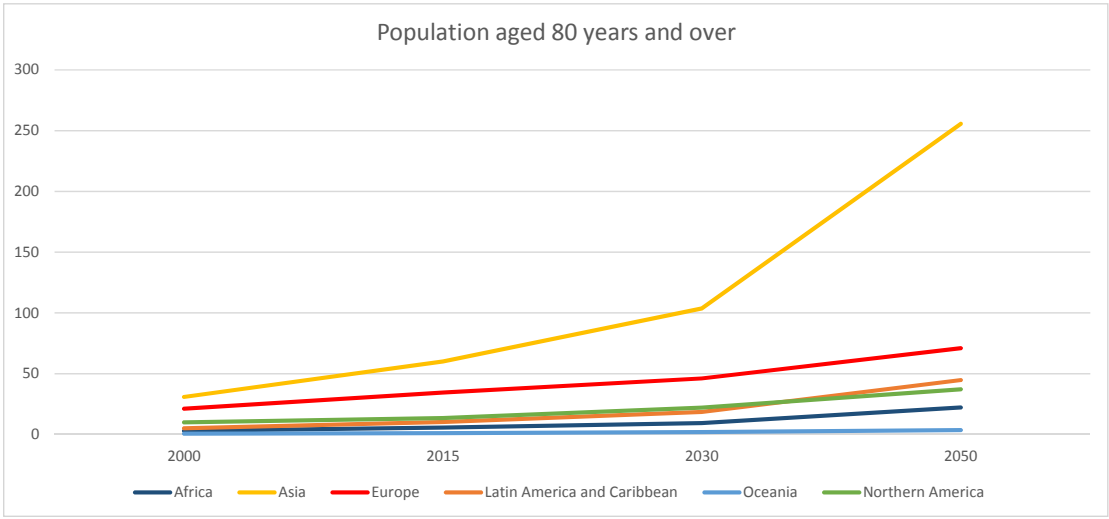
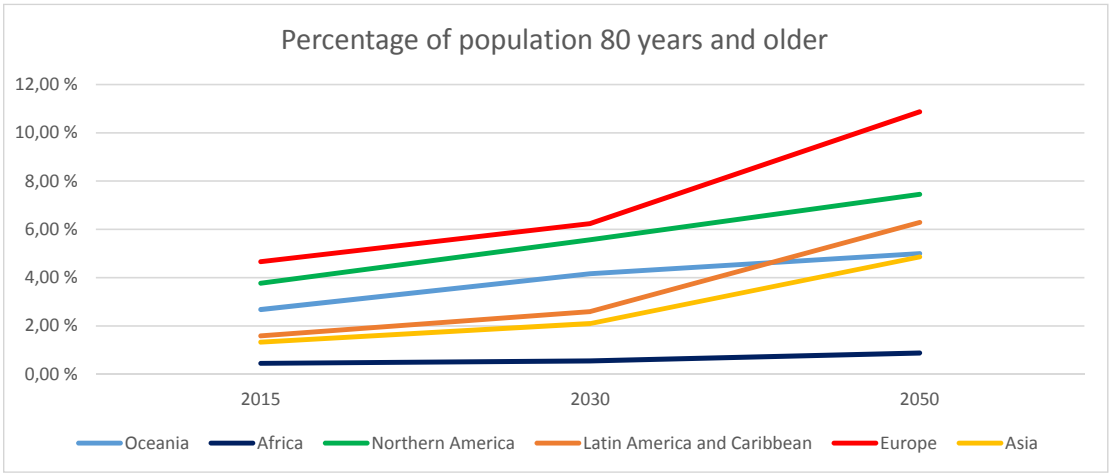


Table 2. Percentage of the population 80 years old and over (%) (UN, 2015).



today. Therefore, health promotion, the ability to take care of oneself for as long as possible and to anticipate housing arrangements for old age have become increasingly important. Moreover, the built environment plays an important role in person-centred care and rehabilitation, which are integral parts of current care policies.

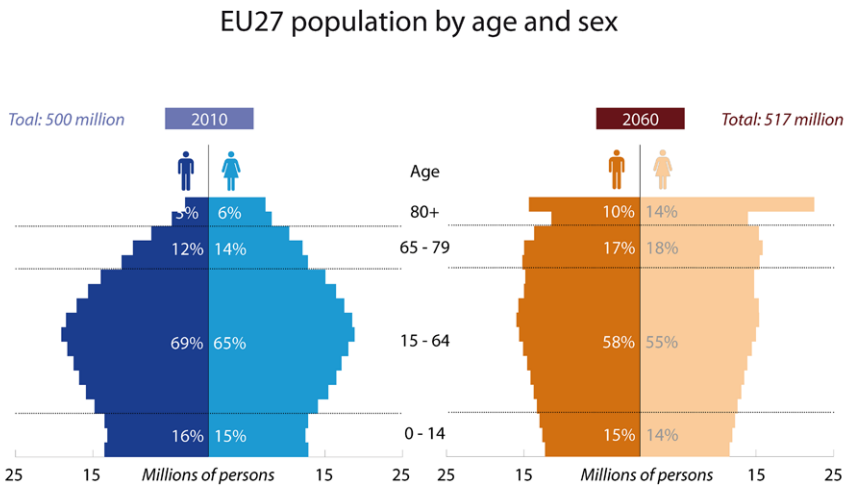


Figure 1. The EU28 population by age group and gender for 2017 and 2080 (Source: Eurostat).

Globally, over half of the population lives in urban areas; and by 2050, the proportion is projected to be 66 per cent (UN, 2014). However, already in 2015, 63 per cent of people aged 80 years old and over were residing in urban areas. Furthermore, the older population is growing much faster in urban areas than in rural areas. In Europe, between 2000 and 2015, the older population in rural areas grew by 2 per cent, and at the same time it increased by 26 per cent in urban areas (UN, 2015). Therefore, attention to solutions that promote the coping of large numbers of frail residents in the urban environment is important. These demographic changes will have significant implications on urban planning in terms of housing and land use, as well as an effect on public transport. This represents a new challenge for architects and planners. The availability of various services and facilities in the urban

environment brings many advantages to older people. The easy access to local services and social activities may enhance the general well-being of older people. However, older residents may also be particularly vulnerable to any changes in the service structure in their living area. According to Buffel (2015), the loss of local transport connections or a decline of local services and facilities in the neighbourhood, for example, may increase the risk of social isolation among older residents.

The relationship with one's familiar living environment changes over a lifespan. People are encouraged to prepare for their old age and to arrange their housing: to relocate or make necessary home modifications. Golan (2018) points out that older people may live in homes that they cannot afford after their retirement age. Moreover, apartments may have challenges concerning usability and residents may have difficulty maintaining their independence. He also argues that older people may have very different types of coping strategies: they may ignore or deny their difficulties or alternatively they may initiate actions to solve their problems. The solutions may be related to the built environment or assistance from another person, for example. Due to unsuitable housing stock for the ageing population, the need for renovations, home modifications and home help will increase rapidly. However, even after home modifications, people may be homebound and require assistance in the activities related to daily coping due to hindrances in the neighbourhood environment. As a consequence, the need for services delivered to homes will grow.

A Swedish survey by Abramsson and Andersson (2016) showed that the probability of living in an apartment rather than a detached single-family house increased with age. The shortage of a housing supply supporting older people may have serious consequences for individuals and for society as a whole. It will certainly increase the need for human and economic resources in the care sector. Furthermore, a lack of suitable apartments in the ordinary housing market may lead to overproduction of housing services targeted to people with disabilities or of old age. Instead of living in ordinary housing, people may be directed to ordinary sheltered housing or extra care sheltered housing with 24-hour care even if they could otherwise manage at home. The National Institute for Health and Welfare in Finland (THL) is collecting statistical data on the use of these housing services on all Finnish municipalities from both public and private service providers. This study utilises

the same terms used in this statistical data (Care Register for Social Welfare). Ordinary sheltered housing is targeted towards older people with minor care needs, providing housing and home help on request during the day. Extra care sheltered housing is a housing service for older people with high care needs with 24-hour care. The increase of these housing services may lead to inflexible housing design solutions, increasing costs and the segregation of people. On the other hand, successful solutions in housing design and the built environment may promote integration and independence and reduce the need for assistance.

Over the last decades, older people's own financial resources have improved. On average, they have a better level of education and higher income than previous generations. Therefore, they will have better possibilities to organise their own living and care arrangements. They are also expected to want more freedom of choice in these matters (OECD, 2003). The housing design affects how well older people can cope in their everyday lives. Most of the old housing stock has been built without taking into account the needs of people with limited functional or sensory capacities. Furthermore, housing developers are not totally responding to the current demand. People can continue living in their own home or prepare for their old age only if there are suitable housing solutions available. Moreover, according to Pirinen (2014), for example, home help or other relevant additional services for housing production have been identified as an area with increasing demand. He found that there are still a lack of actors and viable business models responding to this demand.

In the process of ageing, the geographical radius of daily living becomes smaller. Oswald et al. (2011) found that the immediate surroundings of apartment buildings and the neighbourhood were important, especially for very old residents. Moreover, Gardner (2011) argues that transitional spaces, such as courtyards and entrances as well as other shared spaces in apartment buildings, become potential spaces for social interaction. Furthermore, access to local services and public transportation contribute to physical and social functional capacities. Rosso, Auchincloss and Michael (2011) found that the neighbourhood quality, destinations such as grocery shops, facilities for leisure activities, and green areas within walking distance all increase the mobility of older people. Talen (2003) points out that access to services has to be considered in relation to the needs and characteristics of the popula-

tion residing in the neighbourhood. An enabling environment permits residents to perform activities related to their daily living without creating hindrances.

Access to local services enhances independence and autonomy in old age. For older people, walking to the grocery shop is an activity that maintains both physical and social functioning capacities. Zhe and Chanam (2010) observed that the more walking destinations there were in a neighbourhood, the more older adults walked and reported high levels of neighbourhood interest. Burgess (1954) and Richard et al. (2009) found that access to services, key facilities for the older population and green areas were correlated to social interaction. Moreover, Gehl (2011, p.33) underlines the quality of the environment as a promoter of social activity. Marino and Lapintie (2017) describe semi-public spaces, such as cafés and shopping centres, as spaces that are managed and controlled by private service providers but which are used as public spaces. Peace (2013, p.32) argues that these places have a public nature, as they are communal, unrestricted and open, and they are supposedly for all. However, people may, in the course of their life, have different roles and behaviours, and feel more comfortable in some of these places. For older people, these semi-public spaces are important for multigenerational encounters in the neighbourhood.

Design for All and Universal Design are concepts that aim at creating an environment that enables people to use their full potential, be integrated in society and live an independent life regardless of their age or physical or mental condition. According to the declaration of the European Institute for Design and Disability, everything that is designed by people must be accessible and convenient to use for everyone in society (EIDD, 2004). Furthermore, Universal Design promotes an iterative design process and solutions that are flexible and easily modified for personal needs. Lid (2010) argues that the aim of the built environment is to facilitate human life and that human life is diverse. Moreover, she points out that "*people's capacities vary across their lifetime, depending on the environment, individual factors and the situation*". The concept of Universal Design (UD) has been seen as an integral part of sustainable development, as it has both economic and social impacts (Delta Center, 2013). Architects can anticipate the demographic development by designing housing and urban environments with attention to the architectural quality and the UD principles. The layout, structure and

dimensioning of buildings and spaces are important factors in design for people with reduced functional capacities. Moreover, Ryhl, Kajita and Sørensen (2016) argue that UD is about the physical quality of the architecture as well as the sensory aspects of the architectural experience. The visual quality, light and acoustics play a considerable role, for example, in wayfinding and in the perception of space.

Many scientists point out the necessity of increasing our understanding of the needs of the older urban population in order to create supportive environments that will enable older adults to remain in their homes and neighbourhoods. Architects and urban planners have been criticised for their lack of knowledge or awareness of the implications of the ageing population in society. There are still only a few studies by architects or planners on the subject. However, previous Nordic research in the field of architecture for an ageing population have discussed the typology of sheltered housing for older people, for example. Andersson (2011) identified three different typological concepts in the existing sheltered housing: a hotel, hospital or home. Özler-Kemppainen (2006) proposed a revised model of a multifunctional space adapted from traditional rural houses in new housing complexes in order to enhance social interaction and support older people in their homes. Moreover, a study on the usability of sheltered housing revealed that the space design, staff members' working routines, as well as the whole organisation of the service provider, were interrelated (Andersson M, 2011). Sipiläinen (2011) studied space dimensioning and ergonomics of the spaces for care in more detail. Furthermore, Kjisik (2009) discussed architectural quality and its role in care institutions. He underlined the importance of long-term planning and integration of care institutions as part of the city. Moreover, he argues that the home environment will become a part of the service chain and an increasingly important space for health care (Kjisik, 2009, p. 85). Kondo (2015) analysed the relation of sheltered housing and Ageing in Place. He pointed out the importance of the quality of the neighbourhood environment on the subjective well-being of residents. Moreover, Kajita (2014, p.49) focused on shared access routes and inclusion in urban housing. He argued that the design of an accessible environment is about social inclusion and participation.

In housing design, the space layout, dimensioning and visual perception need to be reviewed. National building regulations and other

guidance (e.g., ISO-21542:2011 Standard) promote accessible design solutions. However, the building is always in relation to its surrounding environment, and the home environment may expand to the neighbourhood. In spite of detailed rules and regulations for the built environment, the design and realisation of indoor and outdoor spaces often lack coordination. Therefore, this study proposes a comprehensive view of the neighbourhood, including the location of housing, access to services, green areas and public transport. To my knowledge, a holistic view of housing design for older people and its connection to the immediate surroundings is still lacking. This study contributes to the link between housing design and neighbourhood planning from the point of view of older people. The framework for the thesis is based on the concepts of *Age-friendly cities* and *Ageing in Place*. The context for the thesis concerns ageing and housing in urban and suburban neighbourhoods in Helsinki metropolitan area, in Finland.

The dissertation is based on material from three multidisciplinary research projects carried out from 2010 to 2015 in Helsinki. These cover housing solutions in the sub-centres of the city: mainstream housing in the district of Lauttasaari (Case Study 1), ordinary sheltered housing in the Jakomäki, Maunula and Pitäjänmäki districts (Case Study 2) and extra care housing with 24-hour care in Oulunkylä (Case Study 3). They are all situated on the perimeter of the Helsinki city centre. They are presented in the following chapters in reverse chronological order. This order was chosen to contemplate the process of ageing and the increasing need for assistance for people with declining physical, cognitive or social functioning capacities. This is done keeping in mind that the process of ageing is individual, and that people's physical condition and cognitive decline are not directly age-related. At the same time, the case studies represent the shift in the social and health care policy in Finland and other Nordic countries. Today, services for older people aim to reduce the amount of sheltered housing and support people in their own homes. Furthermore, the focus of current research and development has turned to housing and care at home, whereas previously more research was done on sheltered housing or the extra care housing environment.

This thesis introduces observations on the built environment and user knowledge from older residents on public and semi-public spaces in the living environment. The daily environment has been studied

through three case studies on different scales of the built environment: a) the neighbourhood, b) shared spaces in apartment buildings and c) their immediate surroundings. The focus of the study has been on solutions that support and empower older residents in their daily lives. The themes of walkability, mobility, access to services and green areas are important throughout the lifecycle, and they are present in the three case studies described in the following. The aim of the case studies was to recognise features in mainstream housing, sheltered housing and group homes for people with memory decline that empower residents and enable them to live a self-contained life. To that end, residents 65 years old and older were asked to participate and to self-report their experiences. Moreover, residents suffering from cognitive decline in extra care sheltered housing with 24-hour care were interviewed. The Universal Design principles, described later in the text, were used as a tool to reflect on different design solutions.

The motivation and research questions

The motivation for the thesis was to produce new knowledge on housing design for architects, planners and other design professionals. The context of the research was older residents in an urban living environment and, more specifically, older people living in apartment buildings. The aim was to gain a holistic view of housing solutions supporting independent coping at different stages of old age. The objective of this dissertation was to assess the living environment, housing and access to services in order to deepen the understanding on the use of the local environment and to develop age-friendly design criteria. Housing and care services are studied in the context of the Nordic welfare society. The research questions were: 1) How can housing design adapt to the challenge of an ageing population? 2) What design features of sheltered housing or extra care housing could be adapted to mainstream housing to enable frail older people to live as long as possible at home? 3) How can the principles of Universal Design be applied on different scales of planning and design for the older population?

Housing design should anticipate changes in the population structure. Many people have mobility, hearing or visual impairments in old age. Instead of facing unwanted modifications to their building design,

architects should take control of the design at an early stage. The initial quality and flexibility of the design can enhance independent living. Each apartment can be modified to the needs of the individual resident. However, shared spaces in an apartment building need to be designed for all residents. The shared spaces in apartment buildings and transition zones in the immediate surroundings are spaces for daily encounters. These gain importance as people become less mobile. This dissertation brings new knowledge on the design of these spaces.

The case studies were carried out by multidisciplinary research teams coordinated by the Research Institute for Health Care Facilities (Sotera) at Aalto University. The author worked as a researcher in all of the case studies and as the project manager in case studies 1 and 2. All three case studies have been carried out in collaboration with the Social Services and Health Care Division of the City of Helsinki. Moreover, other service providers were included in the studies. The residents as well as the Finnish Association for the Welfare of Older People, the Finnish Association of People with Physical Disabilities, the Finnish Federation of the Hard of Hearing and the Finnish Federation of the Visually Impaired were involved as expert organisations in these studies.

Finnish context

In the Nordic countries, health care and social services are financed by general taxes, and services are largely provided by public organisations. Moreover, the municipalities are highly autonomous (Szebehely and Meagher, 2018). In Finland, the local authorities (cities and municipalities, totalling 311 in 2019) have been responsible for organising housing services as well as social welfare and health care services to people living in their area. The social and health care services have been financed by municipal taxes and state subsidies, which cover 74.6% of all the expenses. In 2016, the share of municipalities was 36% and private funding (private people, insurance companies, etc.) covered 25% of social and health care costs (THL, 2018). Anttonen and Karsio (2016) note that Finnish municipalities have some autonomy in their local health care strategy. The municipalities outline ways of organising and delivering social and health care services in their area and may purchase these services through public procurement processes from private and third-sector organisations. Moreover, access to services is determined by needs assessments and the financial situation in each municipality. As the population size, age structure and municipal tax rates vary among Finnish municipalities, this places residents in an unequal position. Many small municipalities have faced challenges financing their social and health care services.

There is an ongoing political debate on the *social welfare and health care reform* in Finland. These reforms aim to achieve a sustainable economy and equal access to health care in all parts of the country. The main objectives of the reform are to reduce social and geographical inequalities, increase access to services and to simultaneously combat cost expansion (Kalliomaa-Puha and Kangas, 2016). Therefore, the government has projected the creation of autonomous service areas (counties) that would provide seamless service chains of integrated social welfare and health care services. The aim of the reform is to ensure

the delivery of social and health care services in all municipalities. So far, however, the political parties have been unable to reach a consensus about the number of service areas and the ways forward for the implementation of the reform. However, the responsibility for residents' well-being, health promotion, land use and housing will remain under the municipalities (Ministry of the Finance, 2016).

The overall aim of the Nordic welfare model has focused on universalism, reducing income inequality and establishing a high level of social protection. It enhances equal rights to residence for all citizens, regardless of income or personal characteristics and abilities. The Finnish constitution guarantees adequate social, health and medical services for everybody. Moreover, according to the constitution, "*public authorities shall promote the right of everyone to housing and the opportunity to arrange their own housing*" (Ministry of Justice, 1999, Section 19). Furthermore, the Finnish urban planning system aims to prevent socio-economic segregation in residential areas. The target is to mix owner-occupied, rental and right-of-occupancy apartments, as well as sheltered housing in residential areas in order to enhance interaction between resident groups. Moreover, the Finnish Land Use and Building Act aims "*to promote a safe, healthy, pleasant, socially functional living and working environment which provides for the needs of various population groups, such as children, the elderly and the handicapped*" (Land Use and Building Act, 1999, Section 5).

In Finland, according to population projections for 2040, people who are 65 years old and over will make up more than 26 per cent of the population. The oldest segment of the population, those who are 80 years old and over is growing particularly rapidly (OSF, 2015a). In 2040, almost 10.5 per cent of the Finnish population is projected to be over 80 years old. This is higher than in Norway (6.3%), Sweden (7.1%) and Denmark (7.2%) (OSF, 2015b). Therefore, the increase will be more dramatic in Finland than in the other Nordic countries (Szebehely and Meagher, 2018). Moreover, in the Nordic countries, people who are 65 years old and over and living alone will be more common than the average in Europe (32% in 2015) (Table 3).

In Finland, the number of single-person households has increased in all age groups, and it has been highest for the age group of 65 years and over (OSF, 2015c). Due to the longer life expectancy of women, living alone is more common for women than for men. Widowhood, di-

vorce and institutional care of the partner are the main reasons for living alone in old age. One-third of men and more than half of women aged 75 years old and over live alone. Moreover, nearly 70 per cent of the Finnish population who are 80 years old and over are female (Table 4.). There is evidence that the risk of poverty is highest among women living alone, and that the risk increases with age (Eurostat 2015). This may limit older women's possibilities to choose their housing or use home help services from private service providers. The current trend in the commercialisation of care services pointed out by Szebehealy and Meagaher (2018) may therefore increase inequality between people.

Table 3. People 65 years and older living alone (Eurostat, 2015).

	Percentage of persons 65 years old and older living alone
Denmark	39.8 %
Norway	36.2 %
Sweden	39.0 %
Finland	39.5 %

Table 4. Gender differences for the older population in Finland (Norden, 2013).

	Life expectancy	The proportion of the population over 80 years old	Living alone when over 75 years old
Women	83.5 years	68%	55%
Men	77.5 years	32%	27%

Szebehely and Meagher (2018) found that recent changes in care services for older people in Nordic countries have increased the amount of informal care, especially in Sweden and Finland. In all age groups, women are more often caregivers than men are. Moreover, a survey by Linnosmaa et al. (2014) revealed that an increasing number of older people are providing informal care to their partner. In 2012 in Finland, the proportion of people aged 84 years old and over of all informal caregivers was 4.5 per cent. The percentage has been increasing in recent years. In very old age, people's physical capacities are limited, and their social relations become fewer. Being a caregiver may affect the social activities and increase the feeling of isolation. Moreover, according to a recent survey, one-third of older people living at home and receiving regular home care reported feeling lonely and being alone all the time or most of the time (THL, 2016). Loneliness may lead to depression, and together with low mobility can further deteriorate functional capacities and aggravate social isolation. This may lead to a premature move to sheltered housing.

Due to the projected decrease in economic and human resources in the social and health care sector, important changes in the service structure are proposed. The current care policies in Nordic countries aim to reduce the number of hospital like care facilities and assist people in their own homes with home care services. In Finland since 2008, the *National Framework for High-Quality Services for Older People* (MSAH, 2008) prioritises services provided at home. There is evidence that most people prefer to stay at home. Moreover, institutional care in hospital like nursing homes and long-term care on health care centre wards is generally more expensive than care at home. Therefore, institutional care is only justified for a short period and on a medical basis. New models combining care and housing are being developed in the ongoing Key project launched by the Finnish government. The key project *Improved home care for older people and enhanced informal care in all age groups* targets client-oriented and cost-effective care at home (MSAH, 2016). Housing design and urban planning are an integral part of the development.

The housing situation of older people

Finland started urbanising late, mainly after World War II and especially since the 1960s. According to Aro (2017), today four people out of five in Finland live in urbanised settings. 70% of the population live in cities and the remainder live in other municipal centres. Moreover, his study on population density reveals that more than half of the Finnish population live within a radius of 200 km from Helsinki. He points out that variation in the dependency ratio between municipalities is high. The situation is challenging in the small municipalities, where almost 40% of residents may be 65 years old and older. However, in the future, the increase in the numbers of older people in small municipalities will be less dramatic than in the cities. According to Ristimäki et.al (2013), people who are 75 years old and over opt for apartments in city centres and sub-centres. The availability of apartments suitable for the older population in these areas is limited, however.

Helsinki is a relatively young city compared to other European capitals. Urbanisation was strongest in the 1970s, and housing construction was the most active in urban areas at that time. One-fourth of the current apartment buildings date from the 1960s and 1970s (Figure 2.). To enhance building new affordable homes for the growing urban population after World War II, the government established a financing and guiding organisation to promote the construction of new apartments. Originally, the government subsidies (ARAVA loans) were targeted for both rental and owner-occupied apartments. Bengtson, Ruonavaara and Sørvoll (2017, p. 68) argue that in Finland, this has promoted home ownership, especially in low- and middle-income households. The government organisation also provided standard designs for the construction of affordable and healthy to live in apartments. The first apartments were realised in 1949 in Helsinki. The organisation, today called the Housing Financing and Development Centre of Finland (ARA) had a great impact on the quality of housing conditions for many people at the time. Currently, ARA has a special assignment to support the construction of apartments for people with low or average incomes and for people with special needs. According to Ruonavaara (2017), the government-subsidised rental-housing sector covers about 12 per cent of current Finnish households. Furthermore, most public and private ordinary sheltered housing and extra

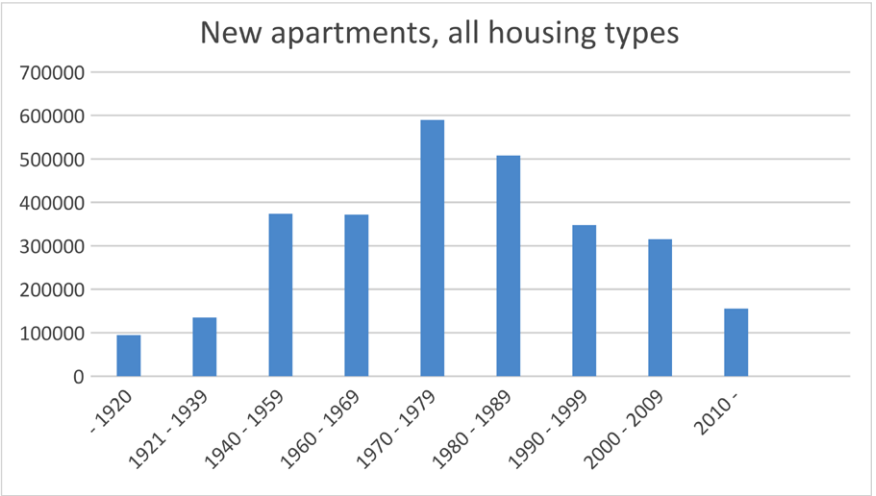


Figure 2. The age distribution of apartments built in Finland (Official Statistics Finland).

care sheltered housing with 24-hour care are built with subsidies and guidance from ARA.

The standard ARA designs have influenced the entire housing construction industry in Finland. For example, apartments from the 1960s and 1970s have almost identical layouts. Today, these apartments need major technical renovations. The main challenges of the apartments of that period for the older population are their narrow doorways and small bathrooms, for example (Verma, Kilpelä & Hätönen, 2012, p.24). This apartment stock is being renewed slowly, by approximately 1.5–2.0 per cent yearly. The first Finnish building act on accessibility dates back to 1984. However, only apartment buildings built in the 21st century are considered accessible according to current standards. The current building legislation (Government Decree on Accessible building, 2017) makes a distinction between mainstream apartment housing and housing targeted for people with mobility impairments. The current regulations concern lifts in apartment buildings and low-threshold entrances (maximum height of 20 mm), which assure basic accessibility. Moreover, there are also regulations regarding the width of door openings, the width of corridors and toilet dimensions. The legislation on indoor areas does not cover single-family houses.

Furthermore, the decree includes regulations for the apartment buildings' immediate surroundings concerning the minimum width

(1200 mm) of access pathways to the buildings, the maximum height (1000 mm) and maximum slope (5%) of access ramps to the entrances, as well as minimum measurements for horizontal landings at the entrances (1500 mm x 1500 mm). However, it does not give any recommendations concerning the elevation differences between street level, plot boundary and the building, for example. This may lead to unsuccessful solutions (Fig. 3).

Many existing housing developments have originally been realised with government subsidies or guarantees for construction. To manage costs during the building phase, they have been built economising on space and accessibility. Today, the home modifications to these same apartment buildings are partly subsidised, again by public funding. The government grants subsidies for the renovation of housing for older people, for retrofitting lifts in old apartment buildings and for housing modifications that improve accessibility. The savings made earlier in the construction phase are currently causing expenses in the use phase.

Figure 3. Incompatible design and construction of street infrastructure and housing may lead to solutions that are not accessible to any resident groups, Helsinki 2014 (photo, Verma, I.).

In Finland, more than 90% of people who are 75 years old or over live in mainstream housing. The majority still live in single-family homes or semi-detached houses, and 44.5 per cent live in apartment buildings. The older age group includes more people living alone in single-family homes and semi-detached houses than other age groups. In the near future, this may increase the need for assistance, as most single-family homes lack basic accessibility and bring challenges for ageing residents. Already now, most one-person households where the occupant is 75 years old or over, are found in apartment buildings (Ministry of the Environment, 2013) (Fig. 4).

In all Nordic countries, ownership is the most common form of tenureship (Bengtson, Ruonavaara & Sørvoll, 2017). The share of owner-occupied housing in the Nordic countries is highest in Norway, where 90 per cent of people 60 years old and over own their house or apartment (Royal Norwegian Ministry of Labour and Social Affairs, 2016). In Finland, almost 80 percent of people who are 75 years old and older live in owner-occupied housing (Ministry of the Environment, 2013). This includes both single-family homes and apartments. A recent survey by Huttunen et al. (2016, p. 62) revealed that in Finland the home ownership is still the favourite aspiration in all age groups. Only 9 percent of the people who were homeowners at the time of the survey reported that they would consider living in a rented or right-of-occupancy apartment in the future. Moreover, 81 percent of those who were not homeowners would have preferred to own their dwelling.

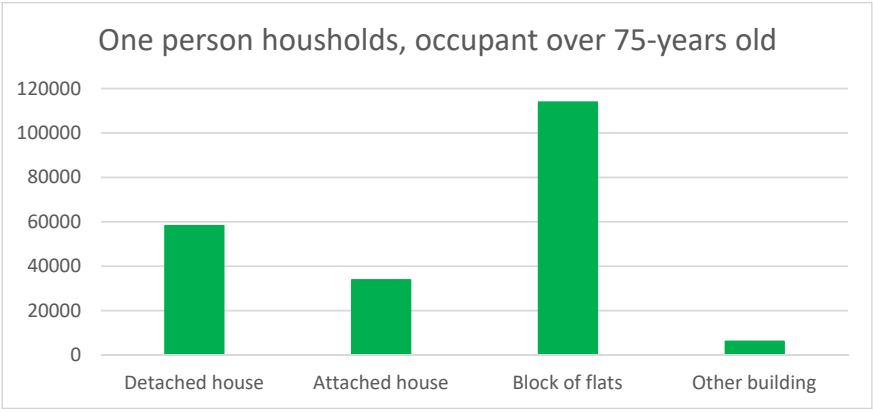


Figure 4. One-person households in 2015 where the occupant is 75 years old or over (OSF, 2015).

Housing and care services for the older population

In 2013 in Finland, the Ministry of Social Affairs and Health (MSAH, 2013) established indicators to monitor the quality of housing and home care services for older people (Table 5). Moreover, the Ministry of the Environment launched the *Government housing development programme for the older population* (ME, 2013). The target was to increase the proportion of older people living at home by improving their housing conditions, offering more accessible housing solutions and providing home modifications. In the last years, the development has been fast, and in some parts of the country, the target indicators for living at home are set much higher than the recommendations. However, there are big differences between municipalities. The new recommendations for 2017–2019 (MSAH, 2017) have no target values for the quality indicators.

Table 5. Indicators for the quality of care (MSAH, 2013).

Quality Indicators	Target for persons 75 years old and over
Living at home or in ordinary sheltered housing	91 to 92 per cent
Getting regular home care	13 to 14 per cent
Getting support for informal care	5 to 6 per cent
Living in extra care sheltered housing	5 to 6 per cent
Living in institutional care (health centre, nursing home)	1 to 3 per cent

For a long time the housing services for frail older people have been based on hospital like institutional nursing homes. These care institutions provided comprehensive housing and health care services. Sweden has managed to give up institutional care, whereas other Nordic countries still have some degree of these services. In Finland, there are still a few older people living in hospital like nursing homes and in long-term wards in health care centres. This type of care for older people is gradually being given up and patient wards are being closed

as people are discharged from them. Moreover, all Nordic countries aim to reduce the number of institutional facilities and increase care at home. The share of housing services and home care vary between the Nordic countries (Fig. 5). In Finland, there are mainly two levels of housing services: sheltered housing or extra care sheltered housing with 24-hour care.

Ordinary sheltered housing (Palveluasuminen) provides an accessible and safe living environment and opportunities for social activities for people who cannot manage at home. This form of housing can provide a supportive environment for people who feel lonely and need assistance occasionally in their daily activities. In an ordinary sheltered housing scheme, residents live on their own, in most cases, renting apartments. Furthermore, it may provide residents with personal alarm technology, and assistance during the daytime upon request. Ordinary sheltered housing may also be referred to as service housing or assisted housing. However, in Finland, the term assisted housing is used mostly for housing solutions for people with disabilities. Solutions similar to ordinary sheltered housing are also found in other Nordic countries (e.g. Ældre boliger in Denmark, Omsorg+ in Norway and Trygghetsboende in Sweden). The selection criteria for residents or service provision may vary in all of the countries. A common feature in these apartments is that the residents do not need nursing. In Fin-

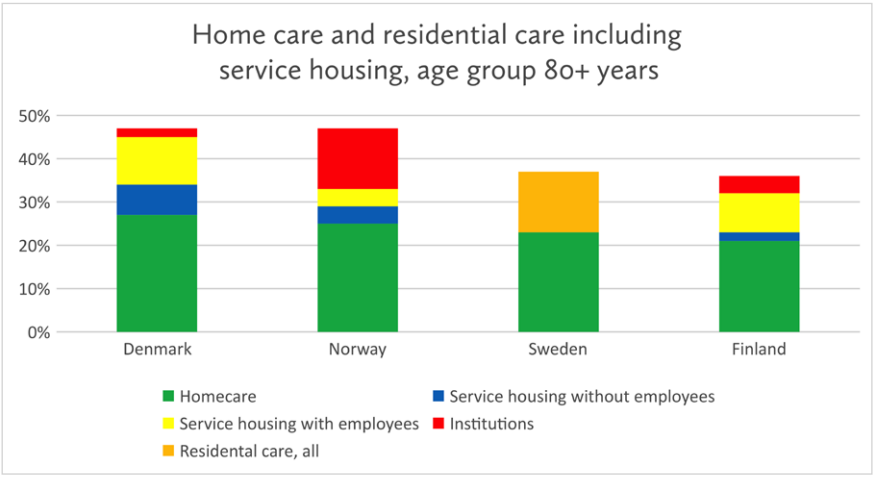


Figure 5. Home care and residential care including sheltered housing, age group 80+ years (Szebehely, M. & Meagher, 2018).

land, the municipalities have been responsible for providing housing for all residents living in their area, including housing services for older people. However, today public authorities run very few ordinary sheltered housing schemes. The services are purchased through public procurement from non-profit organisations and private service providers, which are increasingly responsible for delivering these services. They have become powerful new actors in the field (Szebehely & Meagher, 2018). The aim is to support the residents' social activity and feeling of security. Residents in ordinary sheltered housing may also receive home care from a public service provider.

Extra care sheltered housing with 24-hour assistance (Tehostettu palveluasuminen) is targeted at frail people with highest care needs (similar to Plejeboliger in Denmark, Skärskilt boende in Sweden, and Omsorgsboliger in Norway). Residential homes or extra care sheltered housing with 24-hour care are the main alternative housing models for people with physical or cognitive disabilities in Finland (Väyrynen and Kuronen, 2015). Residential homes provide inpatient care for older people in social care who can no longer cope at home despite access to regular social and health care services. Extra care sheltered housing also refers to group homes for people with cognitive disabilities where care services are available 24 hours a day. The majority of the residents in group homes suffer from memory decline due to Alzheimer's disease or other similar cognitive diseases. Group homes usually have smaller units than residential homes. In Finland, the extra care sheltered housing schemes with 24-hour care are run by the public health care service providers. They may purchase the services from a private or non-profit service provider. The services include comprehensive services for housing, meals, activities, health care and medication. The care costs cover all services and are determined by a resident's personal income. In the following, the term *sheltered housing* is used for ordinary sheltered housing and *extra care housing* is used for extra care sheltered housing with 24-hour care.

According to the ongoing social welfare and health care reform, the autonomous service areas would be in charge of both the extra care housing and sheltered housing, whereas municipalities would remain in charge of promoting mainstream housing for all population groups. In Finland, since the year 2000, the amount of sheltered housing has decreased (Fig. 6). Frail people who would have lived in sheltered hous-

ing in the early 2000s now live at home, assisted with some form of home care. However, due to demographic development and longer life expectancy, the number of people in need of assistance has increased. Consequently, there has been a significant increase in the number of residents in extra care housing (Fig. 7) (THL, 2015).

The demographic development challenges the structure of care for older people, as the existing service structure is not economically sustainable. Kinnunen, Malmi and Vauramo (2014, p. 100) made a comparison of care costs in the Finnish context. They calculated the care costs for one year for 20,000 people living in extra care housing or alternatively living in sheltered housing with seven hours of home care a week. The costs were calculated for one year. The approximate costs of the care amounted to 900 million and 330 million euros, respectively. Beyond the economic factors, most elderly people express the desire to stay at home for as long as possible.

Recent developments in home care services and informal care

In Finland, between 2001 and 2014, the number of people who were 75 years old and over receiving home care increased by 36 per cent (Väyrynen and Kuronen, 2015). In the same period, the coverage of people receiving regular home care has dropped from 13.4 per cent to 11.8 per cent. The statistics indicate that only the number of people who are 85 years old and over receiving regular home care has increased (Fig. 8).

According to Kröger and Leinonen (2012), regular home care in Finland has become increasingly medicalised and directed towards the very oldest and frailest. They point out that the amount of home help (cleaning services, helping with groceries, etc.) has dropped dramatically since the last recession (in 1990). This raises concerns about daily coping, as it is the basis for general wellbeing and being able to stay at home. If older people are not able to perform their basic household tasks, they may be forced to move. Home help services, together with new technological aids and digital services can assist people at home. Moreover, those who can afford to purchase these services from private service providers or who have relatives to provide help can manage at

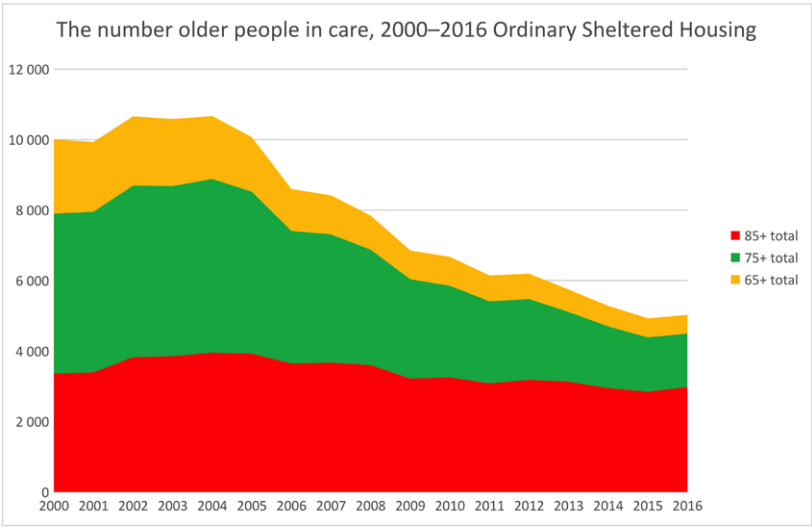


Figure 6.
The number of people 65 years old and over living in ordinary sheltered housing has been decreasing steadily during 2000–2014 (THL).

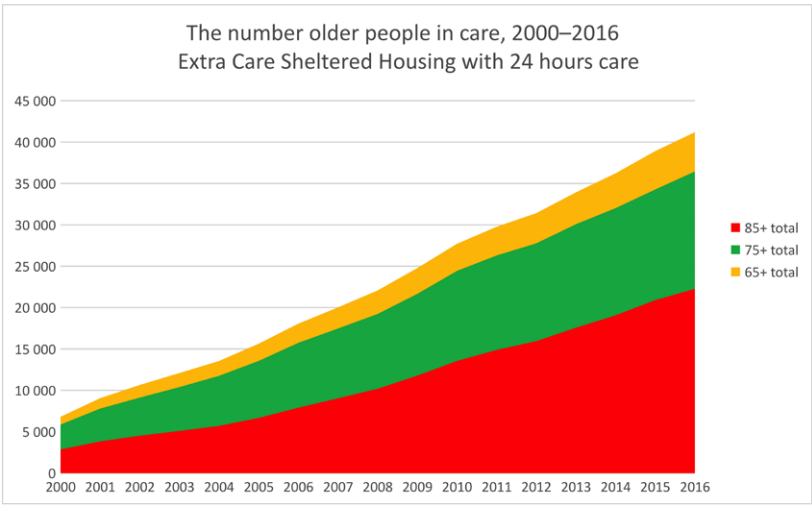


Figure 7.
The number of people in extra care sheltered housing has increased dramatically since 2000 (THL, 2015).

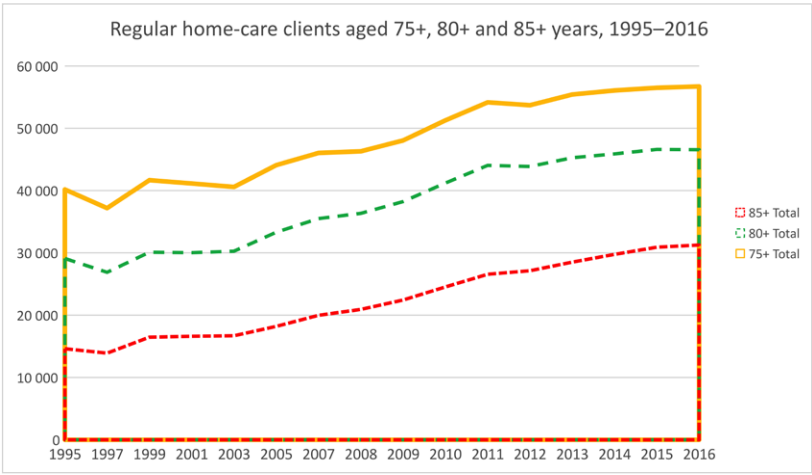


Figure 8.
Regular home-care clients aged 75+, 80+ and 85+ years, 2001–2016 (Arajärvi & Kuronen, 2017, appendix table 1).

home, whereas, a person with less resources and no relatives may have difficulties in maintaining their quality of life. Moreover, the study by Daatland, Slagsvold and Lima (2009) indicates that in the Nordic countries, older people are reluctant to ask their children for help and are more likely to turn to the public services for assistance. Nonetheless, there is an indication that the decline in coverage of care for older people has been followed by an increase in family care in Finland, Sweden and Norway. The increase has been higher in Finland and Sweden than in Norway (Szebehely & Meagher, 2018).

Architecture of housing for older people

Daatland, Høyland and Otnes (2015) argue that the distinction between sheltered housing and extra care housing is not clear. Moreover, the architecture and typology of these housing types may be quite similar. An extra care housing unit may have been converted to sheltered housing by implementing a simple organizational change without any major changes to the building itself. Similarly, extra care housing may be located in an old institutional care facility. The institutional care facilities were originally designed for bedbound patients and have little room for social interaction or rehabilitation. The sheltered housing area in Kustaankartano (Case study 3) was built in 1953 and represents a modern nursing home typology from that period. The apartment buildings have an I-shaped layout, and currently each building has five floors and 24 small rooms (10m² – 15 m²) on each floor with private toilets (Fig. 9). The rooms are located on both sides of narrow corridors without any natural light. These premises are not well-suited for frail people with cognitive disorders who need 24-hour assistance. The building has been renovated and transformed into sheltered housing. Some of the private rooms have been converted for shared use. Each floor is divided into two units with 11 to 13 residents in each unit. Eight similar buildings and two new temporary buildings provide 370 apartments in the area. The hospital-like layout does not enhance the quality of life or navigation in the spaces for people with Alzheimer's disease. Therefore, the goal of the renovation was to shift from institutional-like care homes to a small-scale supportive communal way of living. However, the building frame is not flexible.

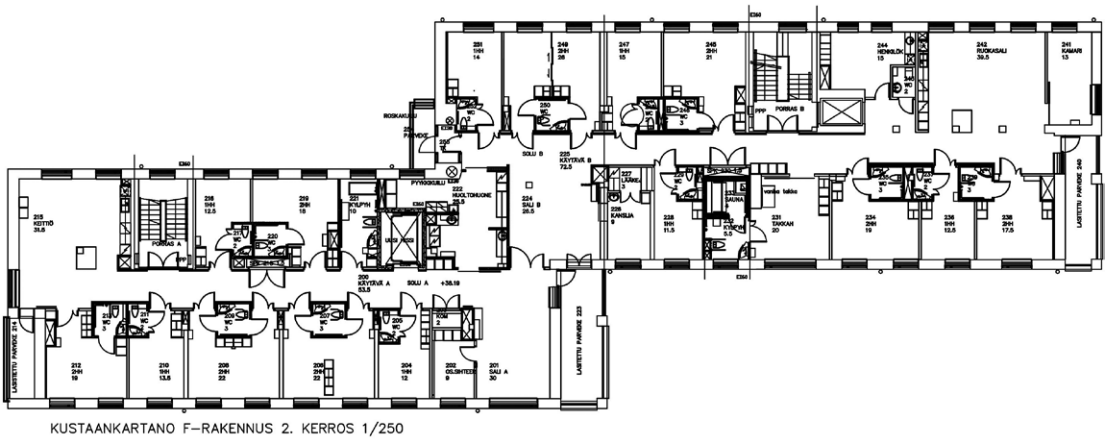


Figure 9. Kustaankartano sheltered housing has little shared spaces, and the private rooms are from 10 m² to 15 m². (Original design by architects E. and O. Saijonmaa, renovation by Architects Brunow and Maunula).

For a long time, the design aimed to create a good working environment for the staff members. According to Devlin and Arneill (2003), the design of care environments in the 1960s started to focus on working efficiency and, for example, reduced walking distances for staff members. Moreover, the layout was designed to provide the opportunity for the staff to maintain visual control over the spaces and observe the patients. Furthermore, they observed, that the design of care environments from the late 1980s to early 1990s, aimed at creating a more welcoming environment for the patient, and the design solutions were targeted towards groups of people with special needs, for example for people with Alzheimer's disease. According to them, the healing environment, the importance of sound, light and the thermal atmosphere as well as a patient-centred approach came into the discussion in the late 1990s. The sheltered housing schemes in Case Study (2) represent architecture from the 1970s and 1980s. They have all a quite similar layout.

The sheltered housing in Jakomäki (Case 2a) was built in 1985. It has an E-shaped layout formed from five separate buildings (Fig. 10). It includes 72 apartments for older people, 20 apartments for people with disabilities and eight apartments for short-term care. The apartments are from 30 m² to 35 m² with private kitchens and bathrooms. Three of the buildings are four-level buildings, and two buildings in the middle have two floors above ground level. Shared spaces for dining and other

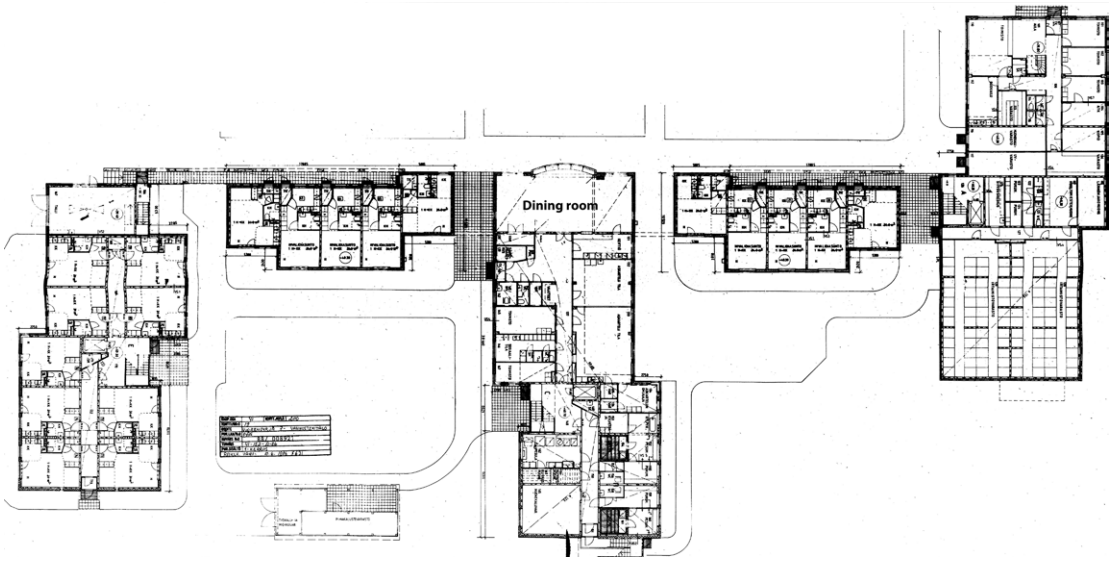


Figure 10. Sheltered housing in Jakomäki, Case study 2a. (Original design by the consulting firm Suunnittelurengas).

activities are located in the middle. In the 1980s the residents living in sheltered housing were self-managing, and there were only five staff members working on the premises (Andersin et al. 2007). The current residents are frailer, have multiple conditions and need more care. In 2016, the total number of staff members was 64 (City of Helsinki, 2016).

The sheltered housing in Maunula, (Case 2b) is originally from 1983. It has a U-shape (Fig. 11). The building has larger shared spaces, and the corridors are wider than the Jakomäki buildings. Moreover, it has 86 private apartments of 25 m² each with a kitchen and toilet. Twenty of the apartments are for people suffering from cognitive decline. Each floor has 28 apartments. One floor can be divided into two smaller units of 14 apartments.

The extra care housing in Pitäjänmäki has an L-shape (Fig. 12). The original plans are from 1982 and the building was under renovation in 2012. The 27 private rooms on each floor are of 15.5 m² – 20 m² and have a bathroom each. The rooms are situated on both sides of a long narrow corridor. The extra care housing is targeted for people with severe memory disorders. The shared spaces are located in the south of the

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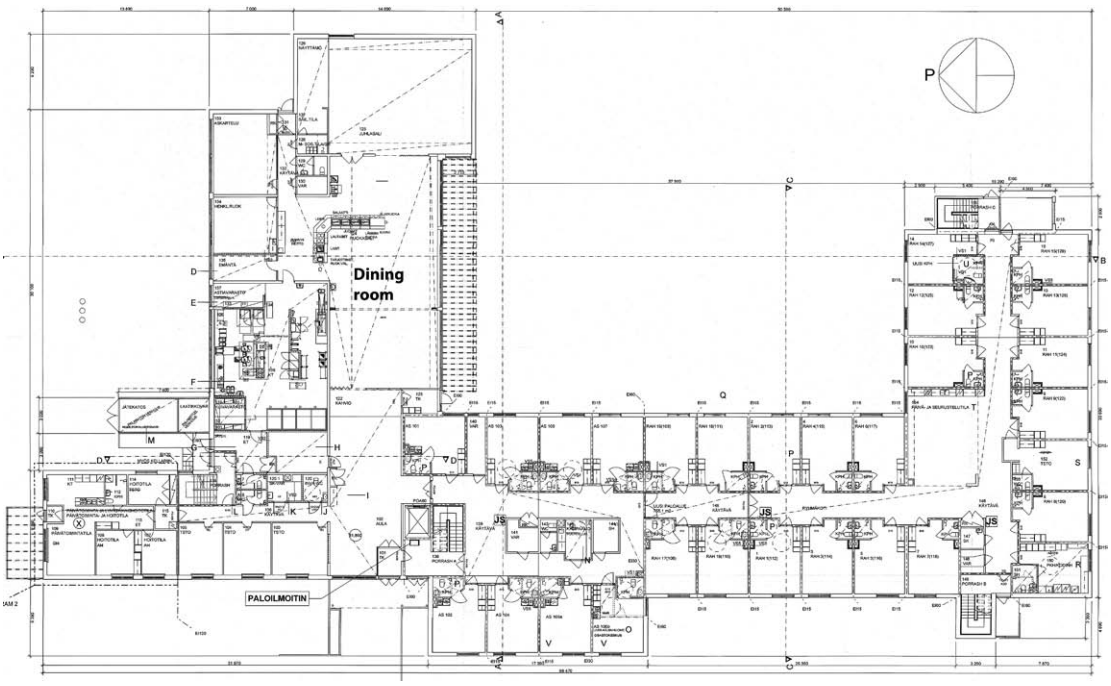

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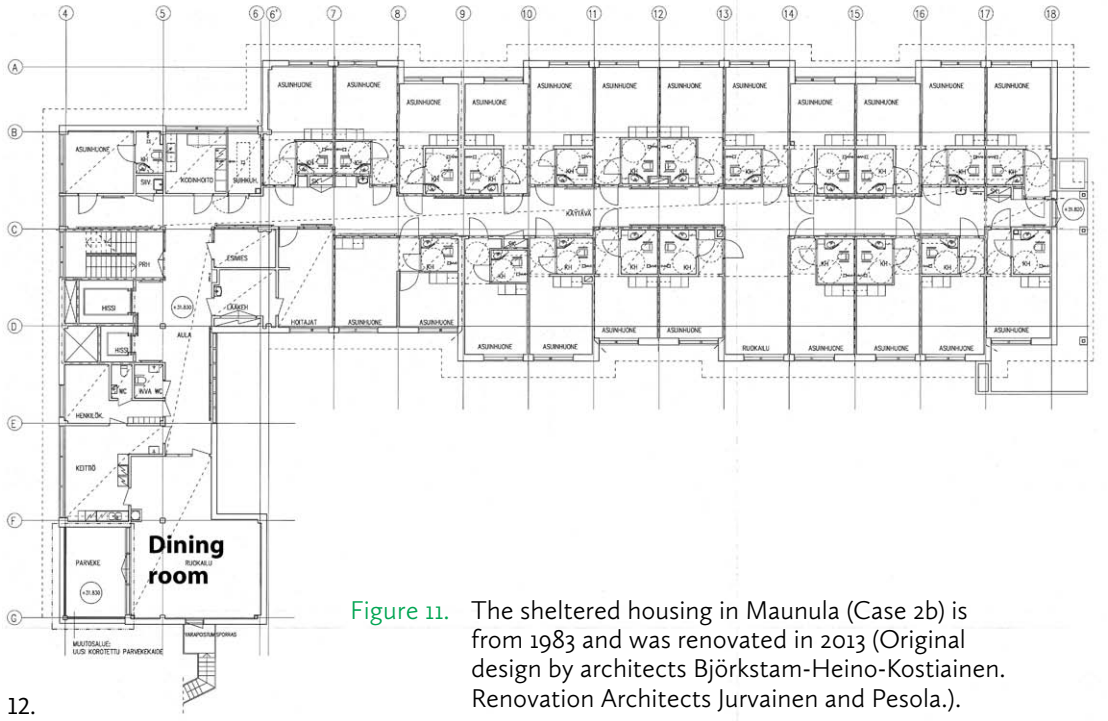

Figure 11. The sheltered housing in Maunula (Case 2b) is from 1983 and was renovated in 2013 (Original design by architects Björkstam-Heino-Kostiainen. Renovation Architects Jurvainen and Pesola.).

Figure 12. Extra care housing in Pitäjänmäki (Case 2c), (Renovation by MV architects, Santtu Mäkelä).

building and on the ground floor. The residents on each floor dine together. There is a small balcony facing south.

Sheltered housing schemes built after the year 2000 may have more shared premises and spaces for social activities than in mainstream apartment housing. Moreover, the aim is to promote contacts between neighbours to combat the feeling of loneliness. The majority of the apartments are small one- and two-room apartments, fully equipped with a kitchen and bathroom. The current recommendation for the minimum area for an apartment is 35 m^2 – 40 m^2 (ARA, 2016). People living in sheltered housing are ordinary renters and not patients. Therefore, the environment should empower them and enhance their general well-being. The environment can also help them to maintain their functional capacities. Corridors are seen as part of living areas, for rehabilitation and social activity.

In some cases, sheltered housing and extra care housing are located in the same building. Short distances create synergies in care service delivery and enable the efficient use of human resources. In practice, the size of the sheltered housing and its units are still determined in part by working efficiency and the numbers of staff required. The staffing levels are currently part of the focus of the political debate. In Finland, the official recommendation in extra care housing for staffing has been one staff member for every two residents. For a unit of 25 residents, for example, there are 4 members of the staff in the morning and, 4 in the evening, one during the night. However, it is considered that cost-effective sheltered housing should have at least 100 residents.

The Wellbeing Centre Onni (Fig. 13), built in 2008 is located in the centre of Pukkila, a small municipality. It provides housing services for older people and health and well-being services for all residents of the municipality. It has twelve apartments for extra care housing and a group home of seven private rooms for people suffering from cognitive decline. The central location and the activities organised for the whole population enhance the residents' inclusion in the neighbourhood. Väyrynen and Kuronen (2015) point out that relocation to a sheltered housing scheme can be felt to be negative, especially if the person does not request the move themselves, and it may also involve feelings of losing control and autonomy. The familiarity of the premises and central location may facilitate the relocation.

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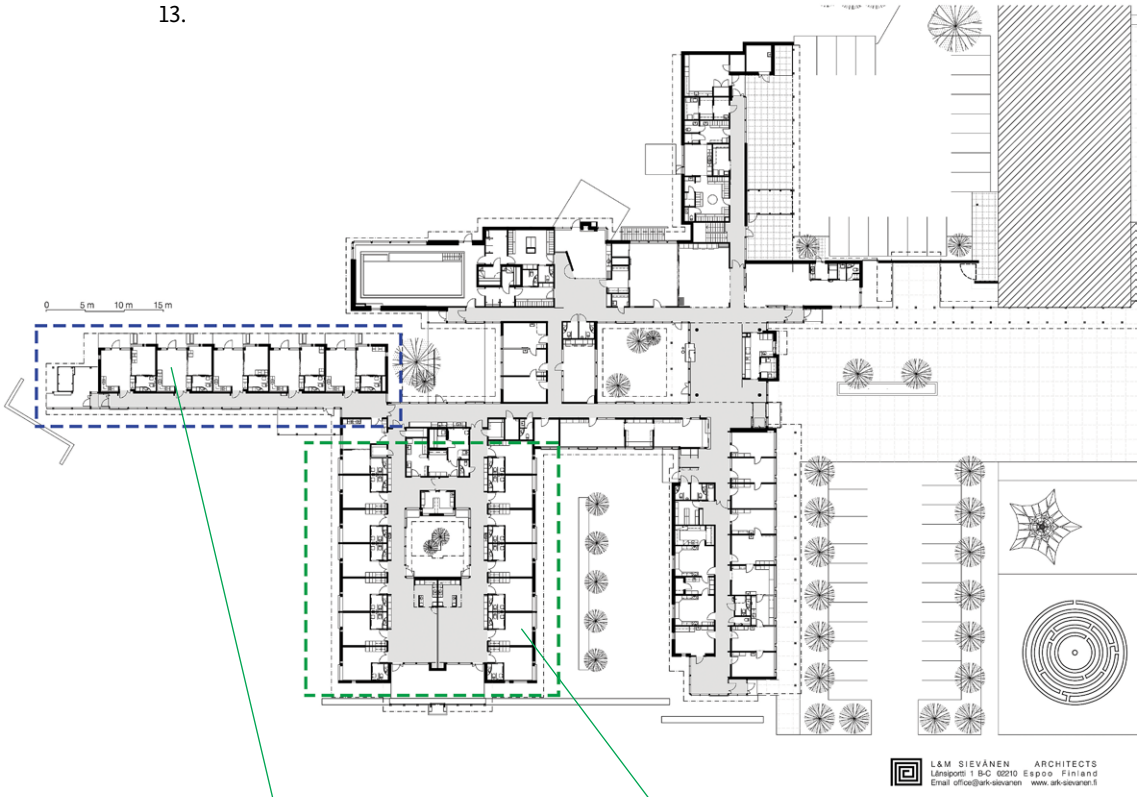

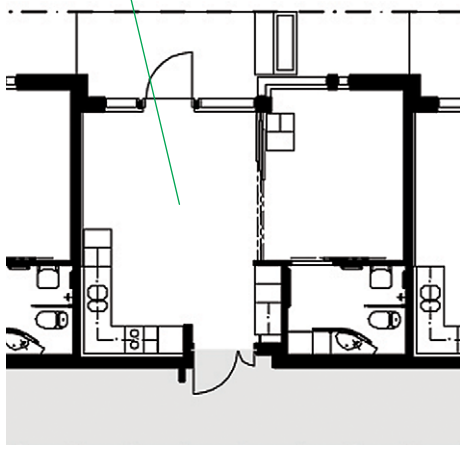

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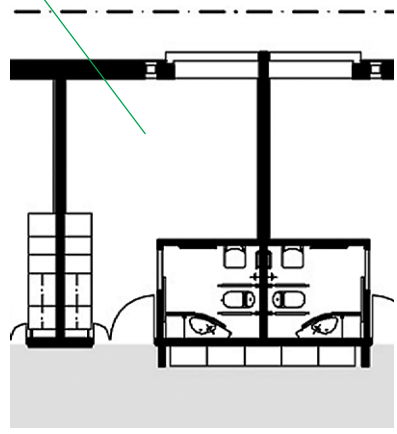

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Figure 13. Residents live independently in private apartments (on the left) or in an extra care unit (the lower part) at the Well-being Centre Onni (Design by architects L. & M. Sievänen).

Figure 14. A room in the group home at the Well-being Centre Onni (architects L. & M. Sievänen).

Figure 15. An example of an apartment in the sheltered housing at the Well-being Centre Onni (architects L. & M. Sievänen).

Group homes and small-scale extra care housing units can support a person with a severe cognitive disorder. Housing solutions and assistive services need to support the personality and individual life of the resident. In group homes, the private rooms are smaller than in sheltered housing, and people are encouraged to use the shared spaces. Moreover, in Finland, the group home residents' rooms are usually not equipped with a kitchen for security reasons, but each room has a private bathroom. The current recommendation for minimum private area is 25 m^2. One group home unit may comprise 15 residents (ARA, 2016) with at least two care givers working on the premises. The unit may be divided into two smaller groups of 7 or 8 residents or three groups of 5 residents. However, the management of three resident groups with two staff members becomes difficult. Several of these small-scale group homes can be put together to form large-scale sheltered housing. This would also allow for better planning of the staffing.

The size and number of residents in a housing unit affect the comfort and atmosphere of the environment. Andersson (2011, p. 127) points out that the association of sheltered housing with a hospital or a home is also related to the interior design; the choice of surface materials on the walls, ceilings and floors, as well as the furnishings. Moreover, Devlin and Arneill (2003) point out that the goal of patient-centred care is also to increase the patient's control over their environment. The residents may be able to furnish their own room with personal objects. The sheltered housing Villa Andante (Fig. 16–18) was built in 2009 and has 46 apartments divided into three L-shape units. Each unit has 15 rooms for people suffering from memory decline. The shared spaces are in the centre of the building and can be joined together. The size of the building and the choices in the materials and colours make the group home feel residential.

The immediate surroundings, safe and easily accessible outdoor spaces and courtyards may encourage mobility and informal social contacts between people. In the design of a sheltered housing scheme, these spaces may be used to promote social activities and the inclusion of the residents in the neighbourhood. However, safety should not override the quality of the environment. The originality and versatility of the housing environment are often lost during building processes that aim at modularity and cost-efficiency during the building phase. Furthermore, spaces for shared use are minimised in order to reduce

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Figure 16. The dining room has views to the courtyard (photo: Verma, I.).

Figure 17. A safe garden with sheltered sitting areas is accessible to the residents (photo: Verma, I.).

Figure 18. The small-scale group home, Villa Andante, has three L-shape group homes for 15 people with Alzheimer's (Design by Architect Tuomo Siitonen).

building costs. However, the open design of shared spaces and visual access to the street level may promote interaction between residents and other people in the neighbourhood. The stimulating design of these spaces can improve the well-being and quality of life of the residents, staff members and visitors.

Framework

Equal use of the built environment

The design of buildings and urban spaces has a societal impact. Crews and Zavotka (2006) highlight the challenge to design environments which are appropriate for the ageing population, as increased longevity leads not only to healthier older people but also to more people with disabilities. At the same time, with demographic changes, awareness of the diversity of people and equal rights for the participation of all people is rising. The UN Convention on the Rights of People with Disabilities declares that "*people with disabilities have the opportunity to choose their place of residence and where and with whom they live on an equal basis with others and are not obliged to live in a particular living arrangement*" (UN Convention of Rights of People with Disabilities, Article 19). Finland has recently ratified the convention (June 2016). Therefore, more attention is required for producing housing and urban environments that do not discriminate against any resident group. The current accessibility regulations in Finland cover public spaces and services, as well as new multi-level apartment buildings. However, to ensure equal opportunities in daily life, a comprehensive understanding of an inclusive living environment is needed.

The ability to participate in society and in local communities depends very much on a person's possibility to use the built environment. An environment that allows people to feel integrated is empowering. The built environment can enable people to use all their potential or hamper people in using their own capacities. The equal right of everybody to participate in society was already introduced in the UN Declaration of Human Rights (1948). This principle is accepted by all UN member states. The practice in each country may still vary, however.

Moreover, the UN Convention on the Rights of People with Disabilities (2006) states, "*disability results from the interaction between people with impairments and attitudinal and environmental barriers that hinders their full and effective participation in society on an equal basis with others.*" Moreover, Vehmas (2013) pointed out that environmental, cultural and societal features are often more decisive for the well-being of a person than his or her individual abilities. The accessibility and reachability of a living environment is a result of many things, and the built environment plays an essential role in it. Therefore, architects and urban planners have the important task of promoting opportunities for all user groups in the built environment.

The terms **Universal Design, Inclusive Design and Design for All** are introduced in the following paragraphs. They are often used as synonyms but have slightly different connotations and may be used by different professionals and interest groups in different countries. Universal Design has its origins in the United States; Design for All is used in the European Union and Inclusive Design was developed in Great Britain. Among others, Person et al. (2015) have discussed in detail specific aspects of the terms in use. They point out the lack of consensus regarding the definitions and the lack of international standardisation. The target of this thesis is not to discuss these terms in use, but rather to accept the common principals and target of equality and inclusion in the design practice. The basis behind all of the concepts is that in the long term, building accessible environments benefits society economically and socially. If these concepts are taken into account in the early design process, it will reduce the need for expensive adaptations and special solutions for people with reduced functional capacities. Moreover, Design for All is becoming a marketing tool for products. People make choices regarding the products and the services they purchase as well as the activities they attend. In the ageing city, usability and accessibility are also becoming increasingly important in making housing choices.

The term **Universal Design (UD)** was first used by the American architect Ronald Mace, who was closely involved in drafting the first accessible building codes in 1973 and further legislation in the 1980s and 1990s (Weeber, 2014). The basis of UD lies in the accessibility movement and adaptive and assistive technology. In addition to accessibility, UD emphasises architectural ambition, aesthetics and quality. Mace

stated that the aim of UD is to design buildings and outdoor spaces, as well as products, to be usable by all people to the greatest extent possible. The seven principles of UD are based on his work (Table 6). He argued that UD is a sensible and economical way to generate integration in society. It is a concept of designing products and environments for the needs of people, regardless of their age, ability or status in life. According to Mace, Hardie and Place (1990), UD exceeds the minimum requirements of building codes and regulations on accessibility. It supports independent living, home health care and ageing in place for the older population. Good design contributes to attractiveness and user satisfaction. Consequently, UD can eventually lead to mainstream production that is affordable to all users and minimises the need for special solutions. Furthermore, instead of trying to fix a specific problem, the design has to take into account a broader view from the outset.

Table 6. The seven main principles of Universal Design (adapted from Mace et al., 1990).

Universal Design Principles	Examples in the built environment
Equitable Use	Planning buildings and environments that do not segregate or exclude any user group
Flexibility in Use	Adapting the space for diverse users and for multiple activities
Simple and Intuitive Use	Open and simple layout, transparency of functions, usability of the space
Perceptible Information	Navigation and wayfinding in a space: visual landmarks, sensory clues in the environment
Tolerance for Error	Building safety: design solutions that do not cause any risks
Physically Low Effort	Accessibility for persons with reduced functional capacities
Size and Space for Approach and Use	Dimensioning for people with different sizes or with mobility aids

Design for All (DfA) describes design solutions targeting the use of spaces, products and services for as many people as possible, without the need for adaptation. The EIDD Stockholm Declaration (2004) states: "*Design for All is design for human diversity, social inclusion and equality*". It has been proved by the European Commission as a good way to develop a more user-friendly and equal society in Europe. In

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Figure 19, 20, 21. The Federal Environment Agency (UBA), Dessau, Germany (photo, I. Verma).

2020 in Europe, "*approximately 120 million people will have multiple and/or minor disabilities*" (EU, 2016). Therefore, the Design for All approach is recognised to represent important potential for the markets in Europe. It will also ensure the equal use of spaces, and services for people of all ages and abilities.

Inclusive Design ensures that mainstream solutions are within reach of as many people as possible, regardless of their physical, social or economic status. In addition to accessibility and good design, it is reasonable in cost. The Inclusive Design concept has been developed in the United Kingdom. Clarkson and Coleman (2013) point out that the focus in Inclusive Design has progressively shifted from designing for "them" (people in old age or with disabilities) to "us". However, the people with special needs can be seen as good informants as by assessing design that excludes people, the problem of inclusion becomes visible. Inclusive Design is presented as a continuous process of knowledge acquisition and design improvement. Therefore, it may have potential commercial benefits for business and increases user satisfaction. Furthermore, Inclusive Design underlines that many people with disabilities and older people have small incomes and are not able to choose the solution that would be most appropriate for them. Therefore, Fletcher (2006) argues, that it is important to identify barriers to inclusion in the early stages of the design process so that good design can overcome them.

The terms **accessible** (used in Great Britain) and **barrier-free** (used in the United States) refer to products or environments for people with disabilities or special needs. Accessibility can be understood as the possibility to access and use a space. However, the term often characterises special solutions that underline the mobility or sensory impairment of a person. Therefore, it sometimes has negative connotations. Accessible or barrier-free building modifications consist of modifying buildings or facilities so that people who are disabled or have physical impairments can use them. There have been efforts to develop additional technical solutions, such as ramps and stair lifts, for groups of people with special needs. However, Aslaksen et al. (1997) argue that this has often led to specialised solutions and segregation. These solutions often highlight the disability instead of enforcing the capacities of the person. They are done without paying attention to the integral design or the quality of space and therefore are rejected by other users and by many architects.

Age-Friendly Cities

The World Health Organization has published guidance to develop **Age-Friendly Cities** (WHO, 2007). The aim was to recognise the potential of the older population and to promote their inclusion in society. In an Age-Friendly City, the participation and inclusion of the older people is taken into account in all aspects of life, including the physical, social and psychological environments (Fig. 22). Housing, access to green outdoor spaces and the possibility to use public transport are identified as the main features enhancing people's general well-being in old age. Moreover, a feeling of safety affects the way people use the outdoor environment. Appropriate housing is a basic need for living. However, currently many older people live in apartments that are not suitable for them because they cannot afford to move to a more suitable one. This may increase the need for assistance at home and more organised community support.

Public transport is a key factor influencing active ageing (WHO, 2007, p. 20). Mobility and accessibility seem to be directly related to well-being and independence in old age. Metz (2000) considers mobility important for gaining meaningful experiences and being involved in the local community and social activities. Furthermore, the possibility to travel is significant, even if the trip is not actually undertaken. Moreover, direct connections to a city centre and cultural services enhance social participation and the quality of life. Australian surveys (Healy, 2004) indicate that older people attend concerts, theatres and art galleries more frequently than younger people do. On average, people 65 years old and older make five times as many visits to libraries per year than younger people do. However, Marino and Lapintie (2017) point out the changing role of libraries as potential meeting and working places for the working-age population. Therefore, they are potential spaces for multigenerational encounters.

A study by Roosenbloom (2001) revealed that the mobility of people over 80 years old has increased in recent decades. The same study indicated that walking was a more important mode of travel than public transportation in that age group. In the study it was found to be the second-best choice after driving. Almost 80 per cent of daily trips of less than 0.5 km were made by walking. Moreover, walking is the main form of physical exercise that helps people maintain their functional

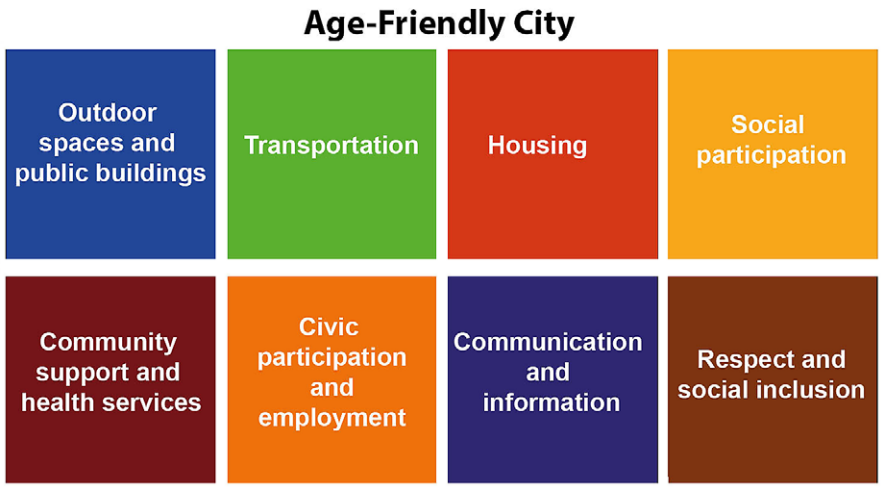

Figure 22. Age-friendly topic areas (adapted from WHO's Global Age-Friendly Cities).

physical capacity in old age. Findings from Chaudhury et al. (2016) suggest that daily activities, such as walking to the nearby grocery shop or bus stop, are significant and may be more sustainable sources of exercise for older adults than activity centres.

Walkable communities have been observed to provide benefits to the health and social characteristics of communities. According to Southworth (2005), a walkable community creates a seamless pedestrian network with other transit modes such as buses, trams, and metros. Moreover, it supports walking for shopping as well as for pleasure, recreation and health. French et al. (2014) observed that a positive subjective perception of walking paths and pavements, as well as a visually stimulating and safe neighbourhood, is associated with a sense of community. Furthermore, a study by Hovbrandt et al. (2007) showed a correlation between environmental barriers and the frequency of activity. Moreover, Svensson (2010) found accessibility to be sensitive to the type and density of neighbourhood planning. His comparison of various typologies of neighbourhoods revealed that accessibility was generally better in more densely populated cities than in low-density areas. He observed differences in pedestrian connectivity and walking distances, for example, to the bus stop in different types of neighbourhoods. He suggests that pedestrian connectivity can be used as an indicator of

how accessible and walkable a neighbourhood is to its residents. Walking route choices are influenced by the total length and connectivity of streets and walking paths, which can be assessed by geographical data. However, not only the distance but also the quality of the environment and topography need to be taken into account.

The term **Ageing in Place** is understood here as having the possibility to live in the place of one's choosing for as long as possible. It includes the idea of getting assistance and support to maintain the quality of life. The discussion around Ageing in Place is whether it takes place *in a* home or *at* home. A literature review by Martens (2018) concluded that Ageing in Place needs to occur in the person's own home and cannot take place in institution. However, the home can also be situated in a senior housing or sheltered housing scheme. In the following chapters, Ageing in Place is understood as the possibility to stay in one's neighbourhood in later life. The possibility to move to an apartment that better supports the capacities of the person within a familiar neighbourhood can enhance independent coping and life satisfaction. However, there is a significant gap between the supply of accessible housing and the need to promote Ageing in Place. Kondo (2015, p.122) points out the importance of developing mainstream housing, neighbourhoods and infrastructures to promote Ageing in Place. Otherwise, people may achieve remaining in place, but the quality of life or subjective well-being may not be attained.

Ageing and independent coping

WHO (1995) considers six factors affecting the **Quality of Life** (QoL): a person's physical condition, psychological condition, level of independence, social relationships, the built environment, and personal beliefs. Furthermore, Lawton (1999) emphasised the perceived QoL. He brought into the discussion the temporal and dynamic aspect of the relation between people and environment. He argued that the relation to the environment is not stable and it varies during the life course. Carr, Gibson and Robinson (2001) pointed out, that QoL is a subjective experience. A person who has generally good health may experience a minor illness with a significant impact on their quality of life, whereas a person with a long-term disability may report a good quality of life.

Gabriel and Bowling (2004) found that older people themselves linked QoL to a safe and pleasant home and neighbourhood, access to local facilities and services, including transport. Their study shows that older people were linking QoL to social and leisure activities and retaining a role in society. Moreover, they found that independence, inclusion and self-determination were the main things that worry people about ageing. However, Bowling et al. (2015) argue that the current QoL measures and self-reported questionnaires are not applicable to people with severe dementia. Furthermore, they point out that the assessments of a person's QoL by care staff members or family may be different from their own, as QoL is a subjective concept.

Rowe and Kahn (1997) define **successful ageing** as including three main components: low probability of disease and disease-related disability, high cognitive and physical functioning capacity, and active engagement with life. The definition is criticised by Foster and Walker (2014) as it leads to an ideal image of ageing that is not realistic. Instead, they propose a definition of **active ageing** that would have a preventive concept, involving all age groups through the course of life. Active ageing is related to the possibility to integrate physical activity in daily life. It may also include engagement in social or economic activities after retirement age (Michael, Green & Farquhar, 2006). A study by Booth et al. (2000) indicated that physically active older people reported fewer obstacles on local walking paths, and safe and comfortable walking. Furthermore, those older people who were physically active were significantly more likely to report access to a nearby recreation centre, a cycle path, a park, a golf course or a swimming pool than those who were inactive. Additionally, Joseph et al. (2006) detected that the presence of indoor physical activity facilities and indoor swimming pools that suit older residents enhanced participation in these activities. Their study revealed that the number of indoor swimming pools strongly correlated with the number of residents of all levels of care in sheltered housing who went in swimming. Furthermore, WHO (2015) defines **healthy ageing** as a "*process of developing and maintaining the functional ability that enables well-being in older age*". The actions towards healthy ageing include creating age-friendly social and physical environments that enable autonomy.

To measure the ability to cope independently at home, occupational therapists have traditionally used the Activity of Daily Living Index

(the Katz ADL Index). It includes activities such as bathing, going to the toilet, dressing and eating (Katz et al., 1963). According to Oswald et al. (2007), perceived independence in daily activities and subjective well-being were found to be closely related to aspects of housing. Moreover, their study indicated that older people living in accessible homes were more independent in their daily activities and had a better sense of well-being. In the care sciences, more complex tasks, shopping and using public transport, for example, have been assigned scores concerning Instrumental Activities of Daily Living (Lawton, IADL score). The IADL score reveals more about a person's self-reported ability to manage activities in the community (Lawton & Brody, 1969). In Finland, the Resident Assessment Instrument (RAI) is widely used in the social and health care sector (Hawes et al. 2007). This is applied in the evaluation and planning of care for a person in sheltered housing or at home. It includes both ADL and IADL tools, as well as tools for cognitive performance and depression. These scores are used to profile people who use social and health care services. The higher the scores are, the higher the need for care services. However, a more comprehensive evaluation method is needed for people with memory disorders. These evaluations are commonly in use when making a decision about home care or housing services.

Carr et al. (2013) argue that continued independence represents an important factor throughout the ageing process as "*it facilitates control over one's life and autonomy, both of which increase well-being and life satisfaction*". A study by Bowling and Gabriel (2007) indicated that the main worries people have about ageing are related to their loss of independence, social participation and individual freedom. Schwanen, Banister and Bowling (2012) argue that the independence of older people includes being able to carry out daily activities at home, take public transport and go to the grocery shop, for example. Therefore, initiatives for reducing the risk of premature loss of functional capacity, together with solutions enhancing independent coping, are urgently needed. The current social and health care polices for the elderly promote living in at home. However, the consequences of this policy are not fully understood or taken into account in the housing industry or in the design of the outdoor environment. The lack of accessible and affordable apartments in a familiar neighbourhood might become an obstacle to living at home or voluntary relocation to more suitable housing.

Memory disorders

Memory disorders are becoming more common as the population ages. Even though the frequency of memory disorders increases with age, it is not part of the natural ageing process. It is estimated that one-third of those who are 85 years old and over suffer from memory and cognitive disorders (Norden, 2013). A progressive cognitive disease may lead to dementia. The progress of the disease is individual, and a person may live with dementia for up to twenty years. It is usually described in four stages: the early, middle, late, and terminal stages (Toner, Mierswa & Howe, 2010). The number of people with memory disorders is projected to increase with the current demographic development. The consequences of a progressive cognitive disease for the person as well as for the family and relatives are significant. Moreover, the financial impact of the disease is important for society. Memory and cognitive impairment remain the main reasons for care delivery and the main reasons for moving into sheltered housing (Norden, 2013).

Alzheimer's disease is the most common cause of dementia in old age. In Finland, 60 per cent of older people affected by memory disease live in ordinary housing. The official statistics indicate that approximately 23 percent of people with diagnosed dementia live at home, whereas more than half of the people living in extra care housing or nursing homes have dementia (Table 7.). However, Finne-Soveri et al. (2015, p.12) estimated in their study that 75 percent of people in long-term care and extra care housing and 40 percent of people receiving regular home care have memory disorders. They estimated that in Finland, 93,000 people have severe or moderate memory disease, 100,000

Table 7. The percentage of people suffering from cognitive disorders in housing services (Sotkanet, 2017).

Housing service	Percentage of residents with diagnosed dementia
receiving regular home care	22.9
in extra care housing	53.0
in nursing homes	50.6

have a mild cognitive disease without dementia and 200,000 people have other mild cognitive disorders.

In Finland, people with cognitive disorders as well as psychiatric illnesses have stayed for longer periods in hospitals and health care centres than in other European countries (Fig. 23). In many European countries, the discharge from hospital is quicker than in Finland. Moreover, people with cognitive disorders have been treated as patients in long-term care wards in health care centres or in institutional care facilities. However, for humane and economic reasons, the aim is to shorten the stay in long-term wards and the living period in extra care housing. Consequently, people moving to extra care housing are frailer and require more assistance and medical care than previous residents. Similarly, more people receiving regular home care have higher care needs than earlier.

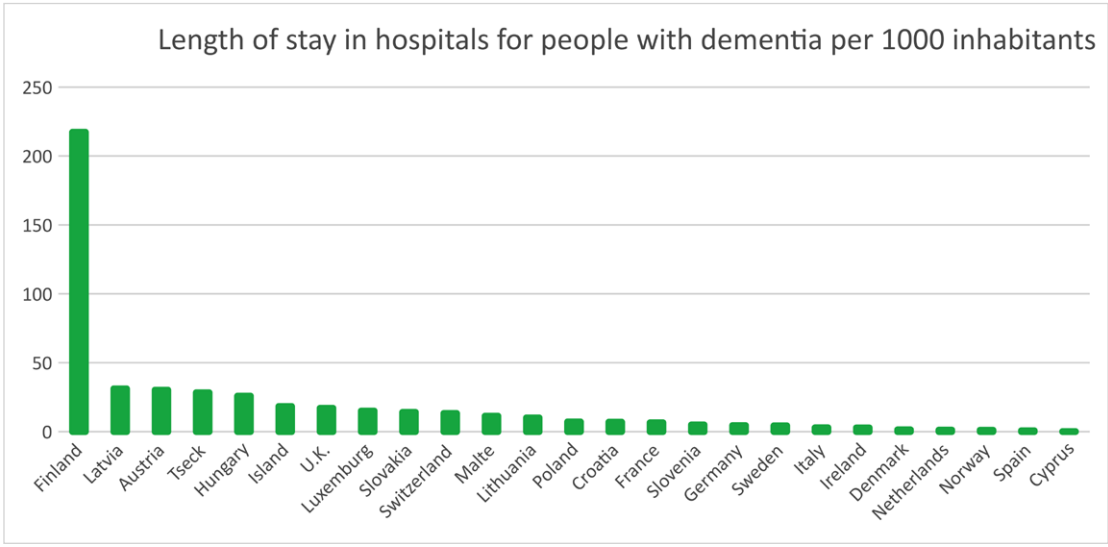

Figure 23. In Finland, elderly people with cognitive disorders are still often treated as patients in hospitals. (Kinnunen et al., 2014; based on WHO European morbidity statistics for 2013).

A person in an early phase of Alzheimer's disease may be in good physical condition and live in an ordinary apartment building. Home alterations to improve safety and accessibility can help people with cognitive impairments to live at home. A person with Alzheimer's may get lost in space and time. Visual support to perceive and understand the environment may help in daily tasks. Therefore, home alterations to improve the perception of the space and safety in the kitchen, for example, may help the resident to cope daily. However, a survey by Finne-Soveri et al. (2015, p. 100) shows that municipalities reported no improvements in their home alteration services for people with cognitive decline in the last ten years. Calkins and Namazi (1991) interviewed families who had previously had home alterations. The needs for modifications had been related to various issues, for example, unwanted escapes from home, safety issues and incontinence. The interviews revealed that after home alterations, the caregivers reported a reduction in behavioural challenges for people with Alzheimer's. The study showed that 85 per cent of the caregivers experienced reduced stress levels after minor modifications. Moreover, Marquardt et al. (2011) argue that home modifications should be carried out in the early stages of the disease to avoid confusion in the resident.

Wayfinding and navigation may cause feelings of insecurity and confusion when moving away from familiar surroundings, even in the early stage of the disease. According to Pai and Lee (2016) "*a person with Alzheimer's disease may restrict himself or herself to a very familiar territory and refuse to go to less familiar places*". The person may stay at home and in the immediate surroundings. However, only a few apartment buildings have safe and inviting outdoor areas and immediate surroundings that encourage a person with cognitive impairment to go out. Assisted technologies and GPS navigation devices are being developed to enhance the mobility of people in cognitive decline. The use of technology, however, usually requires task performance and cognitive skills from the user. It may be useful for relatives or home care staff to locate and guide a person who has lost his way, for example. However, monitoring a person raises ethical issues and always requires the consent of the person.

Social and health care services provide activities and peer support in local day-care centres for older people with memory decline who live at home. The rehabilitation in day-care centres supports the basic daily

activities that are important for independent coping at home. According to Kröger (2005), the best results have been obtained when informal care (from a partner or relative) and formal care (from home care staff) were combined. In addition to home care and day activities, a person with Alzheimer's may also stay for intervals in short-term care. Day-care centres and short-term care are both targeted to rehabilitating the person with cognitive decline and reducing the burden of the caregiver. Day-care services for older people provide support for social activities for people living at home with mild to moderate memory decline. They are typically available during working hours five days a week. Short-term care is a service which aims to maintain the functional capacities of the person living at home and to provide relief to the informal carer. Short-term care can also be given to a person recovering from an illness, injury or surgery. It can last from a few days to a few months. These services are often provided in connection to extra care housing. These services prepare the person with cognitive decline for a possible move from home into extra care housing. The adaptation process may be easier when the person is familiar with the premises and staff members.

In the late stage of progressive memory and cognitive disorders, a person needs 24-hour assistance and is not able to manage basic activities of daily living such as going to toilet and eating. Most people with Alzheimer's disease have behavioural and psychological symptoms at intervals during the disease (Colombo et al., 2007). These may manifest as irritability, anxiety and depression. A person may be apathetic or withdrawn or they could be hyperactive, agitated and wander around. Moreover, the disease may disturb the sufferer's sense of time and their daily rhythm and can cause sleeping disorders. This may lead to conflicts with the caregiver and other people living on the same premises. These symptoms are challenging for the caregiver and especially for the person with Alzheimer's disease. Furthermore, in the late stages, the person may not understand the environmental clues and may have difficulties to verbally express feelings of anxiety.

Housing and the social environment

Sixsmith (1986) has described a home to be a personal, social and physical experience. According to him, the notion of home includes aspects of *belonging* and *meaningfulness.* Moreover, the home is also a personal relationship to the physical and social environment. Thomése and van Groenou (2006) found that older adults compensate for problems that limit their daily life, with adaptations in their social and physical environment. The adaptive strategies may include help and care from another person, home modifications or moving to a new apartment or into sheltered housing. According to Oswald et al. (2011), very old people tend to spend more time at home and in the immediate outdoor environment than younger people do. Moreover, they observed that the neighbourhood quality was more important for life satisfaction for very old people than for those not quite as old.

Anton and Laurence (2014) argue that older people tend to stay in the same area because the longer people reside in one place, the more likely it is to become a part of their identity. Therefore, it will increase their desire to continue residing there. Similarly, Abramsson and Andersson (2012) found that older people move less often than people in younger age groups move. The probability of moving was lowest for older people who owned their homes. According to Dempsey et al. (2009), access to services and the perceived quality and maintenance of the built environment were connected to residents' willingness to stay in their own homes or to relocate. Moreover, a study by Clark and Deurloo (2006) showed that older people were reluctant to relocate and tended to use their savings before downsizing their apartment. However, Painter and Lee (2009) found some evidence that having a disability or being a single head of household may increase the probability of becoming a renter during old age. On the other hand, according to them, geographical proximity to children may reduce the probability of moving and increase the probability of continuing to be a homeowner. Furthermore, Oswald and Rowels (2006) argue that behind voluntary housing transitions, there are both basic and higher-order needs. They found that the important factors for voluntary moves were higher-order needs related to the quality of the built environment (e.g. views, having a balcony etc.) and social networks (e.g. proximity to grandchildren). However, the relocation can also be involuntary. People

with cognitive decline may have only little involvement in the decision-making process when moving into extra care sheltered housing (Oswald and Rowels, 2006).

Informal social contacts, weak ties and the presence of other people are important qualities related to neighbourhoods. Skjaeveland and Garling (1997) found that weak ties are sensitive to environmental variables. In particular, the characteristics of the semi-private spaces, at both the entrance and street level were significant for weak ties. Moreover, Gardner (2011) found that *natural neighbourhood networks* (people living, working and visiting the neighbourhood) are important for well-being in the everyday lives of older residents. She highlights the importance of *third places* (coffee shops, hairdresser, etc.) and *threshold spaces* (entrance, backyards, etc.) as opportunities for social interaction. Kemperman and Timmermans (2014) found that the availability of green spaces moderated social contacts. According to them, the maintenance of green spaces supported social contacts, and they were associated with the feeling of safety in the living environment. Moreover, according to Kajita (2014), the staircase and other shared spaces can "*allow activities on the street and daylight to penetrate into the building*", and the landings may allow *"residents to socialise and just stop to enjoy the cityscape"*. The design of these spaces may enhance the feeling of inclusion.

Gehl (2011, p.11) argues that the quality of the environment influences the activities people have outdoors. According to him when the quality of the environment is poor, only activities such as going out for groceries or taking a bus occur. He argues that in a good quality environment a variety of activities are possible. Moreover, he claims that the willingness to spend time outdoors increases in a versatile environment. This may promote feelings of inclusion and active or passive activity.

A study by Savikko et al. (2003) found that in Finland, 39 per cent of people over 75 years old reported feeling lonely, at least sometimes, and 5 per cent of them suffered from loneliness either often or always. Having an impairment (in mobility, hearing or vision), being a widow or widower and not having friends were the main causes of feelings of loneliness. The results of a study by Victor et al. (2005) are similar. They found that reported feelings of loneliness were strongly related to the factors of being widowed, living alone and being over 75 years

old. Loneliness is one of the main causes of depression, which affects the quality of life in old age. Furthermore, some studies also indicate that an older caregiver may become isolated from friends and other social activities and feel lonely and depressed. Schoenmakers, Buntinx and Delepeleire (2010) found that one-third of caregivers felt depressed. The depression was more common in caregivers who were caring for a person suffering from cognitive decline than it was for other chronic illnesses.

Obstacles in the built environment can aggravate the social isolation. Social activities and contact with neighbours are lost when older residents are not able to leave their apartments or the apartment building. According to a survey of older people contacting the social services of the City of Helsinki (Finne-Soveri, 2012, p. 62), the main obstacles for going out (as reported by the older people) were related to hindrances at the entrance and the lack of an elevator. Almost half of the people reported being able to move outside of their home only with assistance. Obstacles outside the apartment building included the steps at the entrance door and hilly terrain.

Feeling alone, together with housing conditions that do not support daily coping, are important reasons for people to move into sheltered housing (Huttunen et al. 2012, p. 20). A Swedish study by Lindahl (2016) indicated that a feeling of loneliness, together with declining physical functional capacities and a willingness to anticipate one's own ageing, were the reasons people wanted to move into a sheltered housing scheme, *Trygghetsboende*. Trygghetsboende, safety housing, is a housing service for older people, that enhances social interaction between residents, but does not provide food services or medical care services. Residents who had moved into safety housing reported looking for an accessible apartment, seeking relief from household tasks and wanting social contacts to improve their quality of life (Lindahl, 2016, p.51). Likewise, Vasara (2014) found that the narratives of older people in sheltered housing included stories of contentment, autonomy and security. According to Vasara, if the housing solution was subjectively experienced as suitable, it supported the overall well-being of the resident. Vilkko (2000) argues that for some residents, even if an apartment in sheltered housing was not a place one would call home, it was felt to be home enough. The positive aspects of living in a sheltered home were recognised and appreciated.

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Figure 24. An accessible courtyard with raised flowerbeds was realised in order to promote social activities between generations (the Vohnen im viertel project, Munich, Germany) (photo: Verma, I.).

Figure 25. A sheltered entrance with a bench may allow frail people to enjoy the outdoors. The position, though, does not enhance inclusion (Helsinki, Finland) (photo: Verma, I.).

Figure 26. The visual presence of resting places in the neighbourhood may enhance walking (photo: Nenonen, L.).

Figure 27. A walking path with resting places, separated from car and bicycle traffic, enhances a feeling of safety (photo: Nenonen, L.).

The built environment and mobility

The quality of shared spaces in the living environment gains importance for people who spend most of their time at home and in the immediate surroundings of their homes. Even though the majority of seniors are active and mobile, the frailest older people have a tendency to remain close to their homes due to their declining functional capacities. Moreover, age-related impairment of hearing and vision may reduce the feeling of security and increase immobility and isolation, and gradually lead to loss of functional capacities. Consequently, the inability to perform the activities related to everyday living may cause a move to sheltered housing. Furthermore, environmental factors can aggravate the situation. The quality of architecture and homely atmosphere are important for the resident's general well-being.

The characteristics of a neighbourhood can encourage people to use and maintain their functional capacities, even at a very old age. According to previous studies, the built environment has an impact on the safety and mobility of people. A literature review by Rosso et al.

(2011) revealed that street connectivity and the density of intersections, street and traffic conditions, proximity to selected destinations and green spaces were seen as the most likely factors to influence the mobility of older people. According to Giles-Corti et al. (2005), good access to attractive and large public open spaces was associated with higher levels of walking. Moreover, French et al. (2014) found that a positive subjective perception of safe walking paths and a visually stimulating neighbourhood were associated with a sense of community. Moreover, Perez et al. (2001) found that neighbourhood quality and access to local services were major components in the residential satisfaction of older people. However, the study by Finne-Soveri et al. (2015) have indicated a decline in transport services for older people in municipalities. These services would support independent everyday life of the people receiving home care.

A study by Wang and Lee (2010) indicated that having many destinations in the neighbourhood and short, straight walking paths to destinations made walking more likely. The frequency of walking was reported to be higher when there were many destinations within an approximately one-kilometre distance from home. Furthermore, findings from a study in Finland indicated that a distance of 100 m to 150 m to the nearest bus stop seemed to enhance the use of public transport (Sahlsten, 2013, p.31). Moreover, the study concluded that the walking distance to the nearest bus stop should not exceed 250 m. Depending on the connectivity of streets the actual walking distances to a destination can be significantly longer than the beeline measured between two points on a map. Accessibility can also be measured by travel time. According to Diyanah and Hafazah (2012), a five-minute walk is a planning standard, describing the average distance that people are willing to walk before choosing to drive in a neighbourhood area. Moreover, they argue, walking should take less time than driving to enhance walking. However, the standards may vary in different cultural contexts. Furthermore, a person's physical condition and health determine the walking speed. In Nordic countries, seasonal changes may affect the frequency of walking, especially for frail people using walking aids.

Hovbrandt et al. (2007) found that the fear of falling was the most common self-reported problem for mobility outside the home for older people. The fear of falling may reduce mobility and lead to deteriora-

tion of older people's functional abilities. Moreover, the study found evidence that physical environmental problems were correlated to the frequency of activity. Other findings of a longitudinal study (Latham and Clarke, 2012) suggest that the perception of a safe neighbourhood environment is significantly associated with recovery from a mobility limitation. Poor street conditions, hills in the nearby environment and heavy traffic may increase the probability of being afraid to move outdoors. The features mentioned above are all related to the physical environment and can be improved by planning and with adequate implementation. The quality of the environment is highly dependent on the outcome and the realisation of the infrastructure. However, accessibility and safety do not automatically enhance mobility.

Evidence from extra care housing

With cognitive decline, the relationship to the surrounding environment changes. The adaptation process to a new living environment may be demanding for a person with Alzheimer's disease, and it may require time. The challenge is how to provide a sense of security to the frail person without provoking feelings of loss of control over one's own life and identity. The requirement for safety can, at worst, result in an institutional setting that does not promote independence nor a decent quality of life. Orrell et al. (2013) found that for frail older people living in sheltered housing, accessibility and safety were negatively associated with the quality of life. They argue that a housing design that focuses only on safety and accessibility may appear institutional to the residents. Building features such as heavy fire doors and locked doors create obstacles to independence and mobility. Nonetheless, according to their study 94 per cent of the residents in extra care housing reported being satisfied or very satisfied with their accommodation. The possibility to personalise the apartment with private objects and furniture may help resident to feel safe and adapt more quickly to the new environment. Vihman (2013, p. 39) brought out the close connection between the notion of home and memory, particularly in the context of housing for older people. Vihman argues that the objects in the home establish links to the past. Moreover, Bartlam et al. (2013, p. 243) found that older people who

wanted to downsize their apartment complained often about the lack of space for personal objects.

The goal of extra care housing is to provide a safe living environment and to support the resident's physical, psychological and social functioning capacities. New knowledge on cognitive diseases indicates that the environment plays a major role in the well-being and coping of older people with memory disorders. A small-scale, open layout concept and homely atmosphere are commonly accepted to be the best living environments for people with memory disorders. The small scale of the living environment, a domestic layout, its architectural quality and sensory experience (level of lighting and noise, smells, etc.) can support the functional capacities of people with Alzheimer's disease. Moreover, a range of private, semi-private and public spaces in extra care housing has been observed to be connected to the well-being and quality of life of residents (Barnes, 2006). Residents need to have the possibility to withdraw or to participate passively in activities. Findings by Morgan and Stewart (1998) showed that privacy was related to reduced aggression and better quality of sleep. Their study indicated that there were fewer territorial conflicts between residents when there were sufficient shared spaces and the possibility to withdraw into a private place. Furthermore, another study by Gotestam and Melin (1987, cited in the literature review by Day, Carreon and Stump, 2000) indicated that a homely atmosphere in shared spaces reduced social withdrawal. Moreover, shared spaces are important in the design of extra care housing. As the residents may feel insecure about the place and time, a visual connection with staff members and their presence may reassure the residents and improve their sense of security. A study by Andersson et al. (2016) indicated that shared spaces in sheltered housing were used for social interaction between the staff and the other residents in the units, whereas very few residents visited each other in their apartments.

Previous studies have indicated that the scale of the housing unit influences how comfortable residents felt in the premises and how people perceived the quality of care. A study by Verbeek et al. (2010) found that relatives reported a significantly lighter burden and were more satisfied with staff members in a small-scale extra care housing scheme than in large nursing homes. Peaceful surroundings, cleanliness and the opportunity to go out with residents made their visits more pleas-

ant. Furthermore, staff members in small-scale group homes reported to be more satisfied with their work than in larger sheltered housing schemes. Piechniczek-Buczek, Riordan and Volicer (2007) found that the characteristics of the space and other resident's presence affected the experience of the visitor. In extra care housing private spaces are not always clearly separated from the semi-private areas, and the small private rooms may not be designed for inviting visitors.

The care policies affect how well the privacy of the residents is respected. Even though the sheltered housing or extra care housing is primarily a home for residents, other people also use the premises. Nord (2011) points out that the architectural space together with care practices influence the level of privacy. She argues that intruding visitors in a private room may reduce the privacy of the individual space. In turn, a resident is claiming a personal space for himself when sitting down in the shared space in the same corner of the same couch every day. The design of extra care housing should support the social and mental rehabilitation of the residents. Therefore, variation in shared spaces may help to generate activities and social interaction. The design of the premises, as well as the care policies of an extra care housing, can promote collaboration with all users and invite family members or volunteers. The volunteers may contribute their time and knowledge assisting in leisure and outdoor activities or using skills developed during their working life.

There may be some conflicts about the roles of care professionals and family members in extra care housing. In his study, Cutchin (2003) observed three different kinds of territorial tension in extra care housing: "*tension between staff and older adults versus outsiders, staff versus older adults* and *older adults versus older adults*". According to Choi and Bosch (2013), an environment that encourages family presence in long-term care units can "*give family members increased opportunities for interactions with patients and staff, which in turn may lead to increased family involvement in patient care*". The target should be to make use of all the human resources available and integrate family members and volunteers in the care of older people. The Nordic countries follow up closely the outcome of the social and health care reform carried out in the Netherlands. The target of the reform was to lower health care expenditure by increasing productivity and competitiveness of service providers. Moreover, the reform in the Netherlands emphasis the role

of people's own social network in providing care. Only when one's family, relatives and neighbours are not able to provide assistance, people are eligible to receiving formal care. The role of volunteers is significant in the housing services for older people. According to Van Bochove et al. (2018) in the Netherlands, the increased use and responsibilities of volunteers in care for older people have changed the roles of care professionals. The challenges is to outline the different tasks and roles of staff members as well as volunteers. Overgaard (2019) point out that volunteering is, in fact, unpaid work. This may be the case, especially for women volunteering in the care sector because of the lack of paid work opportunities.

The housing services for older people are part of the integrated care model, based on multidisciplinary cooperation in primary care, special health care and social services. Furthermore, the housing services for older people employ people with different backgrounds and different skills. The De Naber extra care housing in Rotterdam offers housing for people with memory disorders. The extra care housing is divided into large residential units with 6 to 7 residents in each. Residents live, participate in household tasks and eat within these units. Each unit has a private entrance from the street. These large residential apartments are connected to the shared spaces with a corridor opening to an inner courtyard (Fig. 28). The architecture of the extra care housing is similar to other residential apartment buildings in the neighbourhood. The main difference with the building and Finnish extra care sheltered housing scheme was the lack of private toilet for each resident. Nonetheless, the scale and layout of the premises together with comfortable furniture made the units welcoming and residential like.

Each residential unit was hosted by one person, who made food and took care of other household tasks together with the residents. The activities of daily living were part of the duties of the hosts, who stayed with the same residents every day and got to know them well. The nursing staff was in charge of the medical care. Buljac-Samardzic, van Wijngaarden and Dekker–van Doorn (2015) argue, that in the Netherlands, the focus on care instead of cure, and low hierarchy between staff members have had positive influence on perception of 'teamwork climate', 'job satisfaction', 'perceptions of management' and 'working conditions'.

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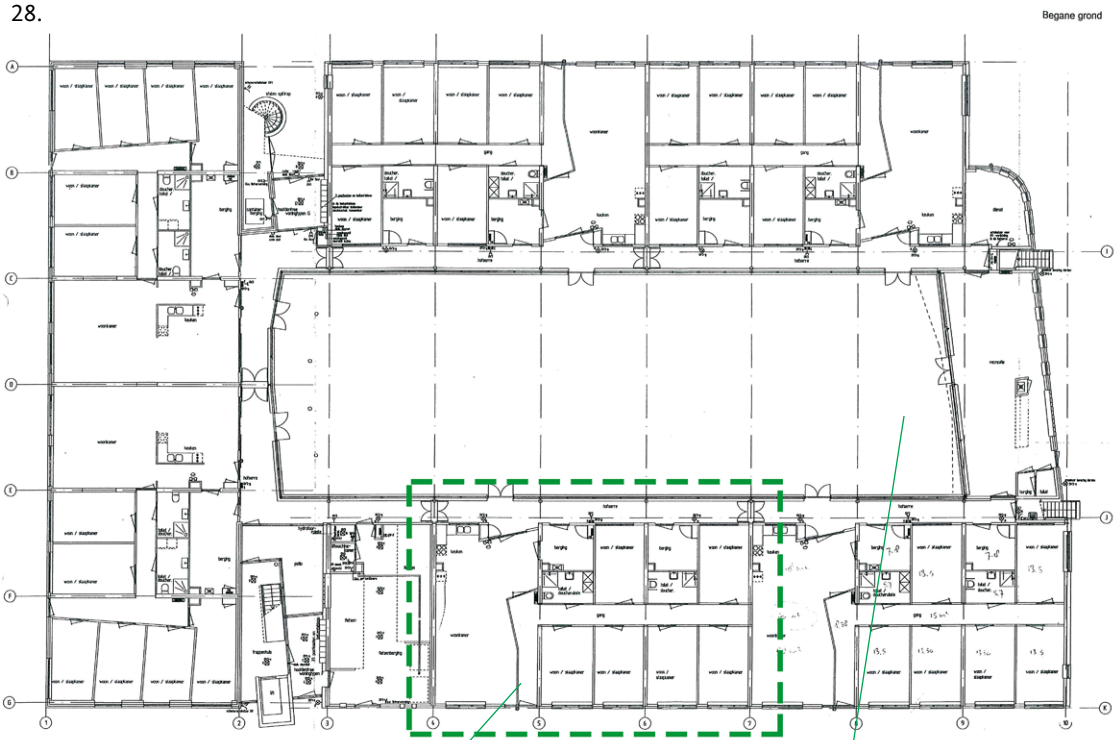

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Figure 28. Group homes (with 6–7 residents) with a private entrance directly onto the street are joined together with a connecting corridor (De Naber, Rotterdam; Design by Wytze Patijn Architects).

Figure 29. Group homes with a private entrance directly to the street. (photo, Verma. I)

Figure 30. The courtyard was for the common use of all group homes. (photo, Verma, I.)

The location of sheltered housing or extra care housing can facilitate the connection to the local community and enhance the participation of residents in the neighbourhood. Moreover, a solution where day-care services for older people and short-term care are located next to extra care housing may enhance the efficient use of premises and the care staff. Day-care activities and short-term care that are delivered in the same premises as the extra care housing may also support the possible housing transition. In the case of a progressive disease, it permits a person to use short-term care and finally adapt to the familiar environment more easily if the move is needed (Cohen and Day, 1993). However, for people in short-term care, it is important to retain the connection to home and the rhythm of their familiar daily life (Verma and Mäkinen, 2009).

An easy-access indoor and outdoor environment is an integral part of the extra care housing environment. Nature offers enjoyment and promotes the quality of life. Safe gardens and outdoor environments where residents can spend time and go for walks are important for maintaining physical and cognitive functioning capacities. Moreover, nature is a source of well-being for both residents and staff members. The outdoor spaces can be shared with the neighbourhood. The sensory experiences, the smells of the garden, the wind and the sun generate positive emotions and have a therapeutic effect. Colourful and fragrant flowers and birds in the garden stimulate hearing and vision. Edible herbs and berries from the garden stimulate the senses of smell and taste. According to Rappe (2005, p. 21), "*plants provide sensory stimulation for all the senses through their colours, structures, scents, tastes, forms and sometimes by their sounds*". The seasonal variation may also help maintain awareness of time for people living in extra care housing. She argues that nature has a positive effect on both the residents and the care staff. Moreover, in her study, nature was positively associated with social relationships between residents and between residents and staff, and it increased the visits by relatives.

The Elderly Care Centre De Toonladder, Almere, consists of extra care housing services for 24-hour care, ordinary sheltered housing, senior housing and a group home for people with dementia (Fig. 31). According to Mohammadi et al. (2019) in the beginning of 2000's in the Neatherlands, the typology of housing for older people was changing from one residential care building towards a residential zone in which

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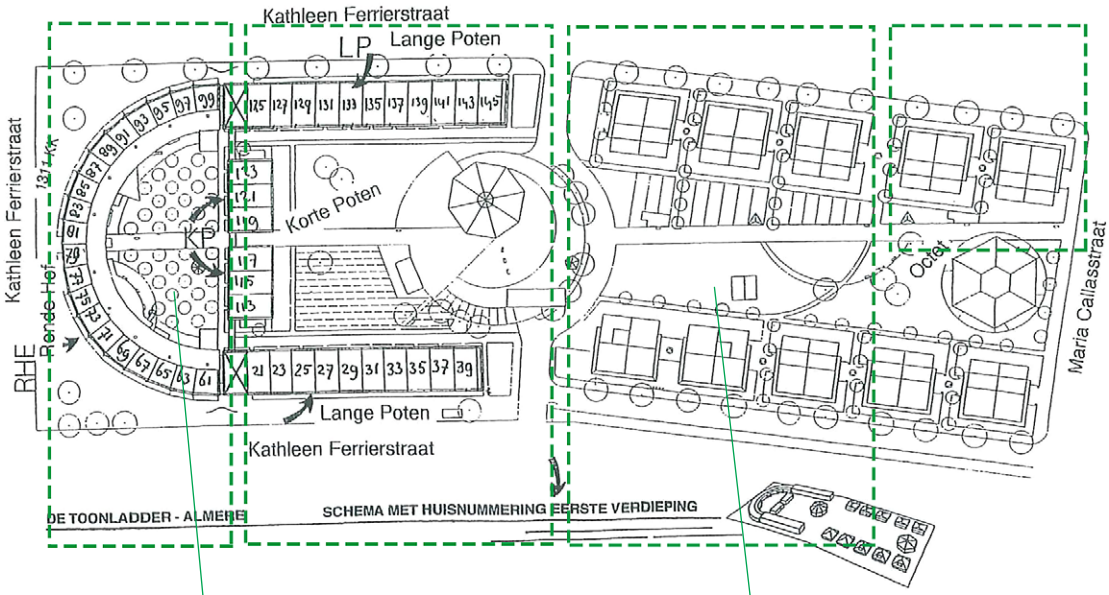

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Figure 31. Elderly Care Centre De Toonladder, Almere, Netherlands. The centre provides (from left to right) 24-hour care, sheltered housing, senior housing and a group home for people with dementia (Design by Architects KuiperCompagnons BV)

Figure 32. Domestic animals that are taken care of by volunteers in the neighbourhood. (photo, Verma, I.)

Figure 33. Urban farming allotments, eatable cultivation and apple trees provide simulation for all the senses. (photo, Verma, I.)

people live in the neighbourhood with a service centre close by. The typology of the premises in Almere was varying from single-family homes to apartments and to a room in a group home. Different level of housing services were all situated around a large courtyard. The outdoor environment was in the use of the residents as well as other people living in the neighbourhood. The residents have open access to the courtyard and can participate in the gardening and caring for the animals. However, the green areas, fruit trees, allotments and domestic animals are the responsibility of a group of volunteers living in the neighbourhood. This may increase the connection to residents with other people living in the neighbourhood.

Studies in senior housing suggest that the proximity and visibility of natural outdoor features increase participation in social and physical activity (Joseph et al. 2006). Williams (2005) argues that residents' ability to see and hear others using public spaces outside their home greatly influences their sense of community and enables them to observe others with whom they would like to interact. Several studies have suggested that a green environment and nature have a positive impact on people's well-being as well as on their behaviour and coping in daily life. Moreover, outdoor activity is associated with both social and health benefits. Therefore, the design of the premises, as well as the care policy, should encourage residents to use the outdoor environment. Furthermore, Namazi and Johnson (1992) observed that unlocking doors to allow residents access to secure outdoor areas reduced agitation in residents. Accommodating residents' exit attempts rather than discouraging them, also generated positive outcomes in their behaviour. Lee and Kim (2007) found that access to safe and stimulating outdoor spaces reduced unwanted exits and improved the quality of sleep. Technology for unobtrusive sensing of entrance doors and monitoring courtyards may be used for safety reasons.

Moreover, several studies conclude that nature and natural elements seem to have a positive and therapeutic impact on people. Van den Berg et al. (2010) observed the stress-relieving effects of gardening. Ulrich (2002) found out that gardens and other natural settings increase patient and family satisfaction with the health care provider and the overall quality of care. The stress-relieving effects of nature are also important for staff members who face a mentally demanding work task. Moreover, results from a longitudinal study (Takano,

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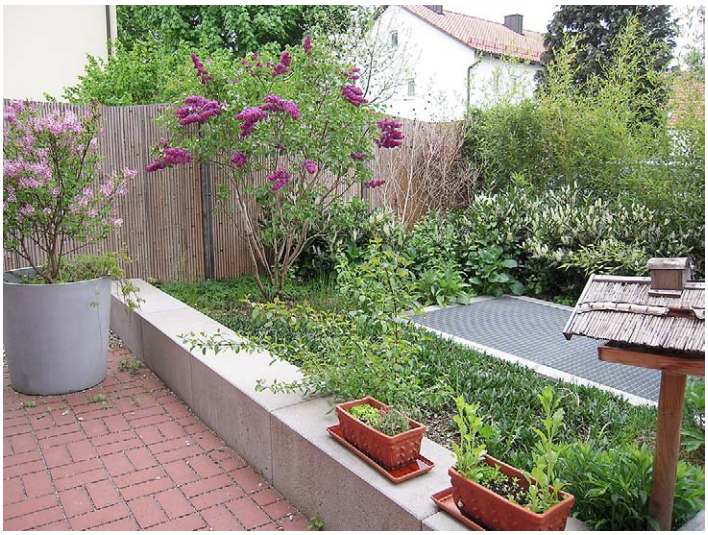

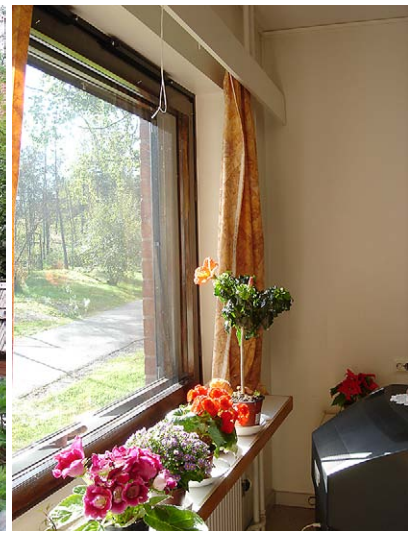

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Figure 34. Homely and small-scale environments enhance the quality of life. (photo, Verma, I.)

Figure 35. Visible outdoor clothing at an entrance door reminds residents to dress warmly before going out. (photo, Verma, I)

Figure 36. Natural elements and colourful flowers enhance the well-being of the resident and staff members. (photo, Hätönen, J.)

Figure 37. Views to outdoor spaces provide visual stimulation. (photo, Hätönen, J.)

Nakamura and Watanabe, 2002) indicated that there was a significant association between walkable green spaces and longevity, even after excluding the influence of a person's baseline functional status. A comparative study by Moony and Nicell (1992) found that aggression among residents decreased over time in facilities with outdoor environments, whereas aggression increased during the same period in facilities without outdoor environments. On the other hand, nursing staff in extra care housing have reported that outdoor spaces increase the need for monitoring (Morgan and Stewart, 1999). One of the main challenges in the Nordic climate is the use of outdoor environments in winter. The cold period can last several months and reduce possibilities to go out. Therefore, in extra care housing, it is important to provide other accessible outdoor spaces, such as balconies, winter gardens and covered courtyards.

According to Wahl and Oswald (2010), the seasonal changes in temperature, weather conditions, smells and noises enrich the experience of nature and may be of particular importance for older people, as they provide orientation in space and time. The exposure to daylight and seasonal changes may reinforce the notion of time. Therefore, according Figueiro et al. (2014), it is important to encourage older people to increase their exposure to light and dark time intervals. Moreover, they argue that the lighting interventions inside extra care housing can be used for treating sleep and behaviour disturbances. McCurry et al. (2011) found that walking and exposure to light improved Alzheimer's patients' night-time sleep. Likewise, the results of a study by La Garce (2004) indicated that appropriate lighting reduced residents' sleeping disorders as well as their behavioural disturbances.

In extra care housing, due to safety, residents suffering from cognitive decline are often not allowed to go out alone without surveillance, especially if there is no visual connection from inside to the outdoor spaces. The care policies regarding the level of self-determination of residents vary in each country, however. An open view to outdoor spaces may help staff members in their tasks. Moreover, a view to attractive outdoor spaces may also encourage residents to go out. Ulrich (1984, 2001) observed the healing effect of a view of nature on patients recovering from illness. He found that the view improved a person's mood and effectively promoted recovery from stress.

Wayfinding and perception

Most people with visual impairments are older people. Laitinen (2009) found that in Finland, more than 10 per cent of people who are 75 years old and older had diagnosed visual impairments. However, many more people have age-related problems with vision, without any diagnosed disease. This may affect their daily activities and mobility. She observed that the inability to cross a road safely or difficulties in climbing up two stairs were three times more likely in people with visual impairment than in those with good vision. A physical and social sense of security is also related to the sensory perception of space. Bernard and Rowles (2013, p.7) argue, that there may be places where one feels socially secured, safe and welcomed, whereas, other places may be perceived as hostile or dangerous. The older people may avoid the use of areas of the city that are felt unsafe. The comprehensive experience of space is formed not only through sight and hearing but also through the senses of touch and smell. Jokiniemi (2007) argue that an environment has to offer recognisable landmarks for different senses so that visually impaired people can act independently. Furthermore, he pointed out that the cumulative experience of a space through all the senses determines the perceived quality of it. A stimulating environment can upgrade the perceived quality of the space, whereas a bad sensory experience (for example, a noise or smell) can make the experience negative.

When one's sense of vision is declining, landmarks, colours and contrasts can support the depth and spatial perception of space. In a virtual environment, Davis and Weisbeck (2015) observed that most of the older people's navigation was based on a series of landmarks. Their study observed that place learning and wayfinding were poor in an environment with few cues. They pointed out that, especially for older residents, the lack of environmental knowledge could lead to immobility and result in a decrease in social interaction. Landmarks can be used to facilitate wayfinding and orientation in spaces for people with poor vision or with Alzheimer's or other cognitive disabilities (Wijk, 2001). Lynch (1960) argues that the paths, edges, and landmarks are among the basic elements in the urban environment that help people to build up a mental map and to understand their environment. In the same way, in extra care housing natural and artistic landmarks (views, paintings, etc.) as well as features of the built environment (an entrance

canopy, staircase, etc.) provide elements that help residents to create a cognitive map of the space (van der Voordt, 2001). Bernard and Rowles (2013, p.9) argue that a mental map is also the result of our daily routines in a familiar place. In the case of cognitive decline, for example, the routine may take over the conscious use of a space.

Alzheimer's disease affects a person's ability to navigate in space and to understand the clues of the environment and therefore the person may easily become lost. Wandering is one of the symptoms of Alzheimer's disease and the people affected by the disease should be provided with a safe and simulating walking environment. According to Cohen and Day (1993), wandering is due to either the confusion of time and place, a lack of activity or just the normal activity of muscle memory. Landmarks and clearly marked walking paths with guidance may help a person to move around in the courtyard and to get release form the anxiety caused by the disease. A courtyard with an open layout and a visual connection to the entrance door enhances the independent use of the outdoor space. In extra care housing, frail people with mobility or cognitive disabilities are able to use the outdoor spaces independently if they are located on the same floor as the housing units. In multilevel buildings, it is profitable, therefore, to have large common-use balconies on each floor that enable residents to spend time outdoors.

Moreover, lighting is an important element, especially in designing for residents with visual impairments or Alzheimer's disease. It can be used to improve the perception of the space and navigation. Colours and light can attract attention to guiding clues and landmarks in the environment. Furthermore, colours cannot be perceived without light. Therefore, the lighting affects the perception of colour contrasts. Moreover, uniform lighting of walking paths, with no reflection or glare from the surfaces, enhances the perception of space and feelings of safety. Residents with cognitive impairments may perceive dark shadows as holes in the ground and reflections of light as wet places on the walking path.

Methods

The case study method

A case study method was chosen to investigate the needs regarding the older population's housing environment in a real-life context. This method made it possible to approach the current topic using various complementary methods (Yin, 1994). Simmons (2009, p. 11) argues that the purpose of the case study method is to generate an in-depth understanding of a topic and to generate knowledge for the development of professional practice. In this thesis, the case study method was applied to explore how people cope in their own housing environment during the ageing process. This helped to understand the challenges and potential of the daily environment and to enhance architectural design for an age-friendly living environment. The unit of research varied from a neighbourhood (Case Study 1) to sheltered housing (Case Study 2) and further, to a group home for people with Alzheimer's disease (Case Study 3). Case Study 2 can also be regarded as a multiple case study, as it was implemented in three independent cases in different parts of the city.

According to Palinkas et al. (2015), qualitative methods can be used to explore and obtain in-depth understanding of a phenomenon or to identify strategies for facilitating implementation of new practices or development programs. According to Sousa (2014), qualitative research aims to provide a description or interpretation of a phenomenon as it occurs in the study context. McKee, Houston and Barnes (2002) proposed that mixed methods, questionnaires and residents' subjective experiences might be the best approach to assessing extra care housing. One single method may not be sufficient to assess the living environment of people suffering from memory decline who may be confused at times. Mixed methods have been used for this purpose in the following case studies. In addition to qualitative methods, quantitative methods such as small-scale surveys and questionnaires were used in all the case

studies to obtain an overview of the research area and to identify possible topics that should be examined in more detail. The mixed-methods are described in more in detail for each case study (Table 8.).

The purpose of qualitative research is to describe a particular phenomenon or experience, not to generalize. Therefore, the application of the results to other contexts and to other groups may not be as relevant as in a quantitative study. However, Mays and Pope (2000) argue that the relevance of qualitative research – the external validity – can be achieved by a detailed description of the research. This will allow the reader to evaluate whether or not the findings may be applied to other contexts or other groups of people. The findings of this study are not supposed to be valid for all population groups. However, they may profit a large number of people. This thesis focuses on the needs of a minority of people in the city. The identification of these challenges in the daily living environment may benefit the whole population and contributes to the development of design practices.

The external validity of the qualitative research is related to the definition of the contextual background, demographics and study setting. Malterud (2001) argues that objectivity in a qualitative study means recognising that knowledge is always partial and situated, and the background and position of the researcher affects the topic and point of view of the investigation. Moreover, Pope, Ziebland and Mays

Table 8. The case studies and methods used.

	Case Study 1	Case Study 2	Case Study 3
Unit of research	Neighbourhood	Sheltered housing	An extra care housing unit
District (s)	Lauttasaari	Jakomäki Maunula Pitäjänmäki	Oulunkylä
Methods	Questionnaires Workshops Walk-through Observation	Questionnaires Art-based workshop Walk-through Observation Pilot construction	Questionnaires - Walk-through Observation Pilot construction

(2000) point out that the researcher has to use a personal empathetic approach to apprehend and interpret the qualitative data. According to Willig (2017, p. 276), an empathetic interpretation of the research results focuses on how things are experienced and expressed in order to elucidate what is meaningful to the people. Nicholl (2017, p. 157) argue that empathy or being empathic is essential for qualitative research and Inclusive Design, as it helps to understand what problems people with declining functional capacities face and how they might feel in certain situations. Furthermore, the previous experience and knowledge of the researcher has had an influence on this thesis. The tools of empathic design were applied to the case studies. These tools focus on understanding the end-users' needs, or possible undiscovered needs, using the sensitivity of the designer. Empathic design uses the direct observation of people in their natural environment (Mattelmäki & Battarbee, 2002). Bordas (2017) regards empathy as the key point when moving from designing for people with a disability to designing inclusive architecture. It is an iterative process, in which the designer's empathy is used to understand the user's needs. To promote a dialogue between users and designers, new tools such as games have been developed (Mattelmäki, Vaajakallio, & Koskinen, 2014). These tools were used in Case study (1) and Case study (2). The case studies described in this thesis have been carried out with multidisciplinary research teams, which may increase the validity and objectivity of the results. The quotes from the interviews and discussions in this text are free translations by the author from Finnish into English. The limitations of these case studies are related to the small number of participants in a specific time frame and context. However, they bring forth useful examples and in-depth knowledge and help to develop the architectural profession.

Questionnaires and semi-structured interviews

Information on the residents' experiences and preferences in the built environment were gathered through questionnaires and semi-structured interviews. The questionnaire had both closed and open questions. The questionnaire asked about the background information of the respondents including age, gender, use of assisted devices, and length of residence. Most closed questions were multiple-choice questions or questions with a Likert-type scaling from 1 to 5. On the Likert

scale, respondents are asked to indicate whether they agreed or disagreed with a given statement and to indicate their level of agreement or disagreement (Harper, 2015). Furthermore, some of the questions used in relation to extra care housing, related, for example, to aspects such as the use of outdoor spaces had three level-scaling (Yes – Occasionally – No). At the end of the questionnaire, there were open questions to further elaborate the responses. According to Krosnick and Presser (2015) open questions can enrich the results of a survey, which is difficult to achieve with only closed questions. The questionnaire was designed for the older population. Therefore it was available on-line and on paper.

Bernard (2017, p.210) describes a semi-structured interview to be an open-ended interview which follows a general script and covers a list of topics. The semi-structured interviews in the case studies were based on the questionnaires. The semi-structured interview enabled people with visual impairments and cognitive decline to participate in the study. Especially those older participants suffering from cognitive decline needed encouragement and motivation to take part in the research. It was important to assure the participants that the researcher was truly interested in what they were saying and was trying to learn from them (Bernard, 2017, p. 215).

Workshops with focus groups

According to Krueger and Casey (2014, p. 72), workshops can empower and encourage people to express their views. The group needs to be small enough to give everybody an opportunity to speak, yet large enough to provide a variety of opinions. According to Bernard (2017, p.233), workshops with focus groups do not replace surveys, but rather complement them. Moreover, they may help to interpret the results of a survey. The focus group and survey may provide similar results, but the focus group provides more detailed information. Focus groups typically have a facilitator and 6–12 participants. The people participating in the resident panels or workshops in each case study were quite homogenous in terms of age, social background and experience. However, according to Sim (1998), in a homogenous group the individual group members are more likely to feel confident and express their views than in a heterogeneous group. The workshops took place in the participants' familiar surroundings. According to Kitzinger (1995), this helps

to create a comfortable and relaxed atmosphere. As with in-depth interviews, it is best to record (or videotape) focus groups. All the workshops in this thesis were audio recorded or videotaped. At least two researchers participated in the workshops, one as the facilitator and the other as an observer taking notes.

Observational walks

Moreover, to obtain further knowledge, methods such as observational walks (the walk-through method) were used in each case study. The walk-through method was adapted from usability studies. Aalto (2014) argues that usability studies in the built environment should focus on the effectiveness and efficiency of the buildings to achieve the users' tasks or goals, as well as satisfaction in the use and context of use (social and physical environment). Blakstad, Hansen and Knudsen (2008) argue that this is a method to systematically and quickly assess the different aspects of the built environment. Moreover, Suopajärvi (2014) point out that the walk-through method reveals the complexity of the subjective experience. According to her, it is related to the physical body experience and other people's presence, as well as the built environment. Observational walking provides place-specific information. According to Pierce and Lawhon (2015), it helps to understand participants' spatial experience. Moreover, Jia and Fu (2014) argue that observational walking enables a comparison to be made between the perceived and objective environmental factors and the use of walking paths.

The participants in the case studies were taken on an observational walk in the neighbourhood or around the premises. It was done in familiar surroundings for the participants, in their own neighbourhood or housing environment. The focus was on the everyday environment and connections between the home and services which had been reported important by the participants. The walking path was selected according to the discussion in the focus groups. The factors observed during the walk consisted of perceived environmental features: access to services, connectivity and the safety of the walking paths, in addition to the sensory environment and traffic safety. The length of walking paths varied from approximately 200 m to 2 km, depending on the participant's physical abilities. The participants had been interviewed or participated in the workshops previously. The observational walk on-site with older residents revealed new qualitative aspects of

the environment. Moreover, the observations enabled the researcher to use her own knowledge as an architect and her familiarity with the UD approach to the built environment and to combine that with the residents' experiences. All the observational walks in the case studies in this thesis were carried out in the daytime in the autumn or spring.

Triangulation and thematic analyses

Cho and Lee (2014) note that qualitative methods produce a large amount of data on various topics. Therefore, in this thesis the content analysis was reduced to cover the features of architecture related to Age-Friendly Cities: housing, transport, and shared spaces outdoors and indoors. The triangulation method allowed mixed methods and qualitative and quantitative data to be combined as complementary sources of information. According to Mays and Pope (2000), triangulation can be used to assure comprehensiveness and a reflexive analysis of the data. Lukkarinen (2004) argues that triangulation combines concrete and subjective knowledge of individual people with the average and abstract data.

The analyses of plans, statistical information and other documents related to technical equipment (e.g. lifts) were used to obtain an overall picture of the built environment. The questionnaires were focused on the perceived quality of the built environment and access to services which were regarded as important by the respondents. The online survey used in Case Study (1) was targeted towards people in the age group of 65 years old and older. This sampling enabled tackling the problems of people in that age group, which currently represents 18 percent of the overall population of the study area. Moreover, to be able to examine specific topics in more depth, the residents were invited to participate in workshops. The topics were discussed further with other people in the same age group living in the area. The questionnaires and workshops provided partial views on the same topics, but together they enabled a comprehensive picture to be formed of the major challenges. Moreover, the observations and reports of the workshop participants provided knowledge about people whose user requirements for the built environment were greater than the general population. The awareness of these requirements may contribute to the quality of the built environment and will assist in the development of design practice.

A thematic analysis was carried out across the data set, interviews, questionnaires, and observations in order to find repeated patterns. The thematic analysis was used to report experiences, perceived meanings and the reality of the participants (Braun & Clarke, 2006). The thematic context was Ageing in Place, and the empirical data was compared to the results of the related literature review. The qualitative data, contents of workshop discussions, results of the questionnaires and field observations were analysed systematically. The first classification of the results was done according to themes emerging from the literature review. The chosen themes – housing, shared spaces outdoor and indoors, walkability, and access to services – were identified in each case study. Secondly, the data from the workshops was explored using a content analysis to confirm and supplement these topics. Finally, the results were analysed and compared using the principles of Universal Design. The triangulation of the research data (geo-referenced data, observations, results of the questionnaire etc.) as well as methodological triangulation (observational walk, questionnaires, workshop, etc.) were used to capture different aspects of the relationship of the older residents to their living environment.

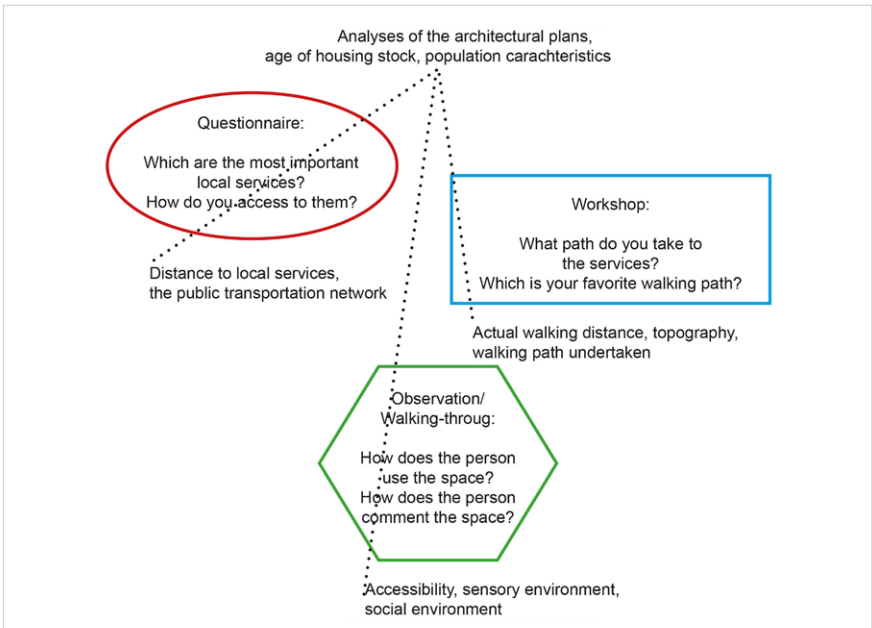

Figure 38. Example of the triangulation of the data on the topic of access to services.

Creswell et al. (2009, p. 211) describe a concurrent triangulation approach, where the researcher collects both quantitative and qualitative data concurrently and then compares the two data sets to determine if there is convergence, or whether there are differences or some combination. In this study, the analyses of the built environment were carried out at the same time as the surveys.

The selection of the cases

The case studies cover housing solutions in the sub-centres of the city of Helsinki as follows: mainstream housing in the Lauttasaari district (Case Study 1), sheltered housing in the Jakomäki, Maunula and Pitäjänmäki districts (Case Study 2), and extra care housing in the Oulunkylä district (Case Study 3). Lauttasaari is a neighbourhood next to the city centre, while the others are suburban locations. The sheltered housing in Case Study 2 was provided by a public service provider (City of Helsinki) and non-profit organisations (Diakonissa Hoiva Oy, Ilmari-Helanderin säätiö). The extra care housing in Case Study 3 was managed by the social and health care services of the City of Helsinki. The aim was to obtain a comprehensive view of the existing housing services. Moreover, the buildings chosen for the study date from different periods but are still used for care for older people. Moreover, the location, as well as the proximity to ordinary housing, and access to nature and services varied in each case. They had different challenges regarding the indoor and outdoor environments, the use of shared spaces and connection to the neighbourhood.

The Helsinki area urbanised after World War II. The age of the population and the housing stock, vary in various parts of the city. Moreover, the number of services and the access to these services and to public transport can differ locally (Table 9). The number of services and destinations within walking distance may influence the chances concerning ageing in place and active ageing. Grocery shops, cafés and restaurants are spaces for cross-generational social interaction. Moreover, the topography and access to natural settings within a district have an influence on the mobility of older people. Therefore not all parts of the city are equally suitable for older residents. Moreover, the

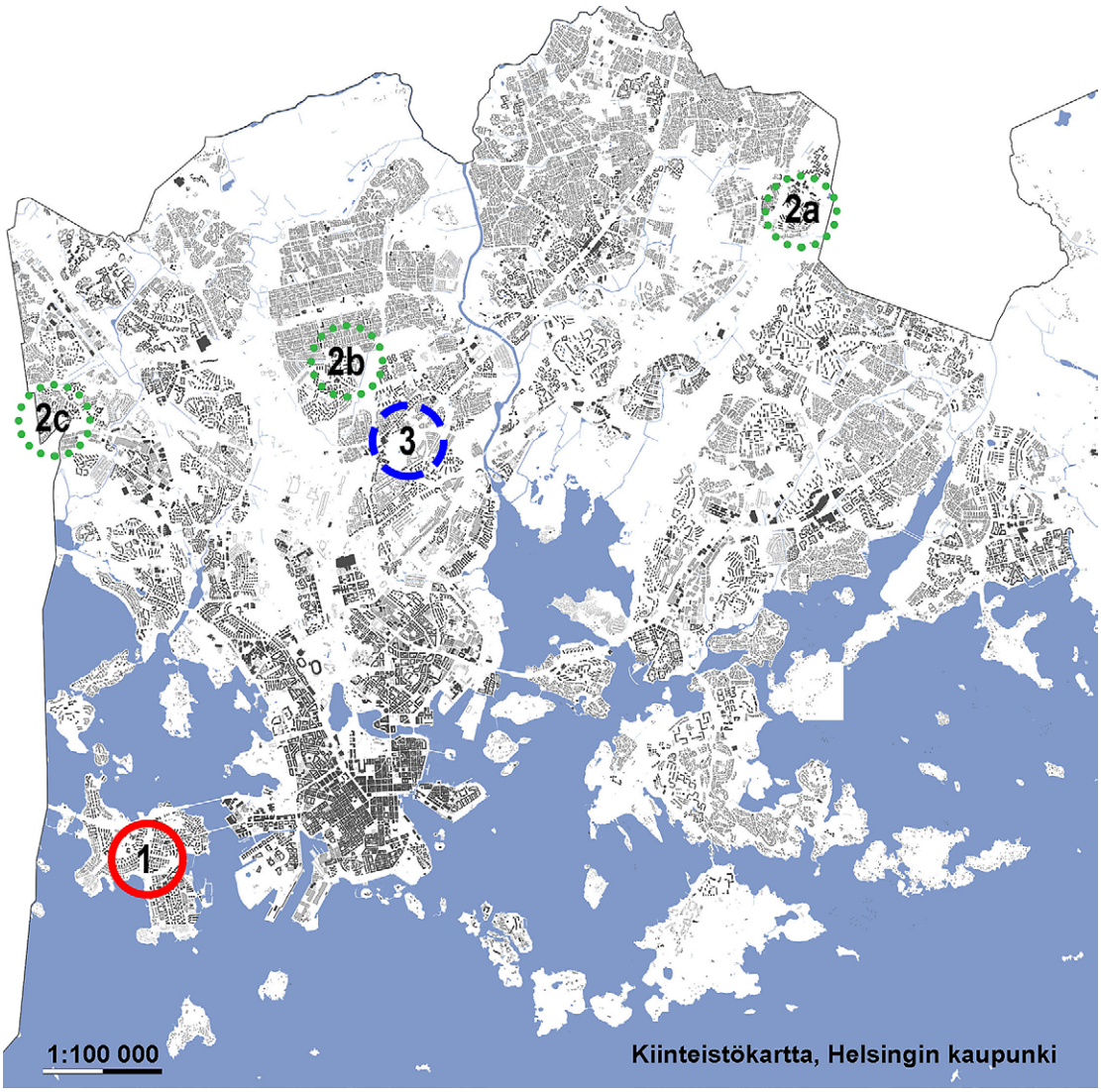

Figure 39. The three case studies presented in the dissertation are marked on the map: Case Study 1 (continuous red circle), Case Study 2a/2b/2c (green doted circle) and Case Study 3 (dashed blue circle).

location of the sheltered housing within the neighbourhood structure has implications for the inclusion of older people.

The neighbourhoods of Lauttasaari (1) and Jakomäki (2a) represent two very different types of neighbourhoods within the city. Lauttasaari is close to the city centre with frequent public transport connections to the centre. It also has the highest number of retail shops and restaurants of the case study areas. Jakomäki is further away from the centre and has fewer retail shops compared to other neighbourhoods in this study. Furthermore, local services are also becoming fewer, and the population has been decreasing in recent years.

Lauttasaari and Jakomäki both have mostly apartment buildings. Only 3.8% of the dwellings in Lauttasaari and 5.4% in Jakomäki are single-family homes. Government-subsidised housing represents approximately 20% of the housing stock in Helsinki. However, Lauttasaari

Table 9. Services and especially number of the retail shops vary in the neighbourhoods (Statistics Helsinki, 2016).

Services	Lauttasaari 1	Jakomäki 2a	Maunula 2b	Pitäjänmäki 2c	Oulunkylä 3
Library	1	1	1	1	1
Health care centre	1	1	1	1	1
Swimming pool	1	1	1	0	0
Gym	7	5	8	7	7
Post office	1	0	0	2	1
Pharmacy	2	1	1	2	1
Restaurant	29	11	12	41	10
Coffee shops and bars	3	2	2	1	1
Grocery store	11	6	3	16	8
Other retail shops	92	2	20	63	25
Church	1	1	1	2	2

(Case Study 1), for example, has very little government-subsidised housing (1.5%), and the residents have a higher socio-economic status on average than other residents of Helsinki. Therefore, older residents in the area may have more opportunities to prepare for their old age and perhaps have the inclination to purchase well-being services and home help in order to live independently at home. In contrast, the socio-economic status of the residents in Jakomäki (2a) is lower than the average in Helsinki. Moreover, the amount of government-subsidised housing is very high (57%) in Jakomäki.

All three sheltered housing schemes in Case Study 2 were situated in neighbourhoods where the percentage of the population 65 years old and over was relatively high compared to the average in Helsinki (16.9%). Maunula (2b) has the highest percentage of seniors in Helsinki (21.7%). It also has a high percentage of government-subsidised housing at 45.2% (Helsinki City Urban Facts, 2017). However, in sheltered housing, the residents may have been moved in from all parts of the city.

Participation

Palinka et al (2015) argue that sampling strategies for qualitative methods are often not evident. They propose that purposeful sampling, instead of random sampling, is useful to describe a particular subgroup and to simplify the analysis and facilitate group interviews. The importance of the availability of participants and their willingness to participate is significant. According to Croswell (2009), purposeful sampling is used so that individuals are selected because they have experienced the central phenomenon. The participants in this study were demographically homogeneous (Robinson, 2014). Russel (2017) considers key informants to be people who know a lot about their culture and are willing to share their knowledge. He considers good key informants to be people who know how to tell good stories. Residents made up the main target group in these case studies. Their participation was emphasised in all three case studies. They were considered experts on their own lives when assessing their living environment. In this study, the older residents participated freely and were interested in sharing their stories and experience with the researcher. The participants were limited to people who were 65 years old and over. They were all vol-

unteers, and therefore the sample may not represent the whole population. However, combining results of the three separate case studies with a small number of participants makes a descriptive analysis of the ageing process possible.

Older people with declining mobility or sensory capacities can be seen as lead users whose participation in the planning and design process may result in new creative solutions that are friendly to all users. Lead users are described as those people who participate in solving a challenging problem and who would profit most from the solution. The solution may become mainstream in the years to come, and the lead users may forecast future trends (Von Hippel, 1986). As the number of very old people is increasing, the challenges faced by this age group will affect many more people in the future. Therefore, the involvement of older people is important when assessing and planning housing and urban solutions.

Zimmerman and Martin (2001) considered the evaluation of the existing environment as a means to improve the fit between occupants and their buildings. Older people and other vulnerable resident groups are rarely involved in the development process. Buffel, Phillipson and Scharf (2012) argue that older people "*tend to spend a lot of time in their neighbourhood, but (they) are often among the last to be engaged when it comes to decision-making processes within their neighbourhood*". An assessment of the housing environment, made with the residents, enhances the continuous development of design practice. Moreover, the development of age-friendly environments needs to be carried out in phases. An understanding of the existing situation is important in order to take prompt action. Furthermore, the users' needs and behaviour are also useful information for future initiatives (Horelli &Wallin, 2013).

According to Finnish legislation "*...a municipality's residents and service users have the right to participate in and influence the activities of the municipality. Local councils must ensure that there are diverse and effective opportunities for participation*" and "*find out residents' opinions before taking decisions*" (Ministry of Finance, 2015, Section 22). The procedures for participation in development are not established, and they may vary in different municipalities. In addition, the procedures do not reach all resident groups. Social media, the Internet and mobile applications are new tools for participation. These methods may increase citizen participation, but they do not reach the very oldest. According to recent sur-

veys in Finland, less than one-third of people aged 75 to 89 use the Internet, and only 5% of them have smartphones (OSF, 2013). Even though this percentage is likely to grow rapidly, various participatory methods for more vulnerable resident groups need to be used and further developed to create attractive and user-friendly cities.

Ethical considerations

All the participants freely participated in the study. People living independently in their own homes (Case Study 1) gave their authorisation to use the recorded material and pictures from the workshops for the study. A research permit for involving the residents in sheltered housing (Case Study 2) and extra care housing (Case Study 3) was granted by the Social Services and Health Care of the City of Helsinki. All the personal information of the residents have been separated from questionnaires and other research data. The questionnaires for the residents were identified with a code delivered by a staff member, and therefore the residents cannot be identified by name. All the study material has been kept safely and treated with full respect for research ethics.

Case Study 1

The background and aim of the case study

The aim of the case study was to assess the possibilities for Ageing in Place: to continue living independently or with assistance at home and in familiar surroundings. The case study was implemented in a neighbourhood south-west of the center of Helsinki. The Lauttasaari area has some 22,300 inhabitants, of which 18.7% are over 65 years old (City of Helsinki, 2017). The case study area is clearly defined by the sea – the area is an island connected to the city centre by two bridges. The socio-economic level of the population is higher and there are more home-owners on average than in Helsinki. However, the neighbourhood is undergoing densification and a rapid development process as many industrial buildings in the south of the area are being refurbished and converted into housing or being demolished in order to provide space for new housing developments. Moreover, there are also ongoing plans for important housing developments west of the district. Furthermore, the public transport network has been undergoing important changes, as a new metro line opened in autumn 2017. Major modifications are being made to the public transport network in the neighbourhood. These developments are causing anxiety for the older population residing in the neighbourhood.

The aim of the study was to identify meaningful spaces and access to services from the viewpoint of older local residents. The focus of the study was on the population structure, the housing stock, the public transport network and access to local services. The aim was to better understand how well the local neighbourhood enhances Ageing in Place and what the preconditions are for living at home. Local residents 65 years old and over, as well as local retail shopkeepers and care service providers (public and private), were invited to participate in the study. As a result, further knowledge on age-friendly neighbourhoods was developed. Moreover, the research process in itself was a useful tool to

promote networks between public, private and third-sector service providers locally in order to deliver better services for older residents.

Implementing participatory methods on the neighbourhood level

The case study involved local residents. Resident's experiences of their living environment and access to local services were gathered with the participation of residents of 65 years old and over who were living independently in the neighbourhood. The aim was to achieve a comprehensive understanding of the challenges in their daily living in the local context. In the first phase, user knowledge on housing, the immediate surroundings, local services and public transport was collected through a questionnaire targeted at the resident group in focus. An online questionnaire was published prior to all of the workshops or observational walks. It was also published in the local newspaper. A paper version of the same questionnaire was distributed in local retail shops, in a meeting organised by the Finnish Association for the Welfare of Older People, and in workshops organised during the study. Answers to both the online questionnaires and paper-based questionnaires were transferred into the same database. The questionnaire focused on the perceived quality of the respondents' own apartment buildings and its immediate surroundings. The respondents were asked about the length of their residence in the neighbourhood as well as in their current apartment. The questions also concerned the frequency of use and ability to access local services and public transport. There were both multiple-choice and open questions. The results of the questionnaire indicated challenging issues in the neighbourhood reported by the residents. The open-ended questions helped to recognise the personal challenges of older people, which were revealed to be quite similar for many people. These aspects were raised in the workshops for further investigation and discussion.

Secondly, voluntary participants were recruited to the workshops through the local newspaper, posters in local shops and visits to established local associations for older people. People were also able to show their interest in participating in the workshops through the online questionnaire. Those who were interested were contacted per-

sonally. Three workshops with focus groups were organised, each with a different theme. The first was held in the local library, with ten senior residents living nearby. In the beginning, people were asked to describe how they travelled to the workshop and which route they took. Spontaneous discussion arose about the best walking paths in the neighbourhood. Pictures of the familiar housing area and other images related to quality of living environment were used to facilitate the discussion. Favourite places and unpleasant spots in the neighbourhood were discussed and marked on a large map (Fig. 40). The second workshop, with eight participants, took place on the prem-

Figure 40. Residents' knowledge of the local environment is useful for the future development of the city. The walking paths and favourite places of the participants were marked on the map (photo Nenonen, L.)

ises of a local sheltered housing scheme run by a non-profit association. Five of the participants were living in the sheltered housing, and three of them lived in their own apartments nearby. The themes discussed were related to their likes and dislikes about living in a sheltered housing scheme. Both workshops took approximately two hours. The moderator (here, the researcher) steered the discussion and helped maintain the interest of the participants in discussing a specific topic. The participants were offered coffee and soft drinks. At the beginning of the workshop, the project was briefly presented to the participants. Pictures of the neighbourhood (taken previously by the researchers) were used to initiate a discussion on the local environment. The two first workshop discussions were audio recorded and transcribed.

The third workshop was organised together with 28 participants, including residents and other stakeholders from public, private and third-sector providers. It was part of the Helsinki Design Week and was organised in the city hall. The workshop was organised to disseminate the results of the study and to invite all stakeholders to discuss issues together. A prototype of a board game (Fig. 41) was designed and used to discuss the findings. A board game was designed based on a map of the neighbourhood. It included questions about the neighbourhood, the built environment and services. The players were divided into groups of five to seven people. The game-based method was appreciated, as it gave each person the possibility to express themselves. On the other hand, the role of the facilitator was revealed as important to keep on the game flowing and the discussion focused on the topic. The game-based approach used in the case study is described in more detail by Hyvärinen, Lee and Mattelmäki (2015). The discussions in each group were videotaped to be analysed later.

In the last phase, to get in-depth user knowledge, observational walks (the walk-through method) were used. The observational walks were carried out to complement the results of the questionnaires and workshop discussions. In Case Study 1, the observational walks took place outdoors. The residents were taken on an observational walking tour around the neighbourhood. The conversation and the walking path were audio recorded. The walks with residents and on-site observations helped to identify the current challenges in the built environment. The daily walking paths and favourite places pointed out in the

workshops were visited with two residents. Moreover, the researcher participated in two walks to the seaside organised by a local senior organisation. The number of older participants on the first walk was 11 and in the second walk there were 5 older people. They already knew each other, which increased the social aspect of the walk. Moreover, the weather conditions and the personal state of health affected the number of participants. The walking route and walking speed were documented using a mobile application. The discussions during the walks were audio recorded.

Figure 41. The Find Lauttasaari! board game prototype (by Jaana Hyvärinen, PhD student in the Department of Design, Aalto University, photo: Hyvärinen, J.).

Participants

The average age of the respondents to the questionnaire ($N = 64$) was 73 years old (ranging from 64 to 95 years old). The participants represented approximately 1.5% of the age group 65 years old and over residing in the area (Table 10). As the participants were volunteers, the gender distribution was slightly imbalanced. For example, the percentage of men who are 65 years old and over living in the area is approximately 40 percent, whereas only 20 percent of the respondents to the questionnaire were male. The majority of the participants in the study were female, which may affect the results.

Most respondents had had a long length of residence in the neighbourhood (Table 11). One of the respondents had lived all her life (78 years) in the same apartment. One-fifth of the respondents (13 people out of 64) had moved to the neighbourhood less than ten years ago. The results indicated that respondents who were 85 years old and over had been living in the neighbourhood and in their current apartments longer than the younger respondents had.

More than half of the respondents to the questionnaire were living alone independently. Women lived alone more often than men. Furthermore, all the female respondents 85 years old and over lived alone (Table 12). Even though the sample is small, it represents the current trends well. According to Helminen et al. (2017, p. 42), living alone is most common for women 85 years old and over and for older people in general living in city centres. In the neighbourhood, less than 15 per cent of men but over 85 per cent of women 85 years old and over live alone (HRI, 2018). This is partly due to the longer life expectancy for women, and the likelihood of being widowed.

The results from the neighbourhood spatial analyses

Analyses of the living environment, the transport network and local service supply were carried out. Existing information from different sources was combined in shape files (gvSIG) and visual maps. Background data about apartment buildings and the density of the population 65 years old and over was collected from the Helsinki Region Infoshare (HRI, 2014) database, which provides open access information

Table 10. The participants and gender distribution of the user study.

	Total	Male	Female
Online questionnaire	64	12	52
Workshop in the Library	10	3	7
Workshop in an Ordinary Sheltered Home	8	2	6
Workshop in the City Hall	28	2	26
Walk-through	11	1	10
Walk-through 2	5	0	5
Walk-through 3	2	0	2

Table 11. On average, respondents over 85 (N = 9) had lived for 36 years (range: 12–72 years) in the neighbourhood and for 33 years (range: 12–68 years) in their current apartment.

	All respondents (N = 64)	Over 85 years (N = 9)
Mean age	73 years old	87 years old
Time living in the neighbourhood	27 years	36 years
Time living in current apartment	16 years	33 years

Table 12 The gender and the living status of the participants (N = 64) in the online questionnaire.

Gender / living status	Male (all)	Female (all)	Male, over 85 years old	Female, over 85 years old	All respondents
The number of participants	12	52	1	8	64
Living independently, alone	3	34	0	8	37
Living independently, with a spouse	8	18	1	0	26
Some other housing arrangement	1	0	0	0	1

on a variety of topics. The population grid of the Helsinki metropolitan area, for example, included grid-based statistics of the total population, the population density and age distribution (HSY, 2012). This was used to identify housing areas with a high density of the population 65 years old and over. Moreover, the information regarding distances, street connectivity and topography found in these maps provided the first indication of the accessibility. However, as Talen (2003) points out, detailed data concerning walkability factors (such as pavement quality) are not available in geo-referenced form. The GIS methodology proved to be a useful tool for assessing and visually presenting the characteristics of the neighbourhoods and combining information on residents and the built environment. However, it is not the focus of this thesis, as the aim is to describe the qualitative aspects of the environment assessed from the point of view of the older residents.

For background analyses, the information about the use of buildings (housing, commercial, public, etc.), existing buildings with or without lifts, and the number of floors was collected from various sources. In order to analyse the accessibility of the existing housing stock, the data on the apartment buildings was combined on a map. The information about lifts was obtained according to the postal address in Excel format and had to be transferred to the map. However, the list was not exhaustive; for instance it did not reveal accurate information about the lifts for each staircase in one building, for example.

The map of the neighbourhood shows the population density of people 65 years old and over and the location of apartment buildings over two floors above ground level, with and without lifts (Fig. 42). It reveals that many old apartment buildings – built in the 1940s and 1950s in the northeast of the neighbourhood – lack lifts. It also reveals that the density of people who are 65 years old and over is high in this part of the city. Many senior people have a long housing history in these apartment blocks and along the main street, crossing the neighbourhood from the east to west. Moreover, it indicates that the senior population is moving into new accessible apartment blocks with lifts in the south of the area. The new housing developments in this area provide apartments that appeal to the senior population.

Spatial analyses were conducted to evaluate the accessibility of local public services (such as the health care centre and library), recreational areas within walking distance (such as parks and gardens) and

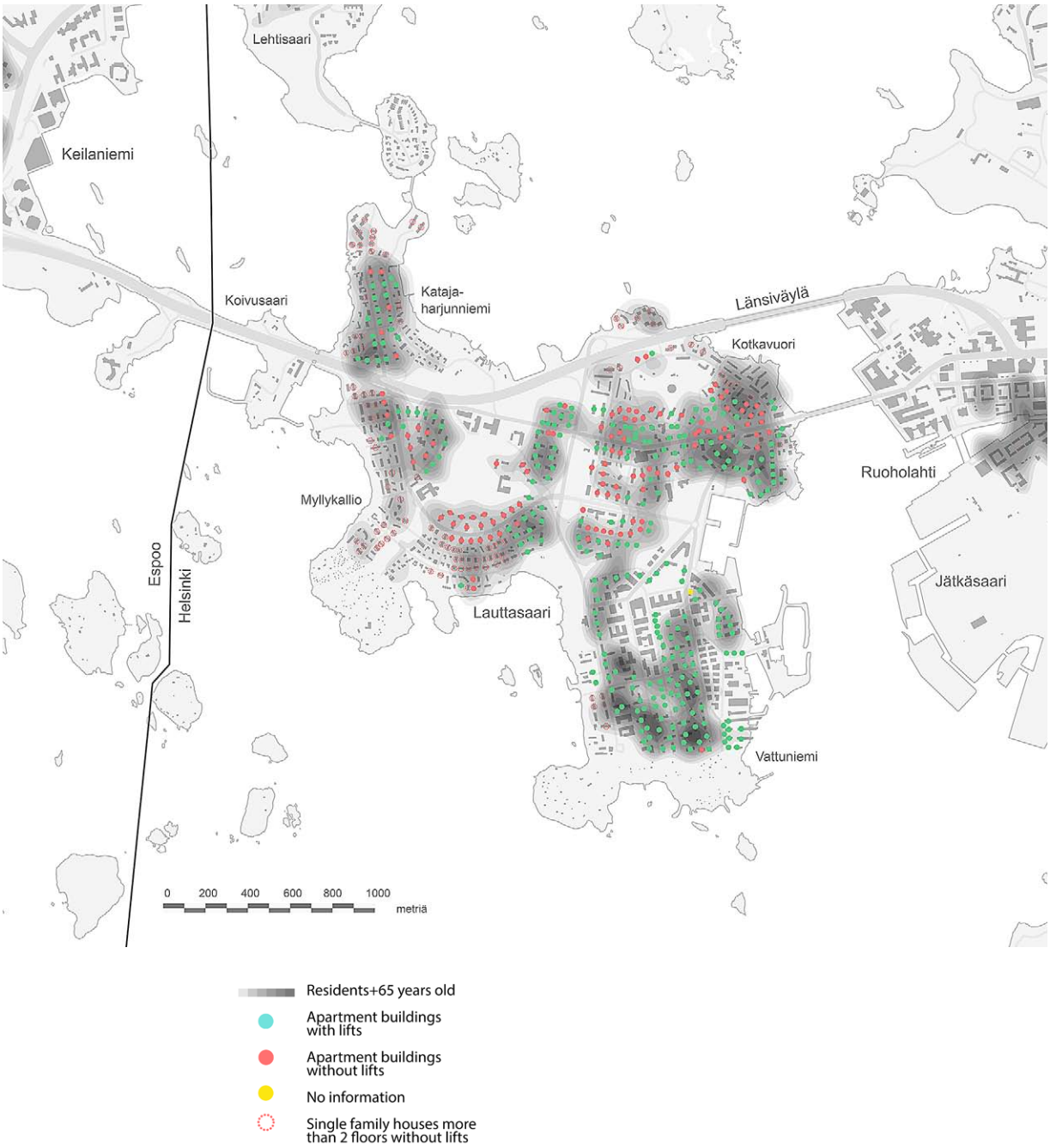

Figure 42. The density of the population in Lauttasaari over 65 years old and apartment buildings over two floors high with lifts (green) or without lifts (red) (map by Laura Nenonen, Research assistant in Sotera Institute, Master's student Department of Architecture, Oulu University.).

the public transport network, as well as local commercial services. Access to these services by foot was assessed with the residents in workshops and on the observational walks. The topography, the distance to the services and public transport network have an effect on how well older people cope daily. The analyses revealed that the district can be divided into several zones according to how well they support older residents (Fig. 43).

Several problems can be identified in the north-west of the neighbourhood (1). The poor provision of local services and public transport, hilly terrain and old apartment buildings without lifts make living challenging for the elderly. Moreover, the apartment buildings are situated on streets with a steep slope (east–west), and therefore, access to the public transport on the main street (north–south) was difficult. The discussion in the workshop confirmed that many older residents had been forced to move from this part of the district. The push factors were more important than the pull factors. The risk for a frail person living in this area is of becoming socially isolated and dependent on other people's assistance.

In turn, along the main road (2), the local services and public transport stops were in good proximity of the housing. The retail shops are situated at street level on the ground floor of old apartment blocks. However, these retail shops were not easily reachable by foot from other parts of the neighbourhood due to the topography of the island. The steep slope of the main street was up to eleven meters in elevation.

The south part of the island (3) was undergoing transformation and densification as old industrial buildings were being demolished of make way for new housing. The new housing developments and the new commercial centre located in the south part of the island are gaining importance. The new services are accessible and easily reachable by public transport. Furthermore, the topography fosters walking. The participants in the workshops with a long history of residence in the district were worried about the deterioration of the physical and socio-economic quality of the neighbourhood. Moreover, many of them regarded the southern part, the old industrial area, as a separate entity, not being part of their neighbourhood. Based on the discussions in the workshops, it seems that residents were moving to new apartment buildings in the south of the district from other parts of the city. However, this needs to be confirmed by further studies.

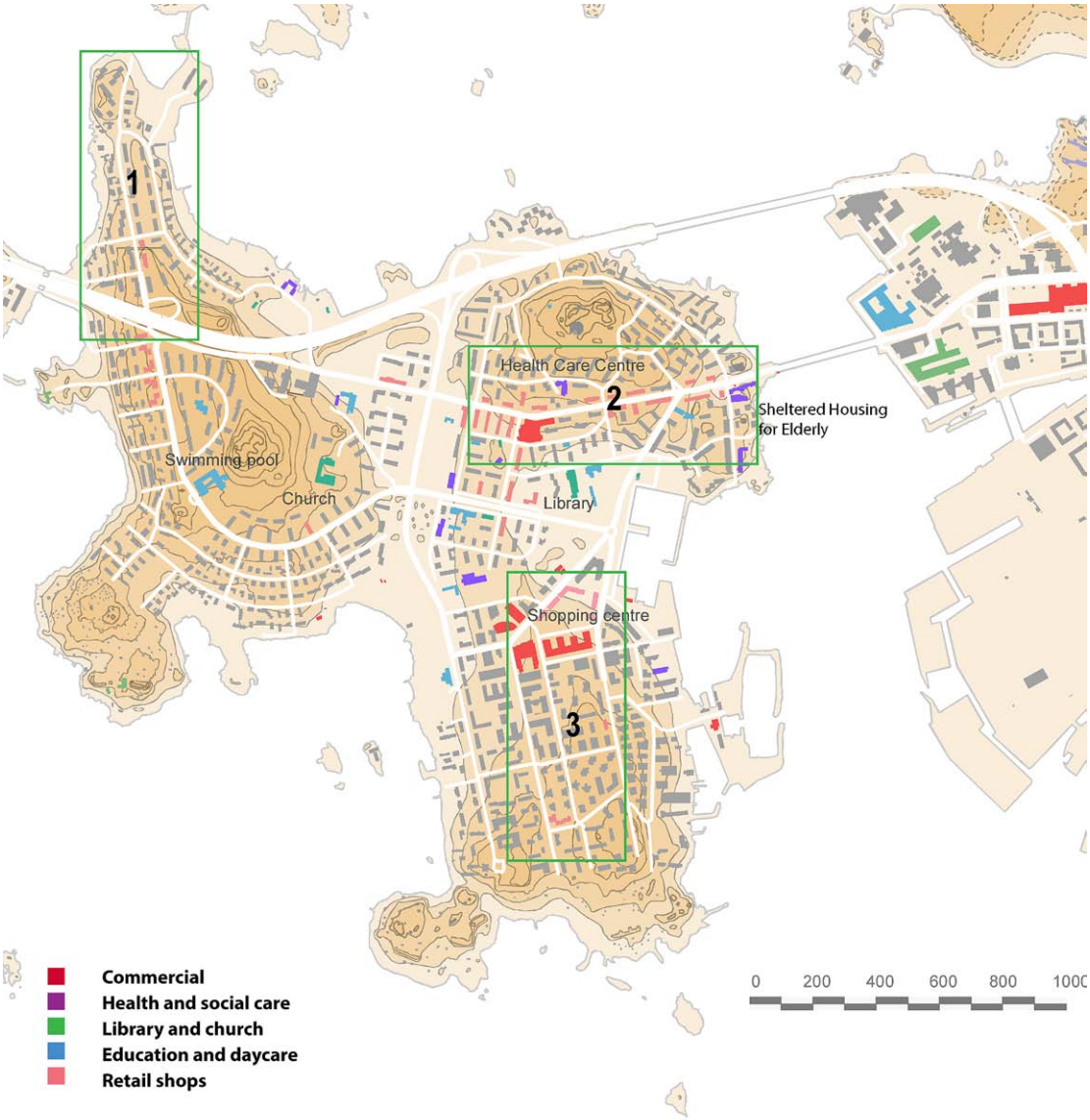

Figure 43. The characteristics of the built environment are different in the north-west (1), along the main road (2) and in the south of the Lauttasaari district (3) (map by L. Nenonen).

Residents' reported experiences of the neighbourhood

The older residents considered the views from their apartment (52 out of 64 people), and the proximity of the sea (47 out of 64 people) as the best features of their living environment. The immediate surroundings and courtyards were visited frequently and became important for older residents. Moreover, the green recreational areas and the sea were not easily reachable. Seven out of ten respondents 85 years old and over considered the courtyard as one of the best features in their living environment, and six of them reported visiting the courtyard on a daily basis. Then again, the residents participating in the workshops pointed out the lack of possibilities for common activities in the courtyard with their neighbours. They considered the different living phases and daily schedules of residents of various age groups as one reason for the few activities in the courtyard. Furthermore, the discussion in the workshops revealed that many of the residents had been living for a long time in the neighbourhood and had made spontaneous social connections with some of their neighbours. They were ageing together and supporting each other by keeping in contact on a regular basis. For the residents, however, their relation to their neighbourhood was changing due to the new urban developments. This was affecting their feeling of safety and residential satisfaction.

The participants in the workshops reported that they often used walking paths across parks on their way to do their daily shopping for groceries. The participants felt that the walking paths in the green parks were safe and attractive. They considered them safer than pavements, even in winter, when the snow from the traffic lanes was often piled up on the pavements. The respondents reported that the snow on the pavements, at bus stops and on street crossings hindered walking. Walking was difficult especially with a rollator or other walking aids. Observation in the winter showed that a few people with rollators would rather walk on the roads, where the snow had been removed, rather than on the pavement. This creates an additional safety risk.

Moreover, during the observational walking tour, the residents pointed out some specific places in the neighbourhood which were sheltered from the wind and traffic noise or with a beautiful view. They appreciated these special places on the island (which was usually windy) and experienced them with all the senses. This kind of user

44.

45.

Figure 44. The semi-public spaces in the courtyards are potential spaces for activities for various resident groups (photo: Nenonen, L.).

Figure 45. Sheltered resting places along the walking paths, instead of placing them on the lawn might attract more people to spend time outside (photo, Nenonen, L.).

knowledge can be used to create meaningful spaces with positive sensory experiences in the neighbourhood. In general, the older people appreciated sheltered spaces and resting places in green areas with benches. Many respondents complained about the lack of benches. Moreover, during the walking tour, the residents reported some discomfort, as the benches were sometimes moved from the walking paths to the lawn and were therefore unreachable by rollator.

> *"This year the campaign "Take the older person outdoors" was launched. Well, where do you take them if there are no sitting places? In my opinion, even if we do these kind of senior apartments, we should also think about how the outdoor walking paths are." (Senior resident, female)*

The sea was observed to be a major attraction and source of well-being for all residents living in the neighbourhood. However, the results of the questionnaire showed that long walking distances and the lack of benches and resting places along the walking path made some places, such as the seashore, inaccessible to older residents. Most respondents considered the seashore to be the best place in the neighbourhood. Regretfully, at the same time, some of the respondents reported not being able to get there anymore. The local association for seniors organises regular walks along the seaside during the summertime. The researchers participated in two of these walks with the approval of the other participants. The participants were observed to be people of retirement age in relatively good physical condition. The walk was found to be a physical, emotional and social experience. The qualitative characteristics of the walking environment were important, as walking was experienced with all the senses. During the walk, the participants stopped to contemplate nature and the beautiful views. The walking tour of approximately 2 km ended in a café on the beach. In the summer, the beach is a common living room and centre for various activities for all people living in the neighbourhood. It is a place for multigenerational integration. Furthermore, it is a space for various physical activities.

Access to local services

Older participants in the workshops preferred to support the small local retail shops along the main street rather than go to large shopping centres. The respondents appreciated the personal service provided by the small retail shopkeepers and other service providers. For example, the local shoemaker was famous for his service and customer friendliness. The results of the questionnaire revealed that the grocer's, health care services and cafés were regarded as the most important services in the neighbourhood (Fig 48.). Moreover, the proximity of the pharmacy was important, especially for people 85 years old and older. The participants in the workshops considered the current services of the banks and post offices to be a challenge. Furthermore, they considered online services and the restricted service hours in banks offices to be discriminating.

Figure 46. Older people, who had previously had some instructions on the use of outdoor gym equipment where using the equipment (photo: Nenonen, L.).

> *"It is the same with banks and business offices – they have all removed the chairs. There are only chairs in the waiting area, but when you go to the desk, they have all been removed. They have only a low service desk or a desk to rest your hand on while you write your signature. Well, how can a person suffering from dizziness or who is old use that?" (Resident, female)*

The participants in the workshops, who lived in the southern part of the neighbourhood, mentioned the easy access to the new shopping area in the south by public transport and by walking. They also pointed out the challenges to access the small retail shops. During the observational walk the residents reported that the steps in front of the shops create obstacles and made them inaccessible (Fig. 48). Furthermore, the older residents were concerned by the narrow pavements that they needed to share with bicycles. Speeding cyclists raised their fear towards these walkways. Moreover, they found small lanes and narrow pavements with a side slope difficult to walk on, especially with a walking aid. The sense of balance may deteriorate with ageing and a side slope may increase the risk of falling. During the walking tour, in some small lanes, the residents were observed to walk on the road rather than on the uneven pavement. A similar observation was made in winter when snow hampered the use of pavements.

According to our questionnaire, more than 90 per cent of the older people did their daily shopping alone and independently. Participants in the workshop reported going by foot to the nearby grocer's and walking or going by bus to specialised retail shops further away. However, they explained not being able to return home from the grocer's on foot carrying heavy bags. Instead, they preferred to use public transport. Therefore, older people living in the central part of the neighbourhood preferred the new accessible services in the south. Furthermore, in the case study area, activities for older people were organised in the local parish centre and the health care centre. These services were both situated on a hilltop, were not easily reachable by foot. The parish centre was a good visual landmark, but it was not reachable for frail older people, even by public transport. They had to go there by taxi. Public transport would need to better connect people to the local services in the neighbourhood.

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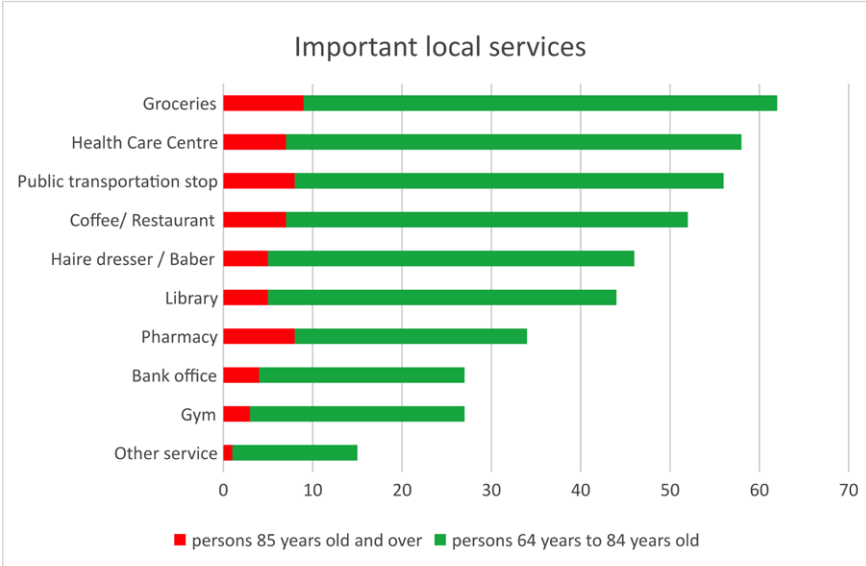

48.

Figure 47. The importance of local services as reported by all respondents (N = 64) and those 85 years old and older (N = 10).

Figure 48. Local retail shops on the main street have many obstacles around their entrances. The bikes and promotional stands on the pavement take away space from pedestrians (photo: Nenonen, L.).

Figure 49. A new accessible shopping area in the south of the district; people 65 years old and older have moved to this part of the district (photo: Nenonen, L.).

Responses of the local small retail shopkeepers

Healy (2004) points out that products and services that are currently designed for younger customers may require modifications as the population ages. In turn, new opportunities for local business may open if services become more user-friendly for older customers. Keeping this in mind, an online questionnaire was published and targeted at the local retail shopkeepers. Moreover, a paper version of the same questionnaire was distributed directly to the local retail shopkeepers. The questionnaire was related to the client structure, the location of the premises and accessibility of the services. Twenty-two responses were gathered from local retail shopkeepers. The vast majority (N=16) of the respondents had small retail services and employed one to four people. More than half of them had been situated in the same neighbourhood for more than ten years (N=13). Some of the shopkeepers reported to be ageing and living in the neighbourhood themselves. Almost half of the shopkeepers responding to the questionnaire reported to have adjusted their services in order to satisfy older clients (Fig. 50). They reported devoting more time for older clients and using larger fonts when providing information. Currently, only three shopkeepers out of 22 had made any modifications to their facilities for older customers (Fig. 51). In the future, however, investment in accessibility may be an important aspect of competitiveness for these commercial services.

Mobility and the use of public transport

The shopkeepers regarded the main advantage of the location of their premises was the possibility to get there by bus. However, the local transport network has been modified, and direct access to the retail shops on the main street and connections from some parts of the island have been lost. This creates hindrances especially for the residents in sheltered housing situated near the bridge in the east of the neighbourhood. Feeder traffic connects to the metro station, and fewer public transport connections remain in the neighbourhood (Fig. 52) The shift from one bus to another or long walking distances may be needed to access the retail services, possibly affecting the use of them.

According to our questionnaire, 90 per cent of all respondents over 65 years old (N = 64) used public transport. However, for those who were 85 years old and older (N = 10), 9 out of 10 mainly used taxis to access services (Fig. 52). Further discussion in the workshops revealed that the attitudes of relatives affected the use of public transport. For example, one participant in the workshop mentioned that her children had forbidden her to use public transport for safety reasons. She was using a rollator and had a fear of falling. However, more easy-access vehicles, a bus stop in close proximity and service-minded bus drivers may encourage older people to use public transport more often. Increased mobility helps older people to live independently and to be integrated in society.

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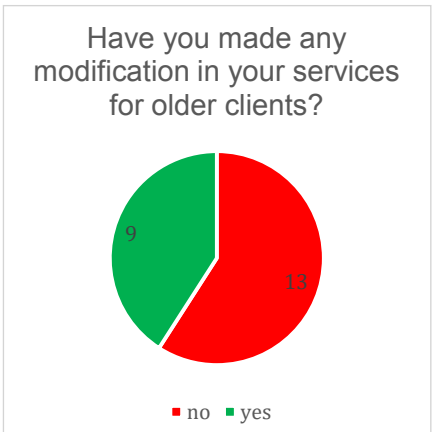

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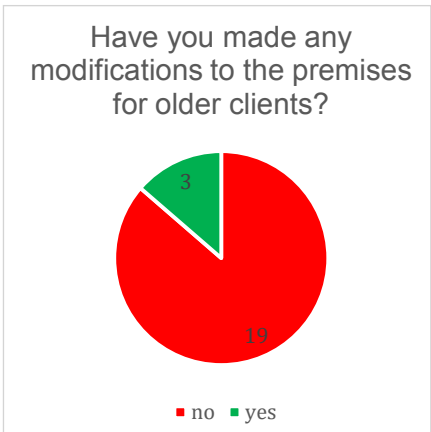

Figure 50. The retail shopkeepers had adjusted their service for older clients.
Figure 51. Only a few modifications to the premises had been made.

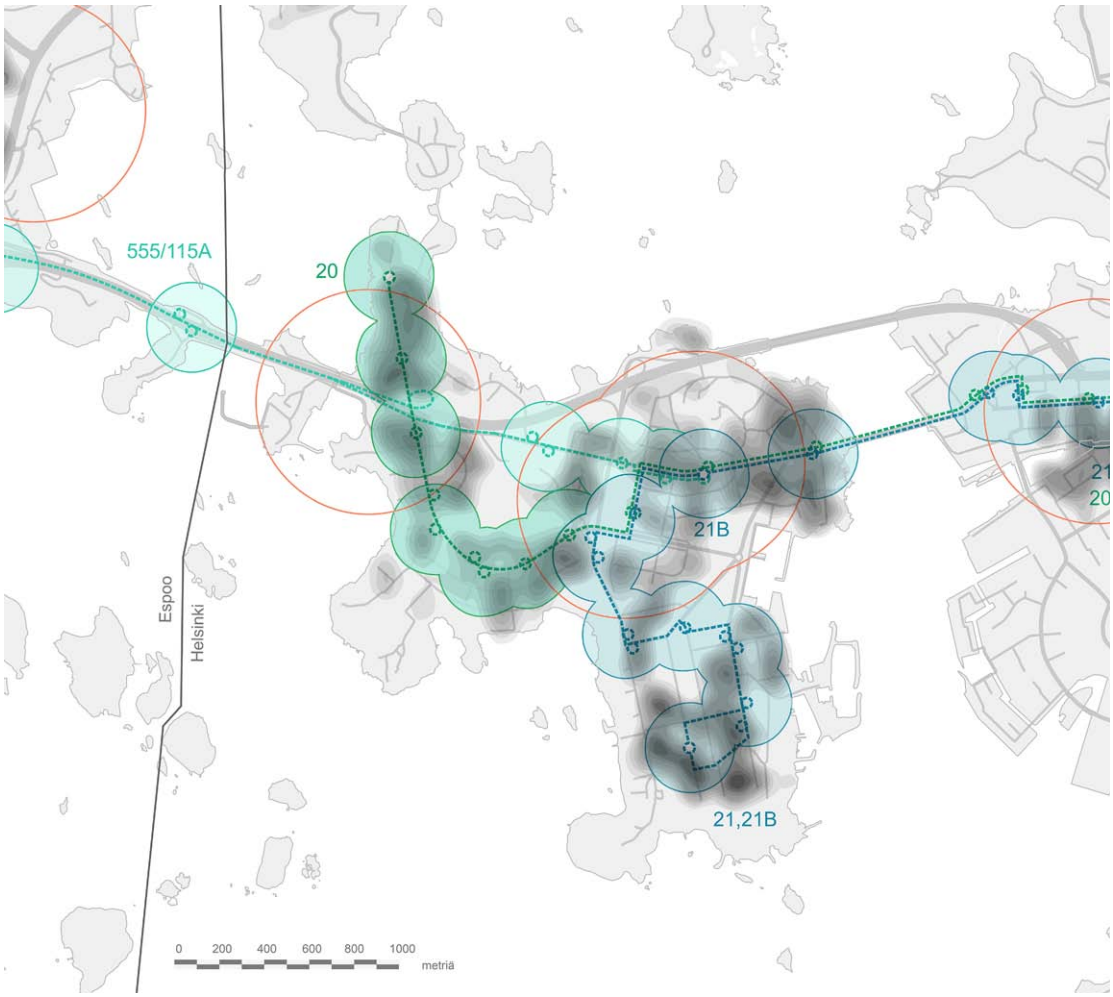

Figure 52. The bus connections and bus stops with a 200-metre walking distance (Nenonen, L.).

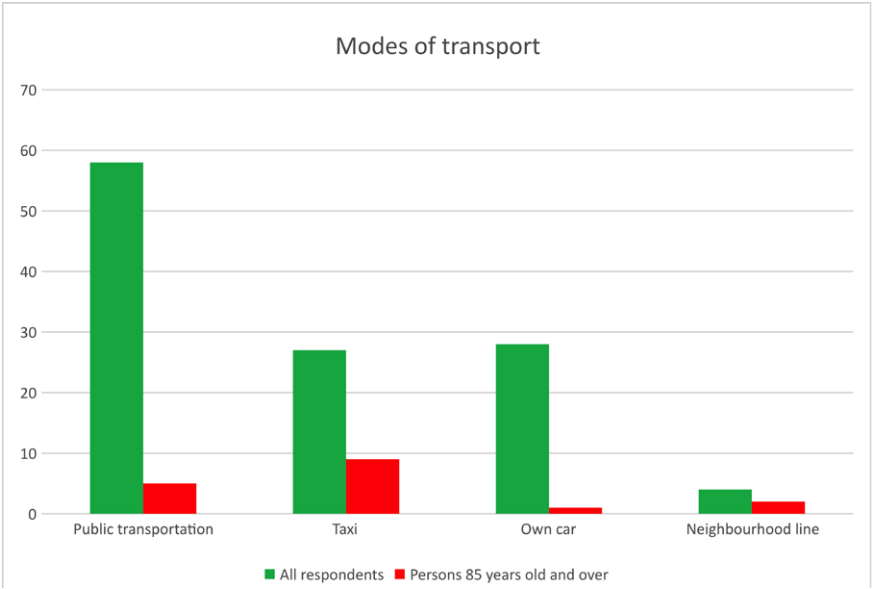

Figure 53. The proportion of modes of transport as reported by all respondents (N = 64), compared to the respondents 85 years old and older (N = 10).

In order to evaluate the accessibility of social and health care services for older people, the public transport connections from the housing area to the destination were assessed. The connection to the nearest centre for older people run by Helsinki city social services was chosen as a destination example. A travel time estimation with the new feeder traffic connections to the metro station was based on the network of bus services and the location of new bus stops. The travel time information before and after the changes were compared and travel times were presented on maps (Figure 54 and 55). Helsinki Region Transport (HSL) provided information about travel times by public transport (Matka-aikakartta). From the areas in the neighbourhood where the density of seniors was high, the estimation showed an increase in travel time. Moreover, the direct connection was lost, and residents would need to change from one vehicle (a bus) to another (the metro), which may reduce the likelihood of the trip being made. One of the residents living in the sheltered housing in the east of the area pointed out:

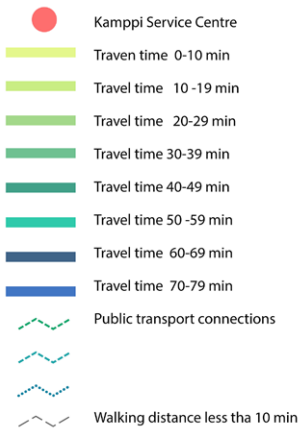

Figure 54. Travel time by public transport to the nearest elderly centre, 2016 (map: Nenonen, L.).

Figure 55. Travel time estimation by metro and feeder traffic to the nearest elderly centre, 2018 (map: Nenonen, L.).

> *"Now we have it so good – if you want to go somewhere, you just go 100 metres to the bus stop. You simply take a bus and then come back the same way. It is great. And then comes the metro. Will you then always need to first go to the metro, walk 100 metres downstairs, go to the centre and then change again? What I'm afraid of is that there will be only one bus every twenty minutes." (A resident in sheltered housing, male)*

Local network of service providers in elderly care

The need for care services delivered at home and home help increases as larger number of frail people live in their own homes. However, the need for assistance and home help may generate new opportunities for small local service providers. One idea is to offer more personalised and more effective services with the collaboration of public and private service providers, together with third sector. The third sector includes both national non-profit organisations as well as local associations. They may provide housing services, day activities as well as leisure activities and coordinate the volunteer work. Local networks and collaboration with private, public and third sector service providers were studied via a network management analysis. The results have been published in a separate article (Nykänen and Jyrämä, 2013). In the case study area, the municipal actors had previously been trying to generate a network of different service providers operating in the neighbourhood. The network had had meetings approximately twice a year over two years. Physiotherapists, home help and home care service providers were invited to collaborate. The analyses brought up the need for better planning and managing these local networks. This would require human resources, a coordinator to help to connect the local stakeholders and to supply personalised services for clients. According to the network management analyses, the third sector actors, in particular, seemed weakly connected to each other within their group (Figure 56.). The collaboration between them was coordinated through a public actor and less directly between third sector organisations. Furthermore, the management of the whole network and the connections between the different actors from the private sector was identified as a challenge (Nykänen and Jyrämä, 2013).

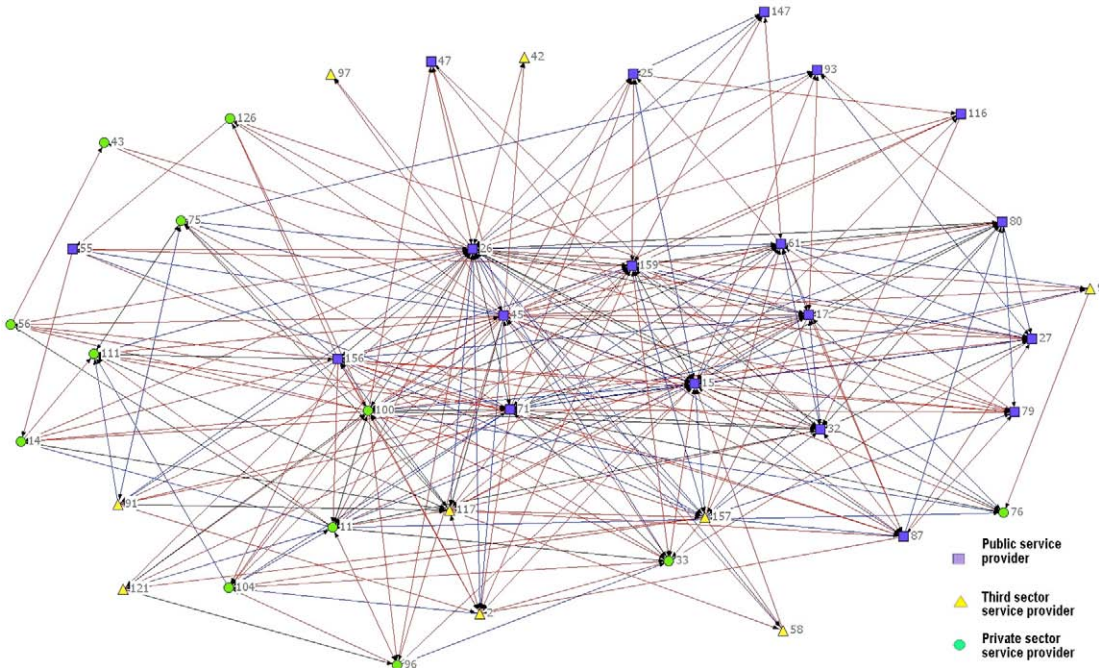

Figure 56. The network of service providers for elderly care (by Katri Nykänen, PhD student, Department of Management, Aalto University, 2013).

The collaboration between the public, private and third sector locally may offer new possibilities for a better and larger range of services. However, Hyvärinen (2015) pointed out the challenge of establishing common goals with all the stakeholders in such a way that all of them can benefit from the collaboration. The human and economic resources of the different types of service providers vary. Moreover, small private companies and volunteer organisations do not necessarily have the human or economic resources to invest in networking activities. They may not have resources to coordinate or manage the network. Moreover, the regulations concerning public procurement and free competition may hinder the public service provider to manage the network. Therefore, according to Hyvärinen (2015) it may require time and effort to build up trust and mutual understanding between all the stakeholders.

57. 58.

Figure 57. Various activities, for both male and female visitors are organised in the Kamppi service centre (photo: Verma, I.).

Figure 58. Kamppi service centre in Helsinki is a popular meeting place for social contacts for seniors (photo: Verma, I.).

Aspects of Universal Design, adapted to the neighbourhood level

The densification of existing housing areas should be done bearing the challenges of older residents in mind. New affordable rental apartments and right of occupancy housing may be needed in old neighbourhoods to provide more choices for older residents. Moreover, neighbourhoods with a high percentage of older residents would need development of outdoor environments and a safe, walking friendly environment. All new apartment buildings and shared spaces should be designed to be age-friendly. The storage rooms, waste bins and other areas should be easy to use and accessible with a rollator. Current legislation provides that passage to the building from the boundary of the plot need to be accessible. However, the seamless design of the apartment building, the threshold spaces inside and outside the building and connection to the street are all necessary to assure the accessibility. Often, the problems may result from the incompatibility of the design or realisation of the plot with the street or with the adjacent plot. Moreover, the courtyards in new apartment buildings should be designed as common "living rooms" with activities, urban farming and sitting places that enhance social contacts between generations and reduce segregation.

At the neighbourhood level, the principles of UD enhance access to local services and health care services as well as to other social activities. The topography, the hilly terrain and uneven pavements may create challenges for older residents with a poor sense of balance. The local green areas and local services need to be easily accessible by walking, cycling or by public transport. The connectivity and hierarchy of streets and direct short cuts to local destinations may enhance walking. The separation of car and bicycle traffic from walking paths enhances the feeling of safety. The pavements and walking paths in the parks should have an even surface and be well maintained the whole year around. Moreover, walking paths should be made through parks and green areas and they should be provided with benches. The walkability of paths, pavements and streets is also important in the winter. In particular, the pavements, street crossings and transport stops have to be free from snow. Therefore, the dimensioning of pavements and pathways for the mechanical removal of snow would facilitate the use of a rollator or wheelchair as well as prams. Moreover, quality indicators of the winter maintenance of walking environment might help to improve the safety of all pedestrians.

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Figure 59. The snow on street crossings hamper the use of a rollator or a wheelchair (photo, Verma, I.).

Figure 60. The perception of the snowy pavement is challenging (photo, Verma, I.).

The hierarchy and connectivity of streets should improve accessibility, walkability and safety. The pavements and walking paths should have free space for wheelchair users and a snowplough. Short walking distances from the home to local services (150 m–250 m) and bus stops (100 m–150 m) may enhance the independent coping and mobility of older people. Good information about the public transport network, sheltered bus stops and accurate timetables should be provided for older residents. The transport network should take into account easy access to green areas and activity centres for older people. The case study showed that it is important to take the existing sheltered housing and activity centres for older people into account when planning any modification to the transport network. Otherwise, sheltered housing that was previously situated in an ideal position regarding public transport may be set to become an unfavourable living place for older residents.

The shops for buying daily groceries need to be accessible. Many retail shops have already understood the potential of senior clients. However, the premises need to be suitable for older people as well. A level entrance and sufficient space to move around with a walking aid inside shops are important. Moreover, local retail shops that open onto the street may also be able to offer sitting places for their clients. Furthermore, low threshold services that older people can access without appointment, providing information on services and situated in frequently visited public spaces may improve the accessibility to basic social and health care. Information on local events and social activities can be distributed, for example, in shopping centres, health care centres, libraries and other spaces frequented by older residents. Furthermore, the older residents pointed out the need for informal meeting places without any organised activity. Shared spaces in the neighbourhood should be accessible to all, regardless of their age, background or religion.

Case Study 2

The background and aim of the study

In the second case study, the focus was on the user experience of shared spaces in sheltered housing. The case study was implemented in three separate sheltered housing schemes built in the 1970s and 1980s which were undergoing renovations. The renovation processes in each building were at different phases. The owners of the buildings were drafting the needs for future renovation or wanted support in the finishing phase of the refurbishment. One of the sheltered housing schemes was run by the City of Helsinki (Case Study 2a), the two others by non-profit associations (Ilmari Helanderin säätiö (Case Study 2b) and Diakonissa Hoiva (Case Study 2c)).

The aim of the study was to assess which factors in the living environment provided satisfaction and a positive experience to the older residents in sheltered housing. The challenges of the renovation included determining how to reduce feelings of loneliness, enhance social and physical activities as well as the general well-being of frail residents. The goal of the study was to gain further knowledge for the design of shared spaces and semi-public spaces and to identify aspects of housing design that would enhance the integration of older residents in their neighbourhood. Living in sheltered housing may segregate the older residents from the rest of the neighbourhood, and residents may feel excluded. The location of such facilities and the design of the buildings does not often promote activities with other people outside the boundaries of the housing scheme. Therefore, the focus was on shared spaces and the immediate surroundings of the sheltered housing and the connection to the surrounding environment. This study aimed at developing the versatility and quality of the environment as a means of improving independent coping, well-being and social activities among the residents.

In the project the author worked as the project manager and researcher, coordinating a multidisciplinary research team, including a

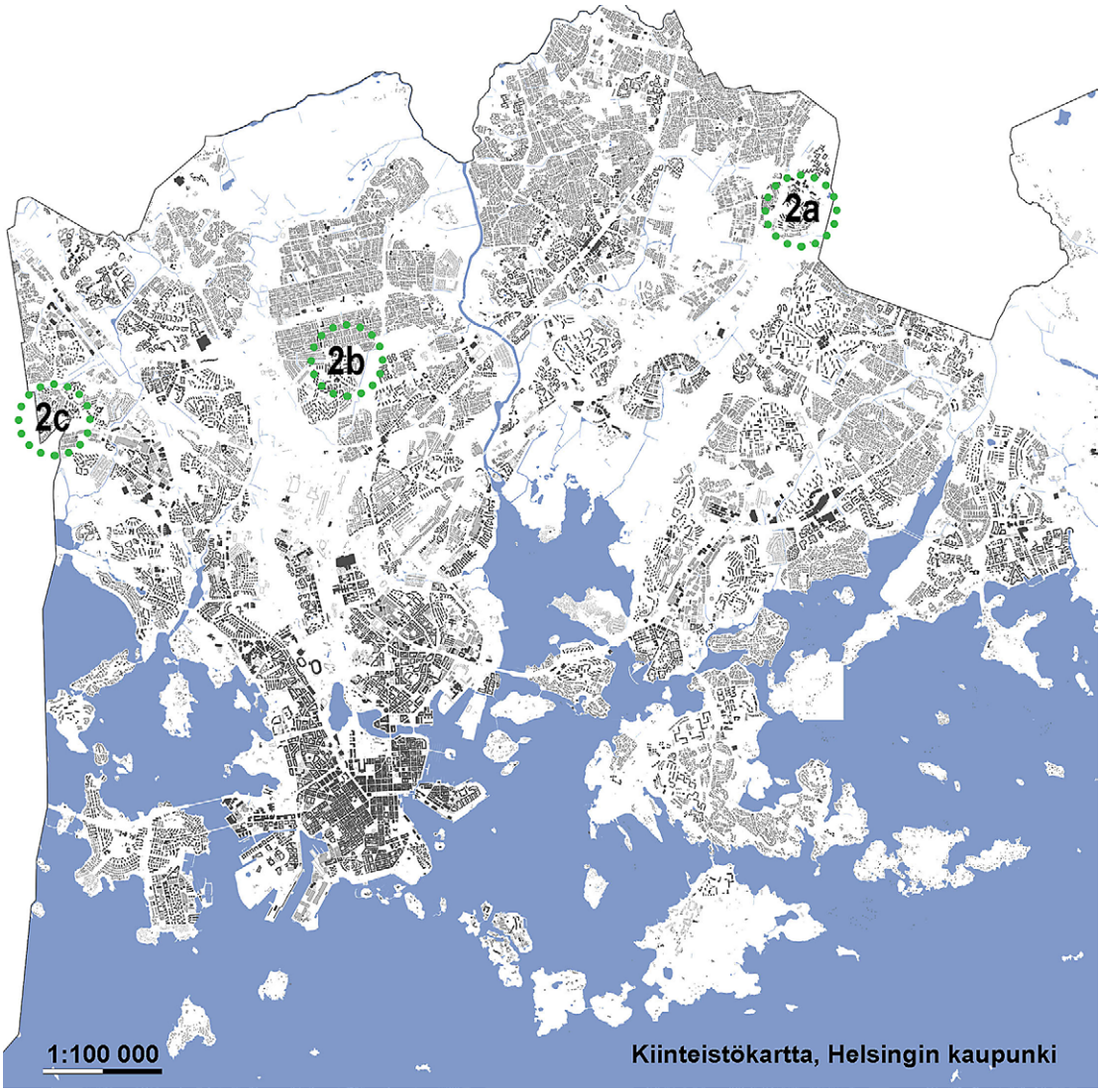

Figure 61. The sheltered housing schemes were situated in the suburban region of the City of Helsinki, in the districts of Jakomäki (Case Study 2a), Maunula (Case Study 2b) and Pitäjänmäki (Case Study 2c).

researcher in architecture at the department of construction economics and master's level students from different universities and backgrounds (in the fields of landscape architecture, design and environmental psychology as well as architectural lighting). Several qualitative methods were applied to explore the user experience of the older residents. The living environment in three sheltered housing schemes was assessed in order to find ways to improve residential satisfaction. The residents of two of the facilities participated actively in the study. The third sheltered housing scheme was undergoing renovation, and the residents had moved out; therefore they were not involved. The residents shared their personal experiences and assessed their living environments with the research group. They were considered the main user group of the premises even though the staff members were also interviewed. All residents had physical or cognitive disabilities but were still able to live in their own apartments.

The results of the study were directly implemented in the renovation projects. The focus of the study was on the multisensory quality and visual perception of the spaces. Universal Design aspects in the project referred to the visual, acoustic and haptic environments. The research produced knowledge related to visual perception and wayfinding which can be used to improve the housing design for older people with reduced sensory and cognitive functioning capacities.

Implementing participatory methods in the sheltered housing scheme

Several qualitative research methods helped to gain in-depth knowledge on the use of the shared spaces and outdoor environments in the sheltered housing (Table 13) studied in the research project. The residents' reported experience and observations enabled a holistic view of the use of the shared spaces indoors and outdoors. Resident panels and observational walks were carried out in order to involve the older residents. Their experiences and observations on-site provided knowledge on the use of the shared spaces in the sheltered housing. A voluntary residents' panel (N = 26 participants) from the sheltered housing in Jakomäki (Case Study 2a) and further a focus team (N = 8 participants) formed from the residents' panel assessed their living environment. A

questionnaire targeted at residents in Maunula (Case 2b) aimed to assess the frequency of use of the shared spaces in the sheltered housing and its surroundings. Furthermore, ten people, including six visually impaired people, participated in semi-structured interviews discussing the sensory quality of the premises and wayfinding on the premises. Moreover, a small-scale pilot construction was co-designed with the residents in Jakomäki and implemented in the sheltered housing. It was an important tool for the empowerment of the residents and encouraged them to be engaged in the study. In Maunula, the residents were asked to assess a lighting scheme that was realised to improve the perception of the shared spaces. The residents in extra care housing in

Table 13. The number of participants in the case study and the means of participation.

Sheltered housing	Questionnaires	User participation	Pilot
Case 2a Jakomäki Participants N = 26		Focus group discussion N=8 Art based workshops N=26	Cosy corner
Case 2b Maunula Participants N = 16	Use of outdoor spaces and commonly used premises N=10	Individual walk-through, people with visual impairment N=10	Lighting pilot

Table 14. The sample of the people interviewed in the study (N = 10).

Participants	With visual impairment	With normal vision
Total number of participants	6	4
Male	1	-
Female	5	4
Hard of hearing	5	1
Average age (years)	89.9	77
Average length of residence (years)	4.2	2

Pitäjänmäki (Case 2c) had been moved to other premises for renovation and did not participate in the study.

The target group in Maunula consisted of older people with visual impairments with no diagnosed memory loss (N = 6). Moreover, four residents (N = 4) with no diagnosed visual impairments were involved in the study. Most of the residents with visual impairments also had hearing difficulties (Table 13). The average age of the visually impaired people was higher, and they had been living longer in the sheltered housing than the residents with normal vision. The participants used walking aids such as rollators and walking sticks.

Residents' panel

People with varying levels of functional impairment took part in the residents' panel. They were asked to discuss pleasant and unpleasant aspects of living in the sheltered housing scheme. A few of them also kept a diary and took photos of their daily environment. A disposable, single-use camera was given to them for this purpose. Moreover, their hopes concerning their daily environment were elicited by using art and other methods that stimulated sensory experiences. In Case Study (2a), art-based methods (the use of colours, natural materials and a simple 3D model) helped the residents to verbalise their personal desires and wishes regarding the premises. These art-based methods may enable people to express themselves despite differences in verbal abilities (Levine, Knill & Levine, 2004, p.121). The methods used in art therapy elicited the aspirations and dreams of the residents living in the sheltered housing environment. The colours, shapes and atmosphere of the residents' art productions were discussed and verbalised in the focus group, and were discussed personally with each participant. Furthermore, a simple three-dimensional model was used to further explore and concretise the themes related to the built environment which had been raised in the resident panel. Natural materials, such as sawdust, sand and moss, were used to work on the model. Residents said that the different textures of the materials were pleasant to the senses of touch and smell. Moreover, they evoked emotions and memories of the past. One of the participants reported that she had not felt sand in her hand for years. The simple 3D model (Fig. 62) seemed to facilitate an understanding of the sheltered housing and the immediate surroundings as an entity.

Figure 62. One of the proposals of the residents was a traditional wooden sauna building and a cooling off space in the garden (Art-based methods used by Ikävalo, S., student at the Department of Design, Aalto University, photo: Ikävalo, S.).

Observational walks

Semi-structured interviews and observational walks were conducted with the residents of the Maunula sheltered housing scheme (Case 2b) to study the navigation and wayfinding of the residents with visual impairments. The semi-structured interviews were conducted personally with each participant prior to the observational walks. During the interviews, the residents were asked about the use of shared spaces as well as the immediate surroundings. The individual walk-through was carried out inside the sheltered housing area. The observational walk in the shared spaces was preliminarily planned. The target was

to identify possible shortcomings felt by the residents in the built environment and immediate surroundings. The wayfinding and orientation strategies of the residents were studied through specific questions and observation. In this study, wayfinding referred to the requirement to "*know where to go and how to get there*" (Montello and Sas, 2006). It requires problem-solving and decision-making processes. Therefore, people suffering from cognitive decline or Alzheimer's were excluded.

Moreover, the comfort, temperature, lighting, colours and acoustics of the space were assessed with the residents. Pairs of adjectives, for example "moist–dry", "fresh–stuffy", "fragrant–smelly", were used to collect the impressions of the residents at specific places in the building. Conversations during the observational walks were recorded. The results of the walk-through and the interviews are described in detail in a master's thesis on behavioural sciences that was carried out as part of the research (Sanneman, C., Department of Cognitive Sciences, Helsinki University, 2012).

Small-scale pilot constructions

Two small-scale pilot constructions were realised in the sheltered housing schemes. These were carried out in the shared spaces, entrance hall and staircases. In Jakomäki (2a), on the basis of the themes that came up in the focus group meetings, a cosy sitting alcove was co-designed with residents and implemented near the entrance. The acoustics, lighting and visual aspects of the space were taken into account in the realisation in order to encourage social intercourse. Moreover, students of architecture implemented art works in the entrance and staircases of the buildings. Furthermore, in Maunula (2b), residents were asked to evaluate a pilot lighting scheme. It was realised to improve the perception of the shared spaces and to enhance social activities in them. Two similar spaces were observed during a four-week period. The lighting was modified in only one of them, and the use of the spaces was monitored. The results were partial. The residents felt that the new lighting was much better than the original lighting. However, the uncomfortable furniture in the pilot space was not changed and therefore, the residents were not spending time in the space. In conclusion, the attractiveness and comfort of a space are a set of elements. In this case, the lighting alone did not increase the use of the space (Maila, R. Architectural lighting programme, KTH, Sweden, 2012).

Spatial analyses of sheltered housing

The residents of each of the sheltered housing schemes had moved to the premises from all parts of the city. Some of the residents reported having had difficulties adjusting to the neighbourhood in the early stages. The Jakomäki (2a) area especially had a reputation as an unpopular living area, which reduced the sense of security of some of the older residents in the sheltered housing. The fear of walking around in the neighbourhood had made the adaptation process longer. The interviews with the residents of the Jakomäki sheltered housing scheme revealed that some of the residents, after two years of residence, reported not being aware of the local services that were within walking distance. They had not explored the surroundings and did not know the neighbouring areas, except for the health care centre that was visible from the premises (Fig. 63). The local commercial centre with small retail shops in the vicinity of the sheltered housing was not familiar to them. However, those people who were more mobile had become familiar with the local services and were attached to their living environment. Many destinations: a grocery shop, pharmacy, library and church were all situated within walking distance of the sheltered housing. However, they were not exploited for physical and social activities, or in the rehabilitation of the residents. Many new units of sheltered housing collaborate with schools and kindergartens, to enhance cross-generational encounters.

The potential for accessible walking paths and better outdoor activities around the premises were assessed. Jakomäki (2a) had the largest sheltered housing scheme with five buildings in an E-shape, and many residents were able to live quite independently. It had the largest outdoor areas of the three sheltered housing schemes assessed. Two separated courtyards were formed between the apartment buildings. One of the courtyards, called *the green yard* by the users, was built including natural elements, several benches and a patio. The residents frequently used it. Another courtyard, called *the stone yard*, was realised with an even pavement, benches and attention to accessibility. However, it was less attractive and there was no shade. Therefore, it was too warm in the summer and was not used.

The sheltered housing in the Maunula district (Case Study 2b) was further away from commercial services. It was located near the local health care centre and social welfare centre (Fig. 67). The nearest com-

mercial services were a walking distance of 400 m from the sheltered housing. There were, however, good opportunities for going for a walk in the nearby green area. Previously, an accessible walking path with benches and a handrail along the path had been implemented by the municipality near the sheltered housing. The walking path had been designed with attention to people with visual impairment and restricted mobility. It had, for example, an even walking surface and guiding tactile materials along the path. There was an accessible walking path in the nearby woods (Fig. 67). The circular walking path (250 m long) had been realised with attention to accessibility. It had benches and a handrail along the path. The walking surface also had tactile paving to mark the edges for people with visual impairments (Fig. 68). Some of the residents frequently used the path.

The third facility studied was a form of extra care housing. It was situated in a residential area of Pitäjänmäki (2c). Most residents had late or terminal stage of Alzheimer's or other cognitive impairment. The extra care housing was situated a long way from any commercial or other local services. A public transport stop called the "neighbourhood route" was located next to the premises. This service route was designed to particularly serve the older people and people with mobility impairment. It was operated from Monday to Friday during the day, with services running once or twice an hour. Even though the residents were not able to use the bus independently, it made friends' and relatives' visits to the facility easier.

The extra care sheltered housing scheme in Pitäjänmäki (2c) was under renovation. A homely atmosphere, perception of the space and clues in the environment are important, especially for residents with Alzheimer's disease. Therefore, the aim of the project was to support the renovation work and to improve knowledge on the visual perception and wayfinding inside the premises. The living space in the use of the residents at the extra care housing facility was limited. They mainly stayed in the shared spaces with the staff members. One of the challenges of the renovation was to provide an accessible courtyard for these residents with cognitive impairment, who are not able to go out alone. The target was to provide a safe outdoor space with edges that was not felt to be oppressive. Moreover, the building was situated on a steep slope, and there were no safe walking paths near the building. The possibility for organising a safe garden north of the building was

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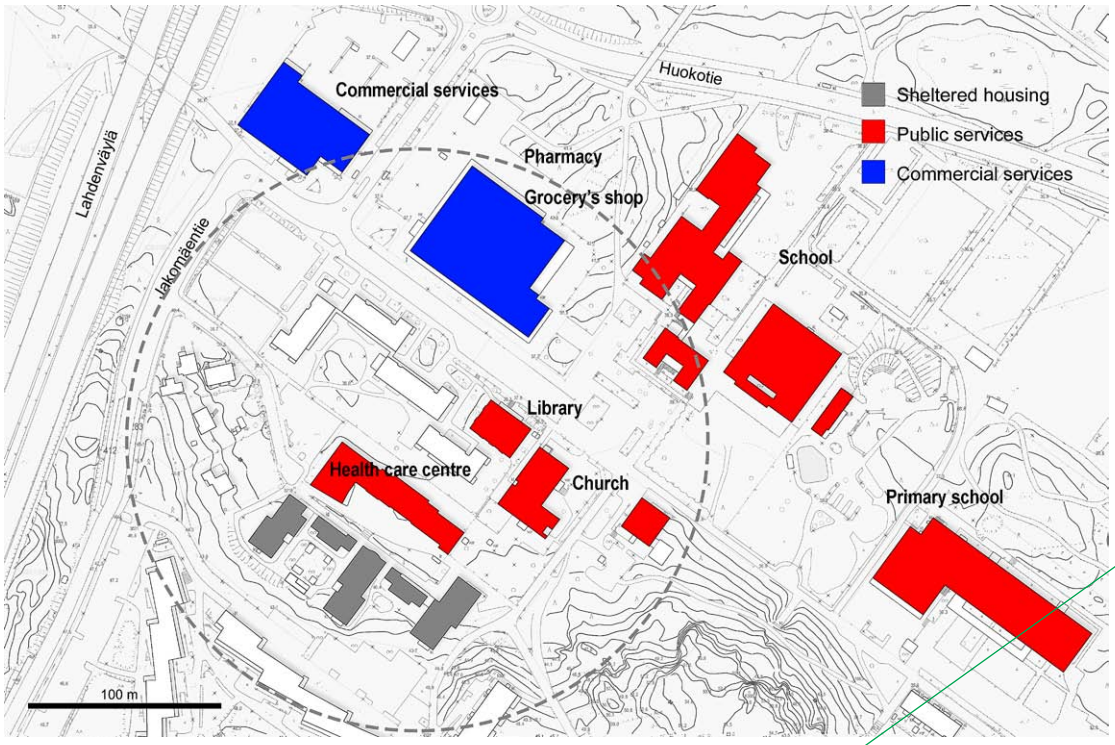

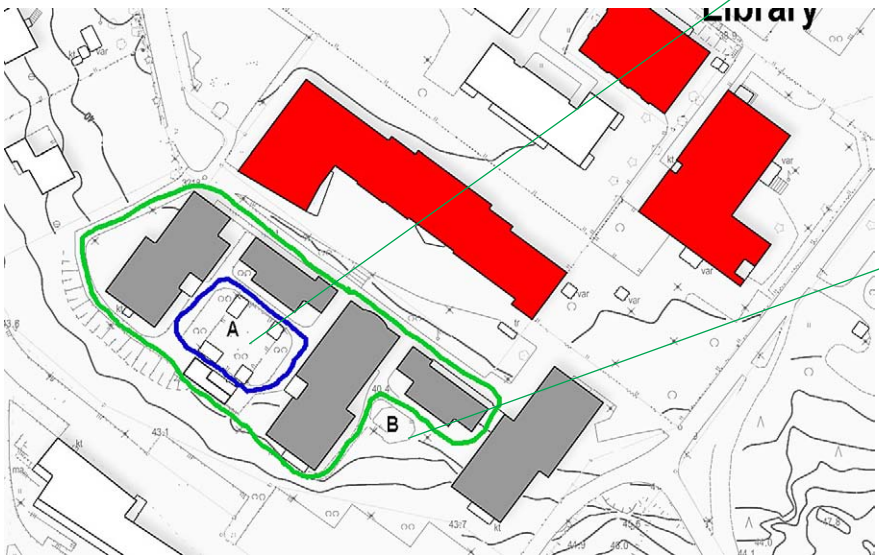

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Figure 63. There are many destinations and services within a 150 m radius walking distance of the sheltered home that were not efficiently in use (map: Ala-aho, R.).

Figure 64. The length of walking paths around the sheltered home could be from 100 m to 260 m (map: Ala-Aho, R.).

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Figure 65. "The stone yard" (B) had no shelter from the sun and was felt to be too hot in the summer; it was not used for activities (photo, Hätönen, J.).

Figure 66. "The green yard" (A) with sheltered sitting places was used both for spontaneous and organised activities (photo, Hätönen, J.).

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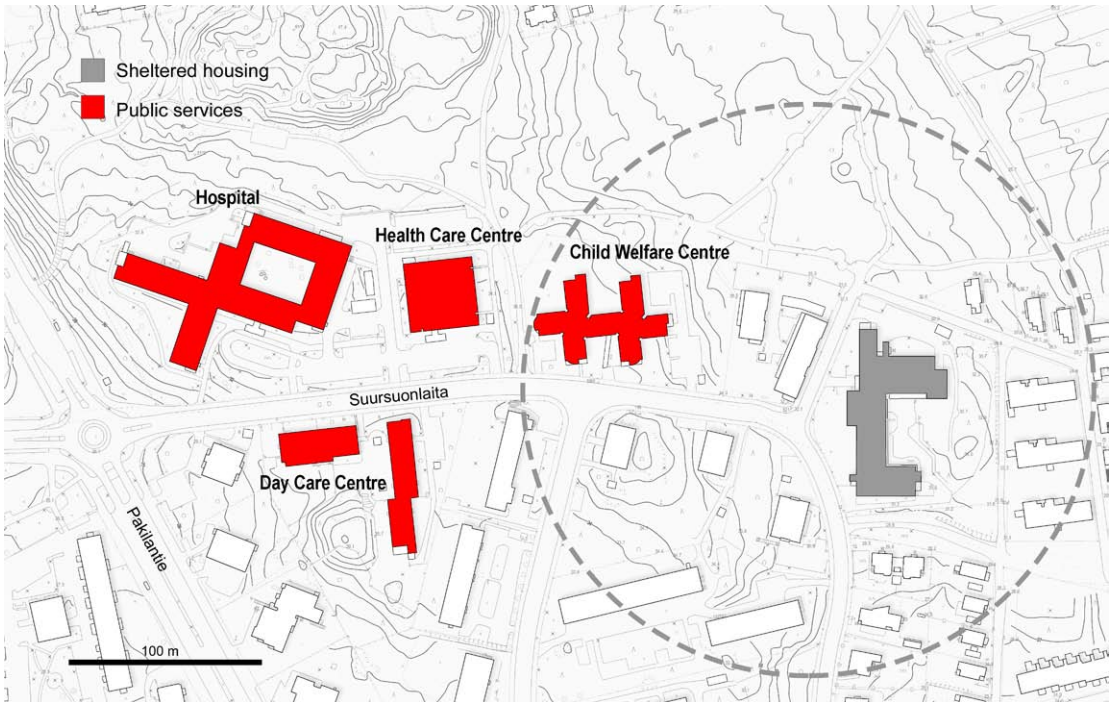

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Figure 67. The sheltered housing site in Maunula is situated within walking distance from the local health care services (map: Ala-aho, R).

Figure 68. The length of walking path in the courtyard is approximately 100 m and to the nearby area 400 m. (map: Ala-aho, R.).

Figure 69. The accessible walking path to the north of the sheltered home with an even surface, benches and handrail to encourage walking (photo: Lehmuspuisto, V.).

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Figure 70. The extra care sheltered housing in Pitäjänmäki was situated in a residential area. There were no open green areas or other services nearby. (Map: Ala-aho, R.).

Figure 71. Only a 100 m walking path on an even surface can be realised easily in the hilly terrain (map: Ala-aho, R.).

Figure 72. The possibilities to use the natural edges of the rock to create a safe garden for people with Alzheimer's may reduce the feeling of being fenced in and controlled (photo: Hätönen, J.).

assessed during the research project (Fig. 71). A large rock wall to the north of the building was identified as a natural edge to the courtyard (Fig. 72). However, the challenge was a public walking path across the possible courtyard. The design of the outdoor space with edges was in conflict with an open access passage through the space. The residents with cognitive disabilities would profit from a safe and stimulating walking environment outdoors. Such an environment would also benefit staff members and relatives.

The Jakomäki (2a) sheltered housing site had the greatest variety of destinations within walking distance, and the residents were partly mobile. Maunula (2b) had the best access to the outdoor green environment, whereas the Pitäjänmäki (2c) sheltered housing site had poor access to services and to green areas. Moreover, the topography did not foster walking with a walking aid. The residents were dependent on other people to take them out. However, even for the relatives or volunteers, there were no destinations to walk to or to take the residents to. The radius of the living environment of the residents was very limited and did not contribute to the maintenance of social or functional capacities of the frailest residents.

The user experience of outdoor spaces and courtyards

The workshops and interviews revealed that those residents who felt the neighbourhood to be unfamiliar also felt socially insecure. They did not want to go far from the sheltered housing alone. Furthermore, residents who were familiar with the immediate surroundings but had declining functional capacities were also reluctant to go out alone. They reported preferring to go out with a relative or member of staff. A few residents were able to go for walks or take the bus independently. Moreover, in Jakomäki (2a) the walking distance to the local shopping centres was less than 300 m. Visual guidance and sitting benches along the path might encourage walking. The residents who were more mobile showed empathy towards the residents who were frailer than they were.

> *"It is a shame that they are not taken to the shopping centre to see other people." (Resident, female).*

The three sheltered housing sites analysed in this study also had courtyards with varying characteristics and sizes due to the layout of the buildings. According to the focus group discussions in the sheltered housing, the courtyard and the view from inside the housing to the garden were important sources of well-being for the residents. Furthermore, the outdoor area played an important role in the social activities with other residents. At Jakomäki (2a), the residents described how spontaneous activities that occurred in the courtyard invited them to go outside. In particular, residents who had their room facing the green yard reported participating in social activities outdoors. Whereas, residents who had their rooms facing the stone yard or the neighbouring buildings expressed feelings of being excluded from these activities and reported a lack of information about the activities. Moreover, the residents regarded the outdoor area as a neutral zone in which to socialise, where contact with other residents occurred naturally. The ownership of the courtyard was shared. Furthermore, it was also easy to withdraw from the activities or conversation when one wanted to do so.

> *"It is easy to walk away from a discussion when it gets too boring." (Resident, female).*

The sheltered home in Maunula (2b) had a small inner courtyard, which was used in the summer. Ten residents in the sheltered home were interviewed about the frequency of using the courtyard and the walking path in the woods. They were asked whether they felt they were going out often enough, too often or too seldom. This was asked separately for both the courtyard and the green area and for the services in the neighbourhood. Five people reported going into the courtyard and three people reported going to the local services often enough. However, three of the residents reported being able to visit the courtyard and the local services too seldom. Only two residents were able to participate in activities outside the sheltered housing (swimming, attending a concert, etc.). The people interviewed expressed getting enough exercise outdoors, but at the same time said that they would like to have more walks and outings if they had the opportunity to do so. The main reported causes for not going outside were the fear of falling or the fear of losing strength while walking, combined with the lack of benches. More destinations, benches and walking paths in the neighbourhood

may encourage the residents to go out more often. Incontinence was also mentioned as a cause for not participating in activities or going out. However, moderate exercise and walking has been related to a reduced risk of urinary incontinence. According to Danforth et al. (2007) "*severe incontinence may be the result of inactivity, rather than less activity leading to reduced incontinence*".

Furthermore, residents wished to have sheltered sitting places, and common activities in the courtyard. Gardening, outdoor games and afternoon coffee outdoors were reported to be enjoyable social activities in the summertime. Moreover, the residents desired to have tools and equipment at hand for spontaneous activities. Lawn rakes and other gardening tools should be visible and free to use. Moreover, for physical exercise it would be profitable to have the possibility to walk in the neighbourhood. It is commonly considered that a 150 – 250 metre walking distance is possible, even for very frail people. The possibility to create new wheelchair-accessible paths in the immediate surroundings of the sheltered housing was assessed. A walking tour of the courtyard was 100m in length and a longer walk of 250 m around the premises may be realisable. Moreover, a guided walking tour of 500 m to 1 km in the neighbourhood would be profitable for some residents and visitors.

The use of shared spaces in sheltered housing

The residents' panel in the Jakomäki sheltered housing scheme (2a) expressed the desire to have more informal meeting places in the building for social activities with other residents, and to meet friends and relatives. According to the participants on the residents' panel, in addition to spaces for structured activities, intimate spaces for chatting and for spontaneous meetings were missing. Some residents had been asked to take photos of their living environment with a single-use camera. As a result, they mainly took photos of their neighbours. This may indicate the importance of the social environment in the sheltered housing. However, due to the layout of the building, there were only a few spaces for shared use. An apartment in each of the buildings had been converted into a common living room. The residents pointed out that the few residents who watched television dominated these living rooms. This was hindering others from having a normal conversation

or engaging in other social activities. Therefore, a separate room for watching television would be preferable.

The residents in the Maunula (2b) sheltered housing scheme (*N* = 10) were interviewed about the use of the shared spaces. This sheltered housing had very large common living rooms on each floor. The use of common spaces on the upper floors was less frequent than the shared spaces on the ground floor. The residents reported using the shared spaces to meet other residents, relatives or members of staff, whereas they preferred to read, watch television or listen to music in their own rooms. Some female residents participated in a needlework group in the common living room. All people responding to the semi-structured interview (*N*=10) came to the ground floor to dine. The second most important activity reported in the shared spaces on the ground floor was meeting staff members (*N*=7), gaining information about activities (*N*=7) or meeting other people (*N*=7). Moreover, recreational activities – such as watching television, listening to the radio and singing karaoke – were reasons for three of the people interviewed to come to the shared spaces on the ground floor (Fig. 73).

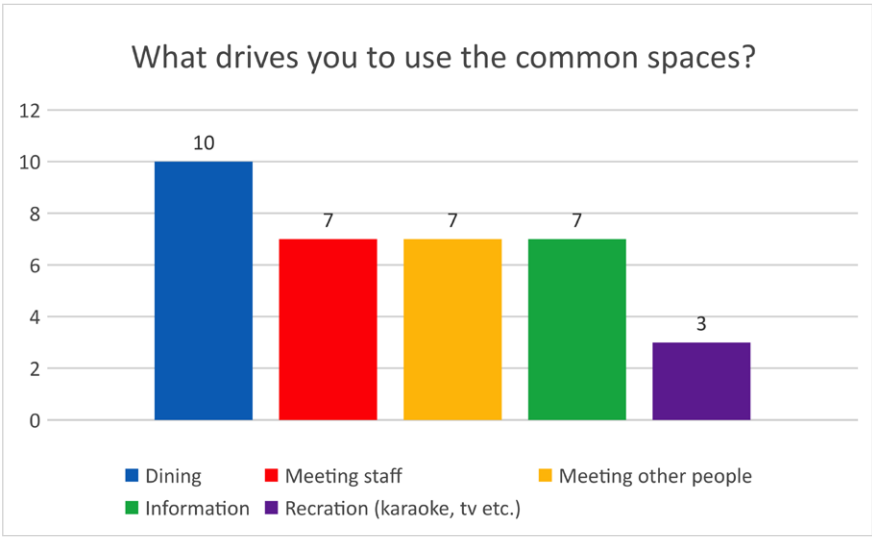

Figure 73. The reasons to use the common-use spaces as reported by residents (residents N = 10).

Mealtimes were observed to be the most important social activity and they set a daily rhythm. The observation revealed that many residents in all the sheltered housing arrived on the ground floor one hour before the meal or even earlier in order to socialise and wait for the meal. However, the dining room was rented out for a private service provider. The doors to the dining room were kept closed between meals and therefore, the space remained unused for most of the day. Therefore, the space outside the dining room became an important place for socialising. The layout and the furniture of the space, however, did not encourage social activity. These spaces were not used in an efficient or economical way as they remained empty for most of the day. Further, as there was no service between or after meals, the residents wished to have a coffee shop on the premises. Local residents, organisations or groups of volunteers could also profit from being able to use the spaces outside meal hours. The shared use of the space would also allow social connections with residents and other groups of people living in the neighbourhood. However, this would require a new way of managing the spaces. Moreover, the staff members were concerned about the safety of the residents.

The size of dining rooms in sheltered housing varied a lot. For the same number of users, there was a different amount of space in use. Moreover, the residents felt that the large dining halls were noisy and uncomfortable. Observations revealed that conversation and moving with a walking aid were difficult, especially when the tables are placed in long rows (Fig. 74). A dining area with small tables for four people was felt to be more comfortable (Fig. 75). Moreover, hearing and seeing other people was easier at a small table.

During the renovation works at the Maunula sheltered housing facility (2b), dinner was served in the shared space on each floor instead of in the dining hall on the entrance floor. The residents gave very positive feedback about this solution, which they felt created a homely atmosphere. The residents expressed the wish to dine in smaller groups on their own floor from now onwards. A previous study by Aalto and Saari (2009) indicated that the renovation of small dining rooms on each floor of a sheltered housing complex, instead of one large common-use dining hall, was the most cost-efficient solution. For the assessment, they calculated the renovation costs, costs of food delivery and working time of the staff members. In sheltered housing with

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Figure 74. The dining room in Jakomäki (2a), with a long row of dining tables did not promote social connections (photo: Verma, I.).

Figure 75. Small sitting groups of four people (Maunula 2b) were observed to be better than long rows as hearing and seeing was easier for social intercourse (photo: Verma, I.).

many older residents with mobility limitations, the staff members need to assist the residents to the dining room. If the distance to the dining room is long or if it is situated in a separate building, much of the working time of the staff members is used in assistance. Then again, a common restaurant open to the public provides more opportunities for social interaction than small dining rooms for residents only.

User experience of shared spaces by residents with visual impairment

The results of the study with visually impaired people indicated that the things that most affected wayfinding capacities and orientation were the level of the impairment of the person and the familiarity of the space. Those residents who had lost their sight while living in the sheltered housing navigated with ease using their memory and previous experience. Moreover, residents who had lost their vision prior to moving to the sheltered housing reported to have learned quite rapidly how to navigate their way inside the building (Sannemann, 2012). Most residents with visual impairments were not fully blind. Therefore, they could use some perceptible clues or light to find their way inside the sheltered housing. They navigated with the perceived landmarks and used their memory to direct themselves. One of the residents reported calculating steps along the corridor in order to find the entrance door of her own apartment, for example. This wayfinding strategy would not be possible for a person suffering from memory decline, however.

The observations and interviews with the residents revealed that perception in the corridors was difficult because of the uniform colour of the surfaces. The walls, ceiling and floor were all of the same light colour. Moreover, the reflections of light on the walking surface hampered perception. A person with poor vision or cognitive disabilities may perceive such reflections as wet surfaces, for example. The visually impaired people reported that they would benefit from contrasts, guiding colours and lights. A continuous row of lights on the ceiling may be used to create a guiding element and may enhance navigation. Moreover, observations revealed that people with visual impairments had difficulty navigating in corridors with a low level of luminosity. For example, during the walk-through, one of the residents missed a turn, as

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Figure 76. The reflection of light on the floor and the position of lamps did not enhance navigation. (photo: Verma, I.).

Figure 77. Displaced furniture and walking aids in the corridor were the main obstacles for people with visual impairments (photo: Verma, I.).

he did not perceive a branching corridor. Furthermore, the layout of all the floors above ground level was similar, therefore a clear indication of the floor number would also be necessary. This indication could be visual information on the wall and tactile information on the handrail. For example, the floor number could be indicated by having the same number of studs on the handrail. Moreover, audio information about the floors in lifts is also useful for visually impaired people.

According to Jokiniemi (2007, p.19), people are also able to perceive a space by using their hearing. Hearing is considered to partly compensate for visual impairment. If hearing is lost, it may affect navigation skills. Most residents with visual impairment in this study had both visual and hearing impairments, which may have affected the results. Unexpected changes in the environment – doors that were left open into the corridor and displaced furniture – were reported to be the main obstacles for people with low vision. However, social skills and a positive attitude towards life helped the residents with visual impairment to cope daily. Most people participating in the study reported to accept assistance from other residents. Unlike other residents, people with visual impairments felt that an open view from the shared spaces on the

ground floor to the outdoor environment was undesirable. They were not able to appreciate the views and they expressed their concern about people from outside watching them inside. This brought them some feelings of insecurity. Moreover, one of them also expressed the desire to only share the sheltered housing with other visually impaired people.

Aspects of Universal Design, adapted to the immediate surroundings of apartment buildings

Green areas and courtyards that are designed for equitable use provide spaces for activities for all resident groups. Moreover, the example of the stone yard and green yard showed that accessibility alone does not encourage the use of a courtyard. A versatile environment with sheltered sitting places, space for activities, outdoor games, petanque or chess, for example, may increase social activities. Moreover, transparency and visual access to outdoor areas from the apartment may enhance the social activities of the residents. A view from a window provides visual access to the neighbourhood. Views to the outdoor environment may also invite residents to go out. The direct visual connection from the outdoor environment to the indoor shared spaces, however, may give rise to a feeling of insecurity in some residents, particularly to those who have visual disabilities. A view onto busy streets, local services, kindergartens and other spaces for social activities enables people to feel integrated. Moreover, access from the apartment to the outdoor environment has to be easy and require only moderate physical effort.

Walking paths of different lengths in the courtyard, around the building and to local services enable even the frailest people to get physical exercise. Benches and sheltered sitting places, as well as handrails inside and outside the building, enhance safety. Well-indicated walking paths to local destinations should be provided with sitting benches and guidance. Especially, older people with memory disorders profit from the visual connection to services and perceptible guidance.

The shared spaces in sheltered housing and extra care housing facilities should be designed for flexible use. They can be designed for multipurpose use and different numbers of people may use them for various activities. Many people who use the shared spaces have walk-

ing aids or are wheelchair users. Space dimensioning and furnishing has to take this into account. Moreover, design of an outdoor environment that enables people with a wheelchair and rollator to approach and to use features such as urban farming with raised flowerbeds may increase cross-generational activities in the neighbourhood. Other shared facilities, laundry rooms, rubbish bins and storage, need to be accessible as well.

The perception of space in corridors and staircases, and the use of contrast and lighting are important for wayfinding and safety. Furthermore, the entrances to apartment buildings and the staircases are meeting places for residents on a daily basis. The entrance is the connection to the outside world. It may also provide possibilities for residents to socialise with other people in the neighbourhood. Resting places near the entrance may enable passive participation and provide a feeling of inclusion.

Case Study 3

The background and aim of the study

The aim of the case study was to gain knowledge of the features in extra care housing environments that may support rehabilitation and the daily activities of people with Alzheimer's or other diseases that cause a progressive cognitive decline. The multidisciplinary project team focused on people living in extra care housing. The project team included researchers from the Department of Architecture at Aalto University as well as professionals in occupational therapy from Metropolia University of Applied Sciences. The project was implemented in a group home for people with memory disorders run by the City of Helsinki. The building had been renovated prior to the study. The study was a post-occupational study to evaluate the quality and usability of the facility. The aim was to assess how well the premises supported the rehabilitation and independent coping of the residents. Moreover, the spaces in extra care housing need to enhance the social activities of the residents without compromising their privacy. The focus of the study was on the use of shared spaces in the extra care housing. In group homes, the distinction between the private area and shared spaces often becomes unclear, as the residents' rooms may open directly into the shared space or corridors. The aim of this research was to gain further understanding of the housing design for people suffering from a cognitive decline.

The research was implemented in Kustaankartano Comprehensive Service Centre, run by the City of Helsinki. The service centre was composed of eleven buildings. The buildings form a circular belt around a large green space. It comprises group homes for people with memory disorders as well as short-term units and day care activities for older people diagnosed with Alzheimer's. The buildings were built in the 1950s and were originally designed with an institutional-like typology with a long central corridor with small rooms on both sides. However, the service centre had large outdoor spaces. One of the group

homes was chosen for more detailed observation. The unit had been renovated recently and some functional improvements to the facility had been accomplished. The group home was composed of two connecting units with 11 residents in each. The planning documents were analysed, the premises were visited, and some staff members were interviewed prior to the observation. Moreover, a questionnaire was distributed to the staff members and to the residents' relatives. The same questionnaire was also used as the basis for semi-structured interviews of the residents. Alzheimer's disease affects a person's ability to communicate verbally. Due to the residents' inability to understand speech and communicate, only four residents were interviewed.

Implementing qualitative study methods in a group home

The visitors and staff members of the group home were asked to report their experiences of the spaces in questionnaires. The experiences of four of the residents were gathered in semi-structured interviews based on the same questionnaire. Direct observation on site was done prior to the questionnaire. This helped to formulate adequate questions related to the use of premises. Moreover, observation of the residents' activities was carried out in one of the group homes over a period of three days, during the daytime. The space, number of occupants in the space and their activities were noted at regular intervals. A questionnaire, focusing on the premises and immediate surroundings was prepared for the staff members and relatives. Due to the challenge of verbal communication with people affected by the late stage of Alzheimer's disease, only four residents with cognitive impairments were interviewed.

Two of the residents interviewed had a moderate memory disorder and one resident suffered from a mild memory disorder. A member of the staff introduced the researchers to the residents in order to gain their trust. Only a few residents were interviewed as most residents in the group home had late stage Alzheimer's disease and were not able to express themselves verbally. Furthermore, one female resident with a late stage cognitive disability showed great interest in the researchers' visit and was interviewed. However, due to difficulties in expressing herself, observing her gave more information than the verbal com-

munication with her. The semi-structured interviews were carried out in the form of a conversation during the visit. The three residents introduced to the researchers were asked, one after the other, to individually show the visitor (the researcher) around the premises. During the visit, the residents were asked specific questions about the premises relating to the facility's layout, immediate surroundings and navigation. Furthermore, the questions were asked in the present tense and only concerned the rooms and fittings visible to the resident during the interview. This was done in order to minimise the need to use short-term memory. The interviews were recorded. The discussions were analysed using the same themes found in the questionnaire: the use of shared spaces, balconies, outdoor spaces and the entrance. Moreover, the order in which the residents presented the premises was observed.

Altogether three female residents and one male resident took the researchers around the care premises. All the residents interviewed lived in the same unit. The observations were made by two researchers. One researcher interviewed the resident while the other researcher observed the situation, recorded the conversation and took notes. Two of the residents used a rollator and two of them had no physical disability. The residents were from 71 years to 86 years old (Table 15). The participating residents with mild cognitive disorders had been living on the premises for only a few months, and the person with a late stage of impairment had been there for four years. The stage of cognitive disability does not correlate with physical disability or the age.

Table 15. The residents interviewed for the study.

	Age	Stage of cognitive disability	Length of residence	Walking aid
Male	71	moderate	5 months	yes
Female 1	81	moderate	9 months	yes
Female 2	86	mild	3 months	no
Female 3	76	late	4 years	no

Moreover, eighteen staff members and eight family members responded to a questionnaire concerning the use of the premises of the group home and immediate surroundings (Table 16). Printed questionnaires for the staff members and relatives were distributed on the wards. They were left visible in the ward and staff members were asked to inform the relatives about them. Only a few relatives were reached with this approach. Even though the questions were related to the private and shared spaces, in the following, only the responses related to the shared spaces and immediate surroundings are discussed. The other observations have been published in a separate working paper (Verma, 2009).

Table 16. The respondents to the questionnaire (relatives and staff members) and to the semi-structured interview (residents).

Participants	Staff member	Relative	Resident	Total
Male	2	1	1	4
Female	16	7	3	26
All	18	8	4	30

The spatial analyses of the extra care housing

Most buildings in the Comprehensive Service Centre had similar facades with red bricks and a typology representing institutional care buildings of the construction period. The residents, however, had changed in terms of their functional capacities from being self-managing seniors living independently to becoming frail older people with multiple long-term conditions or cognitive disorders. Therefore, the old premises no longer supported the functional capacities of the residents or the work of the staff members. The typology of the building consisted of an institutional ward with a central corridor and rooms on both sides. Most of the rooms were intended for one person. To provide shared spaces for the residents, some of the rooms had been converted into common living rooms. The group home chosen for observation was located on the first floor of the building with no direct access to outdoor spaces.

Nine of the eleven buildings in the Comprehensive Service Centre with sheltered housing formed a circle around a large green outdoor space. Eight of them contained housing services for older people. One separate building with a restaurant and a coffee shop on the site was open to residents and visitors and other people living in the neighbourhood. In addition, two temporary buildings for short-term use with sheltered housing services had been built on the site. Furthermore, a library and a gym, as well as counselling services for older people, were provided on the premises of the service centre. Other local services and the nearest grocery shop was located within 400 m and a cafe was within a 500 m walking distance of the service centre. Public transport stops were situated near the site.

The apartment buildings in the sheltered housing facility were named in alphabetical order. However, the letters representing each building were not visible when approaching them. Wayfinding was difficult, as all the buildings were similar, and the guidance was not sufficient. Moreover, it was difficult to locate the entrance to each building. The main entrance doors were not visually perceptible. Furthermore, the doors from the ground level were locked for safety reasons. Visual guidance identifying and guiding the way to each building would improve the wayfinding for residents and visitors. Moreover, clear landmarks at the main entrances would help to perceive the entrance and to welcome relatives, visitors and new staff members. From inside the group home,

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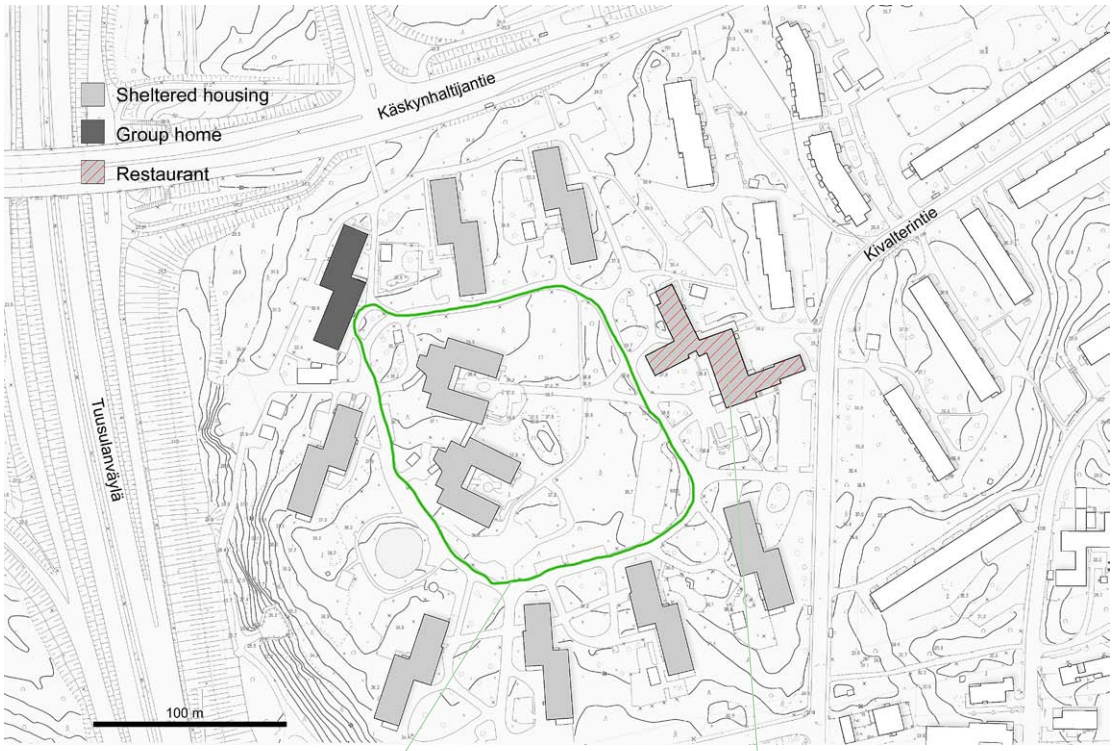

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Figure 78. The Kustaankartano Comprehensive Service Centre (Oulunkylä) consists of 11 buildings surrounding a green space.

Figure 79. The apartment buildings of the Service Centre are from the 1950s (photo, Sotera).

Figure 80. The restaurant building and apartment buildings of the Service Centre form a semi-closed area (photo, Sotera).

the entrance door was visible but locked to avoid undesired exits by the residents. Each floor was a separate unit and the residents were not able to visit other floors. The entrance door to the group home was situated along the corridor. For people who wander in the premises, it is important not to have a locked door at the end of a corridor. They may have an instinctive reaction to open the door to continue their walk and a locked door which they are not able to open will increase their anxiety. In some extra care housing, the exit doors have been masked to avoid unwanted exits. In addition, disguising a door handle with a cloth has been tried to avoid unwanted exits (Bechtel and Churchman, 2003, p. 384).

Residents experiences of the shared spaces

Two female residents were observed wandering hand in hand in the premises and talking to each other about whether they were in a shopping centre and whether there was no exit. Their reflections indicated that the residents did not find the group home to have a homely atmosphere, as they mistook the premises for a shopping centre. Furthermore, they did not notice the exit door, which was situated on the side of the corridor. However, at least one of the residents interviewed knew the location of the entrance and knew that the door was locked, as he stated:

> *"You can exit from that door, but I think it is locked now."*
> *(Male resident)*

Four of the residents introduced the premises to the researchers. Regardless of the length of the residence, all four of them reported not knowing the premises very well and two of them reported only being there on a short visit. Three of the residents interviewed found that the group home was quite crowded. They reported going to their own room to have privacy.

> *"It is quite crowded here". (Resident, female)*

The results of a simultaneous survey in the same service centre by students in care sciences (Mäkinen, Kruus-Niemelä and Roivas 2009, cited in Verma and Mäkinen 2009) confirmed that the residents appreciated the possibility to move around but also needed privacy. The female resident suffering a mild cognitive decline had moved to the facility

recently and had not adapted herself well to the group home. She reported missing her own apartment, and she spent a lot of time in her private room. Moreover, the staff members were also concerned that she was not getting the right level of care and would have managed in a sheltered housing facility.

Three of the residents took the researchers first to the dining room, which was situated at the end of the corridor. The residents easily found the dining rooms, which were situated at each end of the corridor. They described the distance to the dining room as both short and "*within eyeshot*". The dining rooms were visible from the corridor. However, the residents were confused as to whether a meal was offered that day in the dining room or in some other place. They considered the walking to the dining room as physical exercise.

> *"You don't get any food here without making an effort."*
> *(Female resident, laughing)*

The food was delivered to the premises from the central kitchen, situated in the restaurant building, and was not prepared on the premises. However, the meals were highlights of the day and the daily schedule was organised around the mealtimes. The residents were observed spending their time in the dining hall and watching the staff members at work. However, they did not actively socialise with other residents in the room. The staff members found the dining room to be too small and cramped especially at mealtimes as all the residents entered the room at the same time with their walking aids. Moreover, to enable the residents to take part in household tasks the layout of the kitchen and dining area would have needed modifications. The working methods would also need modifications to allow residents participation, as the staff members did most of the daily tasks without involving the residents. The daily tasks can be important for rehabilitation and the maintenance of functional capacities of the residents. An open space with a large table would enable people with rollators or wheelchairs to work in the kitchen with the staff members. Moreover, the space design may encourage and enable the involvement of relatives and volunteers to assist at meal times. A domestic kitchen layout with a proper working space that is easy to use with traditional household appliances can promote the activity of relatives and volunteers.

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Figure 81. The staff members ate with the residents with later stage of Alzheimer's in order to lead them by their example (photo, Sotera).

Figure 82. Residents gather in the dining hall to wait for meals and to be near the staff members (photo, Sotera).

In the group home, relatives were allowed to prepare coffee and sandwiches in the kitchen. One older woman came each day to assist her husband with the meals. The staff members noticed that the visits were as much a meaningful social activity for her as they were assistance for her husband. The dining room can be used for other activities outside of mealtimes. It should be flexible and large enough and be dimensioned to accommodate residents, staff members and relatives.

The private rooms were situated in the corridor leading to the dining room. Two of the residents interviewed were not sure of the location of their own rooms, and they considered the distance to their own room longer than the distance to the dining room. However, they recognised their own rooms when passing the door. Cognitive disorders may affect wayfinding and perception of distances and space. To identify the rooms and enhance wayfinding, the name of the resident, photographs from the residents' youth or a personal object on the door can be useful. Moreover, the perception of space is related to contrasts and light in the space. As an example, the female resident with late stage of Alzheimer's was asked to show where the toilet was in her room. She knew where it was and was going towards it. However, she passed the door, which was the same colour as the wall. A sign and a contrasting colour could have helped her to find the door.

The interviews with staff members and observations of the residents revealed some favourite places where people preferred to spend time in the unit (Fig. 83). The residents preferred sitting places where the visual control over the space was the best, which Regnier (1994, p. 86; 2018, p. 77) called 100% corners. The staff members described how one male resident with a late-stage cognitive impairment became very agitated if he was not placed in the sitting corner where he could have visual control over the shared space. When he had visual access both to the dining area and to the connecting corridor, he calmed down. Sheltered sitting places with a visual connection to common-use spaces give the resident control over the space and enable passive or active participation.

The residents who were interviewed also appreciated the soft and comfortable armchairs in the shared spaces and said how they enjoyed the company of other residents. A few residents were very possessive of their belongings. Therefore, use of the residents' own furniture was not encouraged in the shared spaces as it may have led to conflicts between residents. The residents used the shared spaces for passive or active social activities.

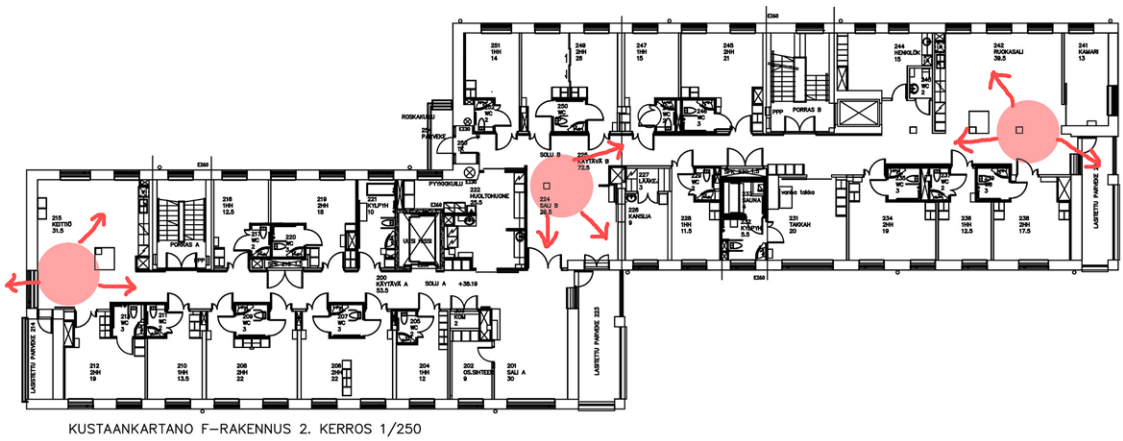

Figure 83. The preferred sitting places on the ward with visual control over the common-use spaces and the outdoor environment.

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Figure 84. The building design, with long corridors without natural light, reduces the cosiness (photo: Sotera).

Figure 85. The corridors should not have dead ends. A sitting corner or activity space at the end of the corridor (photo: Sotera).

> *"It is nice to watch people wander back and forth and wonder what they are thinking." (Female resident)*

> *"I'm sitting where there is better entertainment." (Male resident)*

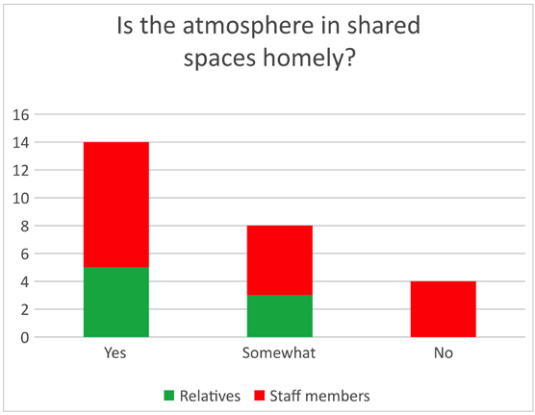
The questionnaires for staff members indicated that there was a need for a variety of shared spaces. They felts that a large flexible space, which could be divided into smaller units, would be useful for organising various activities. The activities with people suffering from cognitive disease were carried out in small groups with only a few people at a time. The challenge is to help the residents to concentrate on the activities without too much distraction. The small number of participants and management of the sensory qualities (visual and acoustic) of spaces may help the residents to focus on the current task.

The relatives and staff members were asked to evaluate the quality of the spaces in the extra care housing unit. Eight relatives and eighteen of the staff members responded to the questionnaire. Most of the relatives and half of the staff members found, that there were enough shared spaces. All the relatives and most of the staff members reported the atmosphere in the shared spaces to be *homely* or *somewhat homely* (Fig. 86). However, the two user groups differently evaluated the quality of the spaces. Further, the relatives seemed to be less critical of the indoor air quality in the shared spaces than the staff members who worked in the premises the whole day. Most of the relatives found the air to be fresh, whereas less than half of the staff members considered the air to be fresh (Fig. 87). Some relatives as well as members of the staff did not consider the atmosphere to be very calm (Fig. 88). The evaluation of lighting differed between the relatives and staff members. The lighting level in the shared spaces, and especially in the corridors, was criticised by the staff members. Most staff members responding to the questionnaire did not considered the lighting levels of the shared spaces to be sufficient (Fig. 89). Furthermore, 5 out of 18 of staff members reported glare in the shared spaces and three of them reported glare in the corridors.

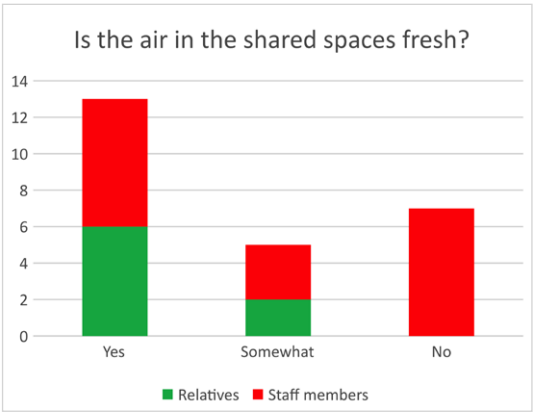
The staff members reported that the level of lighting in the corridors remained the same throughout the day and night. Some of them observed that it did not enhance the daily rhythm of the residents. On the other hand, one staff member working on the premises at night

felt that she needed the same level of lighting in order to be able to work efficiently. The lighting is important for perception, wayfinding and other activities. The observations on-site indicated that the residents did not detect the rooms when there was a low level of lighting. They passed the door openings of the shared spaces by and did not notice them when there was no light inside the room. These spaces remained unused during the observation period. Increased levels of light-

86.



87.



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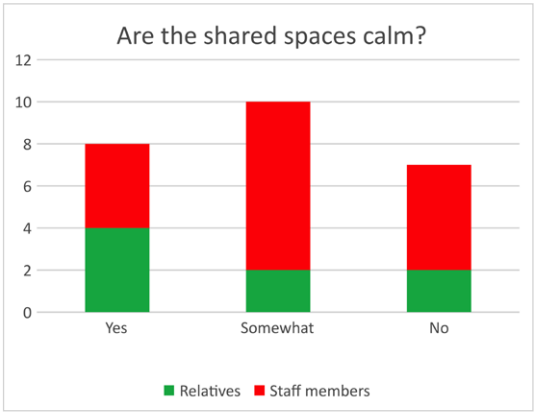

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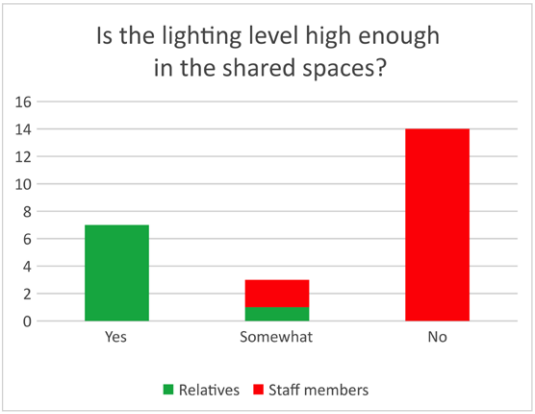

Figure 86. Most respondents (relatives N=8, staff members N=18) found the shared spaces to be homely.

Figure 87. Some members of staff did not find the air fresh (relatives N=8, staff members N=18).

Figure 88. Most respondents did not find the shared spaces calm (relatives N=8, staff members (N=18).

Figure 89. Most members of staff found the lighting level insufficient (relatives N=8, staff members N=18).

ing could be also used to highlight elements such as door openings in order to improve perception and to invite residents in.

A small-scale pilot construction with smart dynamic lighting was implemented in the shared living room on the premises as part of a Master's thesis (Aro, P. Department of Design, Aalto University, 2010). The level of lighting was automatically adjusted according to the time of the day to support the daily rhythm of the residents who were spending most of their time indoors. Interviews during the pilot phase revealed that staff members and residents experienced the lighting levels differently. Interviews with residents indicated that the level of lighting preferred by the staff members to create a comfortable atmosphere was not considered sufficient by the residents. The age-related impairment of vision needs to be taken into account in the adjustment of lighting levels. Moreover, missing or insufficient light for reading was pointed out by residents. Although not all residents were able read newspapers, they still liked to browse them.

Experience of outdoor spaces

The group home analysed had no direct access to the garden which created a challenge for going out. The staff members (*N=18*) reported that residents went to the courtyard regularly (*N=14*) or occasionally (*N=3*). Half of the staff members reported that residents were also able to go out alone regularly or at least occasionally. Relatives and visitors reported also that the residents went out. However, seven out of eight of them reported that their relative was not able to go outside alone. Those relatives who responded to the questionnaire may have family members who had more functional or cognitive limitations than the average resident did in the group home. Moreover, relatives visiting the premises may also not be aware of all the daily activities in the group home. The staff members may also consider the whole group of people and not an individual resident. An observation period would be required to confirm the frequency of the use of the outdoor environments and balconies.

Four residents were interviewed about the use of the immediate surroundings and balconies. They reported seldom going into the courtyard or onto the balconies. Moreover, the staff members, relatives and the residents expressed that there was not much to do outdoors. One of the residents described his own allotment "*some 5 km away*", which

seemed meaningful to him. Another resident interviewed expressed longing for "*an outing in the forest*". She reported the desire to go for longer walks and did not find anything to do in the courtyard. The staff members considered the lack of human resources to be the main cause for not going out into the courtyard more often. Moreover, the care staff members did not have good visual access to the gardens, which would have enabled monitoring the residents who wanted to go out.

The group home had several balconies looking out in different directions. One of the residents interviewed was able to describe on which balcony to go at what time of the day to catch some sunshine. Two of the four residents interviewed reported using the balconies. Two of them mentioned that there were flowers and sitting places on the balconies. However, one of the residents had problems with perception and was reluctant to go onto the balcony because of the transparent glass railings: the view of the difference in height from the balcony to the ground level made her feel unsafe. She expressed her anxiety and a fear of falling from the balcony and did not want to go there. Moreover, she expressed that one could not access the courtyard via the balcony. The residents were asked to show the researchers the balcony, but they were not able to open the door by themselves. To open the door, the handle needed to be pushed up instead of pushing it down. This was done for safety reasons. In reality, it was hindering the use of the balconies. Seven family members out of eight reported that their relative was not able to go independently onto the balcony. They reported the frailty of the residents and the locked doors as the main hindrances to going out.

Moreover, there were metallic ramps at the door openings to adjust the difference in height between inside and outside. The members of the staff had observed that some of the residents perceived these metallic ramps as water pools and did not want to step on them. The design of the balcony should enforce the feeling of security of the residents with cognitive difficulties. Staff members reported residents occasionally going onto the balcony. Moreover, they pointed out that the narrow layout and the heavy furniture did not allow all the residents to be on the balcony at the same time. In particular, people with walking aids needed a large space, so meals and coffee could not be served on the balcony.

The view from the extra care housing facility looked onto a green space. Residents' comments about the views varied. A male resident re-

90.

92.

91.

93.

Figure 90. Sheltered sitting places and a canopy may enhance the use of the outdoor environment (photo: Sotera).

Figure 91. Outdoor spaces and balconies need to be accessible and designed for a group of residents and staff members (photo: Sotera).

Figure 92. The reflective ramp on the balcony was slippery, and it was perceived as a water pool by some of the residents. Moreover, the transparent railing did not enhance a feeling of safety (photo, Sotera).

Figure 93. The ramp to access the garden was steep and did not enable residents to go out independently (photo, Sotera).

garded the windows as "*only useful for letting the light in*". He reported not paying attention to the view. One female resident appreciated the openness of the view. Another expressed that it was nice to see the forest. The resident with late stage of cognitive impairment reported seeing '*nothing*' from the window. Problems with perception and distances are symptoms of her disease. She either could not perceive what was beyond the window or did not find the view interesting.

Aspects of Universal Design adapted to the housing design for people with Alzheimer's disease

The spaces in housing for people suffering from Alzheimer's disease need to be flexible and used for various activities and occasions for different numbers of people. Shared spaces in group homes or other housing solutions can be divided into smaller modular units and joined together for larger common events for residents and families. Moreover, they need to be easily accessible from outside to invite people in. The open layout and location of a common dining room on street level, for example, should invite people from the neighbourhood. The dimensioning and layout of the spaces should invite different user groups: residents, relatives, local associations, volunteers and care staff members. In general, the dimensioning of the shared spaces should take into consideration people with walking aids or other assistive devices.

The activities related to daily living are part of the rehabilitation work of the residents. In group homes, the layout should enable the participation of the residents and relatives in daily tasks. There should be room for several people to simultaneously work in the kitchen, for example. Moreover, ordinary household appliances in the kitchen enhance the use of them. Housing solutions with attention to people suffering from cognitive decline should be designed with clear, perceptible information about the activities taking place in each of the rooms. Furthermore, the same need can be identified for other housing solutions for a more communal way of living.

The possibility to manage the level of stimulation, lighting and noise in the living spaces is important. Noise and visual stimulation should be controlled to minimise overstimulation and reduce stress among residents. The sensory atmosphere affects the feeling of safety

and comfort. The indoor air quality is directly linked to the attractiveness of the space. Landmarks, visual clues, colour contrasts and lighting enhance spatial perception and wayfinding inside and outside the building. The contrast between light and dark, as well as colours, also enhances the navigation for people with visual impairments. The lighting levels need to be adjusted higher for older adults than for younger people. Further, light can be used to spotlight the doors and activity areas, for wayfinding and to guide people to a destination. Working in the opposite way, uniform colour schemes or lighting can be used for spaces that are not targeted for common use. Furthermore, an open layout of shared spaces with a view of outdoor spaces gives residents a sense of control over the spaces.

The courtyard should be designed as a common living room with activities such as sitting, gardening and physical exercise. Walking paths in the courtyard and around the building which provide destinations and an open visual connection to a clearly perceptible entrance door enhance wayfinding, especially for people suffering from memory decline. The walking paths should always direct the person back to the original starting point. Moreover, landmarks and edges enhance the perception of the space and promote the independent use of the outdoor areas. The edges should be formed preferably by natural elements or by buildings to avoid the feeling of being locked in. Sheltered courtyards with no direct access to busy streets enhance the safety of the oldest and youngest residents.

A level entrance, a view from inside to outside spaces and doors that are easy to handle enable residents to engage in outdoor activities independently. The outdoor views and movement sensors in the courtyard may help with monitoring of residents in outdoor environments. However, the connection between indoor and outdoor spaces is especially challenging in a multi-story building. Therefore, large common-use balconies and roof terraces, which older residents can use for activities and meals together with the staff members, may promote spending time outdoors and taking notice of the changing seasons. In the Nordic countries, glazed balconies provide shelter from the snow and enable residents to get fresh air even during winter. The balconies need to be accessible by wheelchair. Furthermore, especially in extra care housing, balconies with two leaf doors also enable bedridden residents to enjoy the outdoors.

Discussion

It is important to find ways to better integrate the older population into society by means of architecture. The anticipation of population ageing should lead to planning and design solutions that are socially and economically sustainable. The UD concept and Ageing in Place policy can be considered integral parts of sustainable development. Jabareen (2016) identifies sustainable design concepts of urban form as compactness of urban space, sustainable transport and density, a mixed land use, diversity and green urbanism. These design principles are the same that promote age-friendly environments. Compactness and mixed land use relate to short walking distances to local services. Sustainable transport promotes a walking-friendly environment and public transport. Moreover, access to local parks and other green areas promote general well-being and help to maintain physical functional capacities. The concepts are not contradictory but complementary. When Jabareen focuses on the diversity of buildings and spaces, UD focuses on the diversity of humans using these spaces. The active participation and inclusion of older people in urban life is important both for the quality of life of the person and for society at large. The built environment and inclusion are key determinants of whether people can live at home and lead an independent and autonomous life.

Architects should recognise the potential of UD as a process for improving architectural quality and users' experiences. As Shea et al. (2016) point out, the UD approach generates better interaction between a building and the people using it. Furthermore, Denizou (2014) argues that the UD process emphasises "*new open-minded design solutions that are adapted to the context and responsive to the needs of the users*". However, interviews with architects conducted by Van der Linden, Dong and Heylighen (2016) revealed that most architects still considered UD as an accessibility and legislative matter regarding specific groups of people. Bordas (2017) pointed out that the risk of strictly following detailed

rules and regulations on accessibility without understanding the user's needs may generate solutions that are the opposite of the desired results. The quality of the design may assure that the solution is respectful to the architecture and does not segregate any user group. The best design outcomes can be obtained in collaboration with local residents and other stakeholders. The residents participating in this study had qualitative knowledge that cannot be found in any planning documents. Future housing developments would profit from the knowledge and experiences of the older people themselves. However, Katz, Holland and Peace (2013) note that people with high support needs are seldom able to articulate their wishes or have their desires met. Participation enables people to take control over their living environment and empowers them. It may enhance their integration in society. According to Manzo and Perkins (2006), some residents with a high degree of place attachment may perceive any development projects as a threat because they will transform the neighbourhood. Those who feel that their relationship to their community places is threatened by redevelopment may consequently resist a proposal, regardless of its potential value. The challenge is to apply various participatory methods that will reach all age groups. The long-term knowledge of the neighbourhood and the local history can be a useful tool for future developments.

Housing conditions are the basis for self-contained life and coping in activities related to daily living. New accessible housing developments may promote an Ageing in Place policy. However, due to the recent economic recession and the need for more affordable housing, initiatives to reduce "unnecessary" building regulations, the *deregulation measures* have been launched in Finland (Finnish Government, 2018, p.18). These measures include a revision of the National Building Code of Finland. The revised Government Decree on Accessibility for building (Finnish Government, 2017) became active from January 2018 onwards. It applies to new constructions as well as renovations of administrative or service buildings and shared spaces in apartment buildings, for example. Only sections 2) Passageways leading to a building, 3) Entrances to a building and 4) Doors, apply to the construction of a detached and semi-detached house. The building code is a technical tool and does not necessarily provide good quality architecture. Moreover, most of the regulations on accessibility are concerning users with mobility impairments, and only little with people with sensory or cogni-

tive problems. These regulations focus mainly on UD principles of low physical effort and size and space for approach and use.

In the public discussion, in the construction industry and in some media, accessibility has been sometimes regarded as too expensive and has even been seen as not necessary. These claims are presented, however, without any research evidence or argumentation. Moreover, a recent survey by the Finnish Association of People with Physical Disabilities revealed, that 90 per cent of people are very much in favour of promoting accessibility in society, especially in public spaces (Norlund, Maunula and Kilpelä, 2016). Even though people do not see the benefits of accessible construction for themselves at the moment, they think it will be useful in the future. A recent study on housing indicated that most people did not consider accessibility to be a necessity when purchasing a new home (Huttunen et al. 2016). However, further investigation revealed that respondents 55 years old and over showed the highest interest in accessibility (Verma and Hasu, 2017). Moreover, in the long run, it may prove costly not to use UD in housing design. The hindrances in the built environment may result in increasing needs for personal support and assistance for older people at home. Consequently, the savings in housing construction are transferred to expenditure in the public social services.

Currently, the care polices for older people and Ageing in Place policies are elaborated for the most part separately from the urban planning and housing policy. However, to develop an Age-Friendly City, it would require an "older people in all policies" approach. The architects and urban planners have a major role in designing the city: housing, urban green environment, service infrastructure and transport. It is difficult to achieve the targets of the Ageing in Place policy, if the city does not simultaneous provide housing solutions and local services that enable living in the community. UD of the urban environment would result to improved possibilities of social participation and inclusion, and access to services for all residents. It would decrease the age segregation and promote housing areas for both young and old.

It is not a long-lasting solution to build new apartment blocks only for one target group. The life cycle of a building may be much longer than its residents' life span. Therefore, the design of an apartment building should welcome people of all ages. The UD of the apartment buildings increases the possibility to adjust the home environment to

Figure 94. A new multigenerational housing plot in Helsinki has apartments for students, for the elderly and for people with disabilities (photo: Verma, I.).

one's changing needs and continue living in the neighbourhood. This would enhance independent coping, equitable use of the neighbourhood environment and maintain of social connections. Moreover, as Hasu, Tervo and Hirvonen (2017) point out, people have different living styles and housing preferences. UD can be used as a tool to produce solutions that are flexible and allow people to make choices concerning their own housing. It allows people to maintain their living style during their lifetimes. Furthermore, it gives the residents "*the possibility to live in the same living environment for as long as they desire, thus the negative effects of relocation in old age can be avoided,*" (Özler-Kemppainen, 2006). Moreover, the use of UD principles in neighbourhood design

may reduce the need for home care services. When people have access to the grocery shops, social activities and other services by themselves, it may reduce the need for assistance.

The main challenge is, however, in the existing building stock. Urban densification and the refurbishment of old apartment buildings are current issues in neighbourhoods built after the 1950s. The apartment buildings of that period need major technical renovations. In particular, neighbourhoods with both an older population and old housing stock need attention. The options of renovation, refurbishment or even the demolition of old buildings that are inaccessible have to be considered to respond to the current housing needs. Therefore, accurate information about existing apartment buildings would be important to anticipate the need for modifications to these buildings. However, Kotilainen, Shemeikka and Helminen (2016, p. 24) point out some shortcomings in current building register of reporting information regarding lifts, for example. Earlier studies by Weenig and Staats (2010) suggest that even a simple refurbishment of the housing environment can considerably help to improve residents' subjective well-being. Then again, Lindahl, Martin and Malmqvist (2012) found that the pull factors to improve accessibility in ordinary apartment buildings have not been important enough and, therefore the owners have been relatively reluctant to carry out renovations in old apartment buildings. At the same time however, housing providers and landlords have regarded older people as good tenants. They have reported fewer disturbances and more savings on water and electricity consumption in apartment buildings with many older residents.

In Finland, most of the older people are homeowners. This may affect their willingness to relocate or become a renter. Furthermore, the oldest residents may not have the financial resources to go through with the necessary renovations or to relocate. Suitable housing choices affordable for older people in their familiar neighbourhood may help them to age in place. Initiatives such as the Housing Development Programme for Older People (Ministry of the Environment, 2013–2017) can promote renovations and raise awareness of housing companies to improve accessibility. However, the programme did not include outdoor spaces, pavements, and green areas or other shared spaces in living areas. There would be a need to develop similar policy programs for integral development and densification of living areas and neighbour-

hoods. Norway, for example, has launched a long-term action plan to make all public indoor and outdoor environments universally designed (Norwegian Ministry of Children, Equality and Social Inclusion, 2016).

Public facilities are shared by all resident groups. These spaces should be flexible in use and encourage social activities between people and across generations. Similarly, local services need to be designed for cross-generational use. Swimming pools, libraries and schools should welcome people of different age groups. The familiarity of these spaces may encourage older residents to participate in organised activities. In particular, Föbker and Grotz (2006) argue that informal meeting places such as cafés and restaurants are more important for social activities than activity centres for older people. In our study, the residents reported appreciating the presence of their neighbours and pointed out the lack of informal, free-to-use, low-threshold meeting places in the neighbourhood. Architects can create spaces to facilitate social relationships in the neighbourhood and make sure that the design of the built environment does not exclude any resident groups.

The walking distance, topography and quality of streets affect the accessibility. Accessibility indoors and outdoors increases safety and may prevent accidents. Moreover, this study indicates, that hilly terrain, uneven pavements and busy streets may affect the use of local services. Our findings confirm the results by Föbker and Grotz (2006) that the vast majority of the older people did their daily shopping on their own. Furthermore, our study indicates that residents choose local services that are the most accessible. This may even have an impact on the local economy. A holistic approach to housing, local services, spaces for social activities, green areas and other meaningful destinations will help to create an inclusive environment.

Policies promoting walking and cycling are on the current agenda in European cities. The participants of this study chose walking paths away from car traffic whenever possible. Walkability gains importance for daily coping as people age, therefore it is important to consider the feeling of safety for older pedestrians. The UD focus on reducing risk factors and improving safety of pedestrians, with signalised crossings, for example. During this study, in the workshops and during the observational walking tours, the fear of bicycles was repeatedly brought up in discussions. A hierarchy of streets and separate lanes for pedestrians, bicycles and cars minimises the risk of accidents. Compactness, short

distances, and winter maintenance of walking paths may encourage walking. Moreover, well-maintained pavements with light-controlled crossings improve accessibility and safety. Hajrasouliha and Yin (2015) propose that a land-use mix, the physical connectivity of streets and visual connectivity have significant positive impacts on pedestrian volumes. During this study, many residents interviewed in sheltered housing had mobility limitations as well as visual or hearing impairments. The participants reported their unfamiliarity with the environment as an obstacle to going out. It would be interesting to further investigate the impact of visual access to services, especially among older people living in sheltered housing. For the frailest people, visual access to the destination may well be the decisive factor for taking a walk.

Moreover, an appealing and versatile environment invites people to walk and spend time outdoors. A previous survey (Pöyry Finland and Helsinki City, 2010) carried out of senior residents 65 years old and over identified the desire to spend more leisure time in the local neighbourhood and especially in courtyards. The courtyard is a natural space for different activities and socializing with neighbours. It should be considered as an extension of the shared spaces of an apartment building, with the same need for accessibility as other shared spaces. Moreover, natural elements and features of the built environment can be used to create safe outdoor rooms for recreational activities. The outdoor areas in extra care housing are important for the well-being of residents, visitors and staff members. Safe gardens and balconies provide the possibility for some residents to go out independently. Many people with. Alzheimer's disease remain in good physical condition and are able to walk long distances.

Public transport enhances the mobility of older people in urban areas. Leisure activities, health services and green areas need to be easily reachable by public transport. Moreover, this study indicates that the older people used public transport even for short distances, when returning home with groceries. The result is consistent with earlier studies which observed that in the central urban areas, older people used public transport significantly more often for short distances (1–2 km) than did younger seniors (Föbker and Grotz, 2006). The network of public transport needs to connect residents to the services they need and spaces that are meaningful to them. Moreover, Peace (2013, p.36) found that the bus timetables and discount tickets influenced the ac-

Figure 95. The building, its shared spaces and immediate surroundings are all constructed with attention to accessibility (photo: Verma, I.).

tivity of older people in the city centre. From the year 2019, the Helsinki City Transport Services offer discount tickets for persons over 70 years old and older, but only between 9.00 and 14.00. This decision may have negative effect on the mobility and social activity of older people living in the area. Information and guidance on how to access public services, such as health care centres, libraries, and post offices by public transport, should be easily available through various information channels. Any modifications to the public transport network should be done with consideration of the population structure and the location of existing sheltered housing.

Most people with visual impairments are older people. People with visual impairments benefit from perceivable paths, edges, nodes, and

landmarks as introduced by Lynch (1960). These aspects help people to navigate in their environment. Moreover, people suffering from cognitive decline may use perceptible information, landmarks and environmental clues for navigation. The guidance system and signs providing visual information about directions and distances to the local shopping centre, public facilities and green areas may increase the feeling of safety and encourage the mobility of people with visual impairments and those suffering from cognitive decline. Clearly visible street names and building numbers enhance wayfinding. Moreover, multisensory information about the environment (visual information, auditory information, tactile information, etc.) promotes the independent coping and navigation of people with declining vision or hearing. Jokiniemi (2007, p. 56) argues that when the environment offers affordances to several senses, people can manage in their environment even if one of their senses is in decline. The landmarks and visual clues enable people with poor vision to navigate in the space.

The visual and acoustic qualities of shared spaces in apartment buildings have specific roles for social activities between neighbours. Moreover, an open plan of shared spaces and the use of colours and lightning enhance the perception of the space and help orientation. Design details, colour contrasts and the use of different paving materials enhance navigation and wayfinding indoors and outdoors. For example, floor numbers should be clearly indicated on each floor – along the corridors, on handrails, on the landings and inside the lift. Moreover, perception and visual clues require light. Older people with declining visual capacities need a higher level of lighting than is needed by younger people with good vision.

The overall goal of current care policy for older people is for people to be able to live in their comfortable private homes in a familiar social environment, assisted by home help and health care services. The design of mainstream housing with the principles of UD may reduce the segregation of people due to their age or functional capacities. Moreover, solutions for communal ways of living are needed for all age groups. However, a relatively small number of people are ready to live in a co-housing communities, which implies the participation of all residents in daily tasks like cooking and eating together and cleaning the shared spaces in the building. Successful housing models according to Jolanki et al. (2017) "*are resident centred and they are based on*

96. 97.

Figure 96 and Figure 97. A group home for people suffering from cognitive decline with safe inner courtyard has been realised in an ordinary apartment building in the centre of the City of Oslo. (photo, Verma, I.)

co-operation between residents, organisations, municipal operators and service providers". Moreover, most older people consider that participation should be voluntary. Integration and the possibility to maintain one's own lifestyle is important.

The number of persons suffering from memory diseases living in the community is increasing. The early and moderate stage of the cognitive decline may affect the IADL tasks. However, the familiarity and perceived safety of the neighbourhood can support the maintenance of functioning capacities. Moreover the literature review by Woodbridge et al. (2018) indicated that the improvements in the built environment were associated with higher ADL functioning capacity, more engagement in activities and independence in activities among the people with cognitive decline.

In Finland, it is estimated that 5 to 6 percent of population 75 years old and older will need support 24 hours a day (MSAH, 2013). They will need care and assistance in all of their daily activities. New and innovative housing solutions are needed for this vulnerable group of people. The location of extra care housing in the urban environment is important and affects how well integrated older people are in society. People suffering of cognitive decline may profit of housing environment, where they can continue to have their daily routines in a familiar place. The ability to have routines and intuitively use spaces that are clearly recognisable can support a person with memory loss. Moreover, supportive social environment and integration in the community may enhance coping in daily life with memory decline. Rappe et al. (2018, 62) point out that safe walking paths to local services and accessible courtyards that are well maintained may enhance possibilities for integration. They argue that green buffer zones in housing areas may decrease the noise and pollution from car traffic, and increase the feeling of safety (Rappe et al. 2018, p. 48). Urban courtyards can also become safe and calm environments for people suffering from memory decline.

Sheltered housing and extra care housing in central locations near services and public transport nodes promote the inclusion of frail people in their neighbourhood. A central location permits the residents to experience being part of community life, even if that interaction is only visual (Cutchin, 2003). Participating passively in social activities may be important for the well-being of the residents. Access by public transport may encourage friends and relatives (who may be ageing themselves) to visit the care home more often. In turn, a remote location makes access difficult both for relatives and staff members. Access to public transport can also be a competitive element when recruiting a workforce. As the human resources in care are decreasing, the satisfaction of the staff members has to be taken into account. Therefore, housing targeted at older people with high care needs should be situated near existing urban centres or sub-centres. Taking all this into consideration, government subsidies and municipal policies should be used to steer housing construction for older people in urban areas.

Different strategies to enhance social participation can be adapted. New housing developments for the older population may provide services and information for the whole neighbourhood. These service centres should be located in the urban structure in the proximity of a

housing environment with a high density of older people. New sheltered housing or extra care housing schemes should be integrated into the existing urban fabric, located within walking distance of local services and near public transport nodes. They may be hybrid buildings, including health care services, cultural activities and commercial services. Hybrid buildings may provide one possibility for Ageing in Place. These buildings could be high-rise towers or low-rise, village-like solutions (Verma, 2017, p. 57–58). On the other hand, services for residents with high care needs can be offered by networking with existing local services and activities without the need to create new ones. The network may provide assistance and home help for frail residents living in the proximity.

The shared spaces in existing sheltered housing that are not used full-time can be offered to local networks, various associations and local resident groups. Hujala and Rissanen (2013, p. 121) observed that some of the spaces in sheltered housing had "*an atmosphere of silent inactivity*", with very few opportunities for everyday activities and sensory experiences. The shared use of spaces would enhance connections of older residents to the neighbourhood and inclusion of various age groups in society. As O'Shea and Walsh (2013, p.146) point out, the connectedness can be improved by the physical layout and design of the buildings. Third sector providers and volunteers also need common, open-use spaces in neighbourhoods to organise activities for residents and to better interact with each other. However, this implies an open concept and flexible layout of the building and a design that is attractive to visitors and local residents. Moreover, sheltered resting places and various activities in the immediate surroundings and courtyards may enhance the social contacts of residents.

Finally, older people are a heterogeneous group with various needs and aspirations, and they want to continue their self-contained life. It must be noted that high support needs do not transform these people into a homogenous group. The potential of the cities needs to be developed further by involving all residents. Qualitative studies with user participation are a good way to learn from existing buildings and positively influence the design process and architectural design to come.

Figure 98. Visual access to the entrance and outdoor areas may give a sense of control over the space and shared spaces encourage social activities (photo: Verma, I.).

Conclusions

This study brings new knowledge to architects and other actors in the field of designing living environments on examining how to anticipate the demographic development in cities. The aim of the dissertation was to combine user knowledge and the principles of UD in order to contribute to building an inclusive urban environment. The research questions identified in the beginning were: How can housing design anticipate the challenge of the ageing population? What design aspects of sheltered housing or extra care housing could be adapted to mainstream housing to enable frail old people to live as long as possible at home? Moreover, how can the principles of UD be applied in planning for an older population?

User involvement was important to obtain a more holistic evaluation of the built environment. The older residents were considered to be main informants of their living environment and were well able to contribute new insights to the topic. The residents participating in this study had substantial qualitative knowledge about their living environment.

Throughout the study, the older participants expressed the wish to have a normal life and to be integrated in society. The study indicates that the length of residency in the neighbourhood was related to familiarity with the living environment, which gave residents a sense of security, and supported their activities in daily life. Moreover, the length of residency seemed to encourage informal social contacts with neighbours. Residents reported social ties with their neighbours, giving peer support and having positive social control over each other. Several people who were 65 years old and over and participated in the workshops had an older neighbour to keep an eye on. The social ties and integration in the neighbourhood may also support people suffering from memory decline.

The UD of the housing environment may enhance the possibility to continue one's life in familiar surroundings without sacrificing habits

or a sense of identity. Moreover, people with declining sensory capacities relied on their memory to cope in the activities of daily living. For a person with poor vision, memory was a strategy for navigation in familiar surroundings. Therefore, living in familiar surroundings enhances independent coping. Environmental clues, clear landmarks and perceptible guiding signs may help older people to navigate in their living environment, even with mild cognitive disorders. With both low vision and cognitive decline, however, wayfinding becomes a major difficulty.

The built environment can be seen as an accessible "platform" which should enable the integration of all stakeholders, service providers and residents but allow various architectural solutions. The architectural design may empower people in the living environment. Older people need more destinations and possibilities for social interaction around them than people in good physical condition. The poorer the resident's condition, the shorter the distance to local services should be. Therefore, a central location of housing suitable for older people enhances Ageing in Place.

The densification and modification of existing neighbourhoods with accessible housing developments and local service provision may enable older residents to remain in their own homes. Moreover, well-maintained walking paths of different lengths with visual landmarks and guidance may encourage walking. Visual access to the destination or to the next resting place may be a decisive factor in taking a walk. Moreover, the connectivity and hierarchy of streets, and walking paths separated from car and bicycle traffic, enhance the feeling of safety. The dimensioning of pavements, pedestrian crossings and bus stops for mechanical removal of snow is important in the Nordic climate.

Access to outdoor spaces, nature and green areas enhance well-being. The immediate surroundings of housing are important for people's daily activities. However, several people participating in this study reported that they did not find much to do in their courtyards. Therefore, people living in their own homes, as well as people living in sheltered housing, would like to have possibilities for outdoor activities in a courtyard near their homes. Frail older people may need attractions and destinations in the neighbourhood to get the motivation to leave their apartments or go for a walk. One of the residents in sheltered housing was interested in growing plants; another was longing to go on an outing in the forest. The possibility to engage in outdoor activities,

such as gardening or petanque or other outdoor games, would enhance physical and social activities with neighbours. Winter gardens, roof terraces and shared-use balconies with glazing or other outdoor spaces protected from snow and rain would enable older people to enjoy seasonal changes throughout the year.

Walking is the main physical activity for older people and an important mode of transport. Therefore, in an age-friendly neighbourhood, the access to services has to be considered primarily from the point of view of pedestrians. The older participants in this study reported doing their daily shopping alone. For some of them, it may be the only time to meet other people. They reported choosing the services that were the easiest to use. This included both access to services and accessibility of the premises. This may indicate that in existing neighbourhoods, the premises of the local services – the grocer's, hairdresser and pharmacy, for example – need modifications to be accessible. Moreover, the public transport network within the neighbourhood may affect the use of services. The loss of direct connections to some of the services may be a risk for older people, for the service providers and for the liveability of the neighbourhood.

In these case studies, older people often attributed the challenges of the built environment to their personal functional capacities. According to them, for example, the reason for not seeing or hearing was due to their visual and hearing impairments. Furthermore, the main reported cause for not going outdoors was reduced functional capacity. However, many obstacles caused by reduced physical and sensory functioning capacities can be lessened by the UD of the built environment. During analyses of the sheltered housing, many shortcomings related to the lighting and acoustics of the environment were identified. Deficiencies in people's sight or hearing can be at least partially compensated for by improving perception with an appropriate level of lighting, colour contrasts, and better acoustics.

This study indicated that due to the remote location of the extra care housing for people with cognitive decline, there might not be walking destinations nearby. Moreover, unfamiliar surroundings may be an obstacle for using the immediate surroundings. This is a problem as people suffering from memory decline may still be in good physical condition and would benefit from physical exercise. The opportunity to take longer walks in an outdoor environment can help them to manage

their anxiety and give them meaningful experiences. Moreover, relatives and volunteers can only take frail residents for a walk if there are walking paths and destinations in the proximity. The remote location of housing does not promote the inclusion or general wellbeing of residents. Instead, access to local community, busy streets and occasions to meet other people increase the quality of life. Some residents in sheltered housing preferred to participate passively and observe the staff members, other residents and people visiting the premises. Comfortable sitting places in shared spaces and at entrances, where visual control of the space was as large as possible, were the most desired aspects for older people in the sheltered housing scheme. These threshold spaces indoors and outdoors are also potential spaces for social interaction in mainstream housing.

The residents living in their own homes wished for spaces in which to buy affordable meals, hold informal meetings and spend time. Mealtimes were also the main events that structured the day in sheltered housing. It was the occasion for social interaction with neighbours and other people. Restaurants located in sheltered housing that are open to the public might increase the feeling of inclusion for the residents of sheltered housing. Moreover, collaboration with local service providers, schools, cafés and restaurants can offer a variety of activities to the residents. Inviting shared spaces in the neighbourhood with flexible design, offering small sitting groups and space for walking aids would enhance the opportunities for daily social encounters.

The development of an age-friendly housing environment needs collaboration between various disciplines and services. Collaboration between city services for land use and transport, leisure and cultural activities, as well as for health care and social services, can promote an age-friendly local environment. The best housing locations and synergies for the shared use of existing resources can be found together. Furthermore, participatory methods made the older participants actively think about ways to improve their own living environment. One of the main results of this study was that instead of the elderly being passive receivers, they became active producers. Research may facilitate community networks and collaboration between local stakeholders and public service providers. Moreover, it can empower older people by inviting them to participate in residents' panels or other workshops in the neighbourhood.

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Population ageing and urbanisation are global trends. Changing demographics in cities create new challenges for housing design and urban planning, as more people with mobility and sensory limitations will live at home in the future. This study explores the living environment from the point of view of the older population through three case studies. Qualitative methods used in the study provide in-depth knowledge on the built environment supporting everyday life at old age.

There is still little research evidence in the field of architecture on Age-Friendly neighbourhood design. This doctoral thesis provides new insights on this timely topic for architects, planners and other specialists who provide services for older people in cities.

A mix of land use, access to local services and a walking friendly environment enhance mobility and independence at old age. Moreover, results show that older people choose local services that are the most accessible ones. Anticipating population aging by applying Universal Design to neighbourhood design may empower the older population and allow them to remain active in their community.

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