

## HOUSING DESIGN IN AN AGING URBAN CONTEXT

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### Abstract

**Objective** – The aim of the study was to gain further knowledge on housing design supporting older people in their daily living. The physical condition and social situation of each person may vary during the life course. Housing design and urban planning need to anticipate the population ageing. The aim was to find design features in the living environment that support general wellbeing and self-contained life at old age.

**Background** – Inclusion is an important factor for life satisfaction and wellbeing at any age. 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. Access to local destinations and a walking friendly environment promote walking and independent coping. Moreover, access to local services and social activities may increase the sense of integration within a community.

**Research question** – The research question was: which features of the built environment promote daily coping, and how can urban planning and housing design support the older population?

**Methods** – Three case studies were carried out in Helsinki area. The study used qualitative and mixed methods: workshops, observational walking tours, interviews and questionnaires. The older people living at home, in ordinary sheltered housing and in a group home with 24-hour care were main informants in the study.

**Results** – The results indicated that the neighbourhood design, public transport network and proximity of green environment influenced the mobility of older people. The familiarity of the living environment encouraged residents to go for a walk and do their daily shopping alone event at very old age. Furthermore, the older residents used the local services that were the most accessible ones. Moreover, versatile neighbourhood environment with various activities enhanced cross-generational social encounters.

**Conclusion** – Comprehensive design of housing, local services and public transport may enhance the daily coping of frail persons. The access to services has to be considered primarily from the point of view of pedestrians. Furthermore, the access to green areas, local services and facilities enhance cross-generational contacts and feeling of inclusion. The ordinary housing developments with attention to Universal Design will enhance living at home and ageing in place policies. Furthermore, housing and services for frail people with high care needs in central locations enhances inclusion.

**Keywords:** *Older people | neighbourhood planning | housing*

### Introduction

This paper is introducing a doctoral thesis in the field of architecture focusing on housing design in the context of an aging urban population [1]. The urban environment can offer many advantages to the growing number of older people. Architects and planners need to anticipate this demographic change and contribute to socially sustainable development in the cities. Previous research indicates that features of the urban environment e.g., accessible dwellings, public transport [2], access to services [3], and to the green environment [4] are enhancing mobility and the general wellbeing of older people. All these features are recognised as important for the development of Age-friendly cities and communities [5]. Housing solutions and neighbourhood environment, that support older resident's functional capacities may increase their mobility and social activities. Moreover, Buffel et al. (2014) argue that availability and access to services may increase the sense of integration within a community [6]. The natural neighbourhood networks [7] and cross-generational activities increase the general wellbeing of older people. Therefore, a comprehensive view of neighbourhood planning is needed.

The design of housing and shared outdoor spaces in the neighbourhood is important for creating an inclusive society. Smith, Rayer and Smith (2008) observed that the length of residence increased with age [8]. The older population tends to reside longer periods in the same neighbourhood than younger people do. This resident group in particular may be affected by the deterioration of the quality of the built environment and infrastructure. It can also benefit the most from improvements in the living environment. Successful renovations and housing alterations may lead to

reduced needs for assistance. In Finland, urban densification and technical renovations of old apartment buildings from the 1960s and 1970s are current topics. Many of these buildings still lack lifts. Especially, neighbourhoods with a high proportion of the older population and an ageing building stock and infrastructure need an upgrade. However, the shared outdoor spaces are seldom included in the renovation projects. Universal Design (UD) is a relevant tool for planning inclusive neighbourhoods for people of all age groups, regardless of their age and functional and sensory abilities. It is a process to make the built environment suitable for people to the largest extent possible. In Finland, ageing in place policy aims at supporting older people to continue independent living in their current home, with support of care services [9]. Applying UD into neighbourhood design may promote the implementation of the ageing in place policy and enhance the integration of older people in society [1].

## Background

Urbanisation and population aging are global trends. The majority of the world population live in the cities, and the older people as well are increasingly moving to urbanized areas [10]. In Europe between the year 2000 and 2015, the percentage of the older population in the cities has increased by 26 % compared to only 2% increase in rural areas [11]. This demographic development is going to shape our cities and communities and has direct implications for housing design. It represents a new challenge for architects and planners. Smith, Rayer and Smith (2008) estimated that due to population ageing by 2050, the percentage of the European population with significant limitations in performing daily activities, such as walking, climbing the stairs, or carrying groceries would reach 11.6% [8]. Therefore, it is important to provide living environments that enhance everyday life and support people with reduced functional capacities. The WHO guidance for Age-Friendly Cities highlights the importance of urban planning in terms of housing and land use, as well as public transport [5]. People's concerns about the aging process are related to maintaining independence and having control over one's own life. These are important factors for life satisfaction [12]. The home environment is the basis for independent coping and self-contained life. Therefore, the needs of the ageing population need to be anticipated by a comprehensive and inclusive design of the built environment.

In general, the economic situation of the older population has improved over the last decades, even though the personal situation of people may vary. The design and production of goods and services may need to be modified to fit their needs [13]. As an important consumer group, their needs and wishes will also influence the housing markets. For example, a recent Finnish study revealed, that majority of persons aged 75 years old and more, preferred apartment buildings in the walking distance of local services, in city centres and sub-centres near public transport [14]. The location of housing, access to services, and outdoor activities are major factors for everyday life for older people and young families. The study by Oswald et al. (2007) found that the oldest age groups had a tendency to spend more time at home and in the immediate outdoor environment than younger residents did [15]. Therefore, the courtyards and other threshold spaces in the living environment become potential spaces for daily encounters with neighbours. Gehl (2011) argues that the quality of outdoor spaces promotes optional and social activities, as people are spending longer periods in a good quality environment [16]. In the aging process, when the social relations are getting fewer, informal social contacts within the neighbourhood gain importance. To some older people, the local grocery shop or coffee shop keeper, or hairdresser may represent the only social contact. The possibility to remain living in the familiar neighbourhood may therefore enhance general wellbeing at old age.

Kajita points out that housing design with attention to accessibility promotes social inclusion and participation [17]. In Finland, more than 90 percent of persons 75 years old and over live in their own homes [18]. A home in this context is a dwelling in an ordinary apartment building or a detached house, an apartment in senior housing, or in ordinary sheltered housing. In an ordinary sheltered housing, people live independently in their own apartment. Home care services and assistance at home may be provided upon request. Whereas extra care sheltered housing, including group homes for people with memory decline, provide housing and care 24-hours seven days a week. The Development program for housing for older people (2013–2017) [18] and the implementation of the programme (2020 -2022) launched by the Ministry of the Environment aim at improving older people's housing conditions, accessibility in existing apartment buildings, and promoting age-friendly apartment developments. The program targets one million accessible dwellings by 2030. The estimation of housing needs is based on the population prognostics. By default, only the apartment buildings built between 2000 and 2030 are considered accessible, and the renovation of old apartment buildings and detached houses has been identified as the main challenge. They would need to cover one third of the housing need (Fig. 1). Furthermore, the Ministry of Social Affairs and Health launched a new development program to promote home care services and ageing in place policy (2017 – 2018) [19]. The aim is to develop remote technology and home care services that enable more people to stay longer at home than previously. Furthermore, informal care from family members and home help may support older people in their daily life. Nonetheless, the housing environment suitable for the resident's functional capacities remains the basis of daily coping.

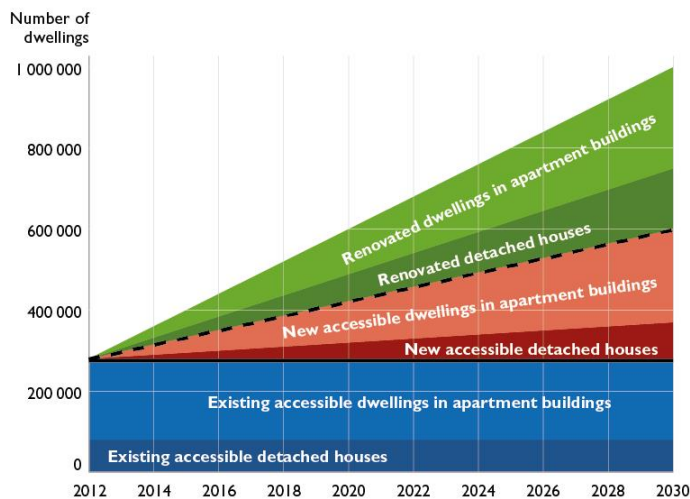


Figure 1. One million accessible homes include 1/3 of renovated housing, 1/3 of new developments and 1/3 of existing housing (Ministry of the Environment, 2013).

New housing solutions supporting residents with high care needs are required as well. The location of these housing services in the centre or in the sub-centre of cities, in the proximity of good public transport connections, promote residents' inclusion in the society. Central location enables older residents to feel integrated, and transport connections may enable older relatives and friends to make visits more frequently. Moreover, the recruitment of staff members might be easier in a central than in a remote location. The land use policies in municipalities can promote this development. [20]

## Aim of the study

The objective of this study was to gain in-depth knowledge on housing design features supporting older people in their everyday life using older people themselves as informants. Qualitative research methods, self-reported experiences of residents, and observation in real life environment were expected to provide understanding of the needs of the older age cohorts, nonetheless with understanding, that the older people are not a homogenous group of people. The physical and mental functioning capacities and social situation of persons may vary but they still want to keep their self-determination and decision making on housing. The research questions were which features of the built environment promote daily coping and how can urban planning and housing design support the older population? The knowledge and self-reported experiences of older people living at home, in sheltered housing, and in a group home for people with memory decline were gathered to gain further knowledge on housing design supporting independent coping during the life course. The overall aim was to gain information for architectural practice, future housing developments and refurbishment of existing neighbourhoods.

## Method

The case study method enables to have a comprehensive view of the challenges in the daily living environment in real life context [21]. This method was implemented in three different scales of the built environment: 1) neighbourhood, 2) immediate surroundings of apartment buildings, and 3) shared spaces in the sheltered housing. Each of the case studies used mixed research methods focusing on the living environment from the point of view of the older population in different stages of aging process and declining physical, sensory, or mental functional capacities. The case studies were carried out in Helsinki sub-urban area, Finland during the period from 2010 to 2015.

In the first phase, open access documents on population statistics, residential density as well as topographic maps were analysed. Moreover, architectural plans of buildings, information about apartment buildings with lifts, and public transport networks were studied for each case study area. In the second phase, workshops and observational walking tours were carried out with local residents 65 years old and over. Semi-structured interviews and questionnaires were used to assess their experiences in their current living environment. Mixed research methods and observation on site enabled to recognize features supporting older residents as well as challenges in the daily environment. Residents were regarded as main informants and their self-reported experiences provided knowledge of the positive and negative features in their living environment.

The study sample included people living independently at home (N=64), and older residents living in sheltered housing (N=36). Moreover, persons living in a group home for people with memory decline (N=4), their relatives (N=8), and care staff members (N=18) were invited to assess the shared spaces and outdoor environment in the group home. All

participants were volunteers. The interviews of residents with memory decline and observations in the group home were carried out in collaboration with Helsinki city social services and health care division.

## Results

The questionnaires and interviews were related to the themes of housing, mobility, and access to services. These were discussed more in detail in the workshops organised in each of the case study areas. This paper describes the findings of the triangulation of the data on these themes. The results indicate that the access to local services, walking-friendly environment, and public transport stop at a walking distance of home was enhancing independent coping of older residents.

### *Walking-friendly environment*

The discussions in the workshops indicated that older people were choosing the local services that were the most accessible ones. The access to services was not always correlating with the distance to the destination. The topography, narrow pavements with slide slopes, and many ongoing renovations in the neighbourhood were hindering walking with a walking aid. Moreover, observation showed that steps at the entrance of the retail shops or other hindrances were creating obstacles in the built environment. These obstacles may in long term, have impacts on the local economy. The results of our questionnaire indicated that residents living at home in the familiar environment went to grocery's alone even at very old age. Some persons with mild cognitive decline reported however, having challenges in wayfinding, and having nobody to go with them. The residents living independently reported that access to public transport supported the use of local services, access to health care services and social activities.

The interviews with residents living at home indicated that familiarity with the living environment increased their feeling of safety, whereas residents reported themselves to be unwilling to walk alone in places that were unfamiliar. Especially, residents in ordinary sheltered housing who had moved from other parts of the city seemed to have poor knowledge of the neighbourhood. They were reluctant to go out alone. Many of the residents in sheltered housing had moved from other parts of the city and the neighbourhood was unfamiliar to them. The frail residents were reluctant to go out alone because of fear of getting lost or losing their strength. The main obstacles for going out self-reported by the residents were the fear of falling and physical pain. The results indicated that the people living in a sheltered housing used local services and public transport less often than older people living in ordinary housing.

### *Access to green environment*

The walks and visits to the local parks and seashore were promoting the general wellbeing of older people. The green areas with various activities in the neighbourhood were observed to be spaces for cross-generational encounters (Fig. 2). However, some residents reported that the long walking distance to the seashore or steep climb to the parish hall made these meaningful places inaccessible to them. Furthermore, streets with heavy car and bicycle traffic were reducing the feeling of safety. The older residents reported choosing versatile and safe walking paths across green parks when possible. Short and direct connections across the parks to local services and destinations, like the library, enhanced walking. Moreover, older residents reported appreciating the sensory qualities of these outdoor spaces.

Sheltered sitting places in parks and benches in public outdoor spaces may encourage walking. The benches were often lacking along the walking paths. One of the major challenges for mobility in the Nordic countries is the winter conditions and the snow piled on the pavements and street crossings. The older residents reported the snow and slippery conditions being major risk factors hindering the use of walking aids. Yet, the participants in the workshop found that the walking paths in the parks were safer than narrow pavements in the winter. Good winter maintenance and mechanical clearing of snow made them walkable.



Figure 2. In the summer, the green areas are used as living rooms for the neighbourhood (photo: Verma, I.)

### ***Immediate surroundings***

Most older residents living at home self-reported visiting the courtyard daily. The participants in workshops expressed the desire to go out more often and wished more activities, especially in the courtyard. Yet, many residents in ordinary housing as well as in sheltered housing noted that there was not much to do in the courtyard. They self-reported to be interested in common activities, like urban farming and dining, which might enhance social contacts between neighbours of all ages. In sheltered housing scheme, the residents reported that the view from their room to the courtyard invited them to join activities taking place outdoors. The results indicate that the accessibility alone did not enhance the social activities in the courtyard.

One of the sheltered housing schemes had two similar size courtyards. The observation on site revealed that residents were passing through the wheel-chair accessible “stone courtyard” to spend time and socialise in the “green courtyard” (Fig. 3). Nature was an important factor for wellbeing and social activities. The visual quality and versatile environment of the green yard with sheltered sitting places was attracting the residents. The seasonal changes, natural light, sounds, and smells offered experiences for all senses. The accessible courtyard was inviting and appealing to the users. Furthermore, residents self-reported that gardening and outdoor games, as well as having afternoon coffee outdoors, were enjoyable social activities in the summertime. At the same time, they said that it was easy to withdraw from the activity, when one felt the need to do so.

The residents in the group home for people with memory decline were not able to go out alone. One of the interviewees, a resident with memory decline, reported to like gardening and another was wishing for an outing in the woods. The analyses of the case studies revealed that the outdoor spaces in the group home for people with memory decline were smaller and the destinations at walking distance fewer than in ordinary sheltered housing. Therefore, the possibilities for outdoor and social activities were limited. One of the relatives pointed out that there were no places to visit with the resident in the proximity. The nature, outdoor spaces, and coffee shops, or other services in the proximity would enhance the wellbeing of all users: the residents, staff members as well as relatives or volunteers.



Figure 3. Residents enjoyed having afternoon coffee in the courtyard (photo: Verma, I)

### ***Shared spaces for residents***

The observation in the group home for people with memory decline revealed that residents preferred sitting places where the visual control over the space was the best. Observation on site and discussions with the staff members revealed that the sitting places near windows with visual control over the entrance, and shared spaces were the most popular ones. The residents were spending much time in the shared spaces near the staff members, participating passively in the daily activities. One of the residents in our study expressed to enjoy watching people go back and forth. For privacy, she went to her own room. In the sheltered housing scheme, residents reported to use the shared spaces mainly for dining, meeting staff members and meeting other residents.

The indoor air, lighting, and temperature together with aesthetics are part of the quality of environment. The relatives and staff members in the group home were asked to evaluate the quality of the shared spaces. The results indicated that relatives' perception of the quality indicators of the premises was better than the perception of the staff members. The relatives reported higher satisfaction with the cosiness, lighting level, indoor air quality and acoustic qualities of the premises than the staff members did. This may be due to staff members spending longer periods in the premises daily whereas, the relative's visits are usually shorter and less frequent. The quality of the premises is important as it may also affect people's willingness to visit and spend time in the sheltered housing premises. (Fig. 4).

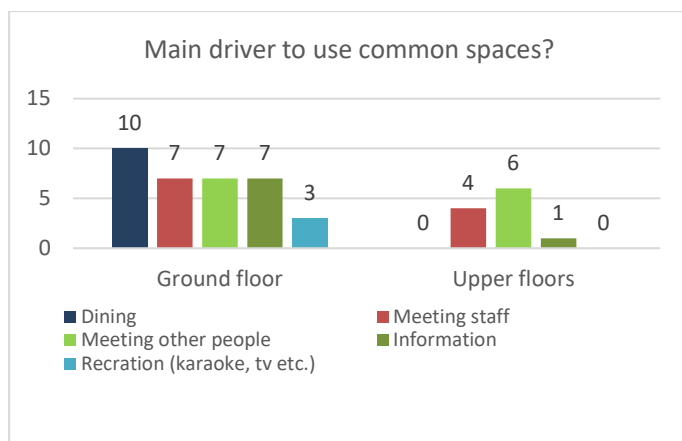


Figure 4. The residents (N=10) reported to use the common spaces for dining and social activities.

Furthermore, in addition to spaces for structured activity, the residents were pointing out the need to have intimate spaces for chatting and for informal meetings. A variety of shared spaces would accommodate the residents' need for social activities. The staff members pointed out, that most of the residents entered the dining room at the same time with their walking aid or wheelchair, which made the space very crowded. The dimensioning of shared spaces and a flexible design would allow various numbers of people to carry out different activities in the same spaces. Moreover, accessible shared use space for residents, relatives, and other people from the neighbourhood would promote resident's social activities and their inclusion in the neighbourhood.

## Discussion

The results of this study are in line with the findings by Barnes, which indicated that an offer of series of private, semiprivate, and public spaces was connected to the well-being of residents [22]. Ryhl, Katjita and Sorensen point out that Universal Design is also about the physical quality of architecture as well as the sensory aspects of architectural experience [23]. Previous study by Piechniczek-Buczek, Riordan and Volicer found that the characteristics of the space, peaceful surroundings, cleanliness, and opportunity to go out make the visit of relatives and friends more pleasant [24].

Comprehensive assessment of existing housing provision, local services and transport network is necessary when designing new living environments or densifying old neighbourhoods. In the future, the living environments need to support independence and self-contained life of people at all ages. Mix of land use, accessible housing in the proximity of local services and public transport enhance daily coping of frail persons with mobility limitations. The Universal Design features in the built environment may increase independence and reduce the need for assistance in everyday activities. It may also enhance social participation within the community [25].

Housing for people with mobility limitations and sensory or cognitive decline integrated in the neighbourhood design may decrease segregation and feeling of exclusion. Access to green areas and public transport promote mobility of older people. The fear of getting lost may lead to immobility, isolation, and cause premature loss of functional capacities. Well-indicated, and safe network of walking paths to local services and meaningful destination encourage walking. Guided walking paths of different lengths around the building, in the immediate surroundings, and in the neighbourhood would provide a variety of choices for residents. The legibility of the living environment and landmarks along the walking paths may help navigation and wayfinding. Mitchell et al. (2004) observed that people with memory decline used landmarks and other environmental features to find their location and route [26]. The proximity of services and visual access to destinations may encourage walking of the frailest residents.

The hierarchy of the streets, separation of pedestrians from bicycle and car traffic would increase the feeling of safety of older people. Moreover, accessible open spaces in the neighbourhood may encourage social activities among people of different age groups. Inviting and versatile environment invites people to spend time in shared spaces. Sheltered sitting places, outdoor games and gardening in courtyards may enhance daily encounters with neighbours of all ages. The results are in line with the earlier observations by Gehl (2011), which highlighted the importance of qualitative aspects of the environment for social activities [16].



Figure 5. The multigenerational housing development in Helsinki (photo: Verma, I.)

The housing design needs to be accessible and targeted to all resident groups. Special housing construction for the oldest age cohorts alone is not a sustainable solution [1; 14]. Therefore, the design needs to take into account the variety of resident groups. Flexible design may enhance the shared use of local services and facilities for cross-generational social activities. *It should include accessible outdoor environments to enhance the feeling of inclusion of all residents.* Older persons and small children are both frequent users of the immediate surroundings. *Flexibility and adaptability of outdoor spaces for various activities may promote cross-generational encounters.* All age groups profit of easy access to local services and facilities, safe walking environment and good public transport network. Accessible walking paths of different lengths to various destinations in the living environment may enhance mobility of older residents. Helminen et al. (2017) point out that 200 m may be a long walking distance for the frailest [14]. Hierarchy of streets, separate lanes for pedestrians, bicycles and cars minimise the risk of accidents and enhance feeling of safety of both children and older people.

Shared spaces indoors and outdoors may enhance social and physical activities as well as cross-generational encounters. Ordinary sheltered housing schemes and group homes for people with memory decline integrated in the neighbourhood reduce the age segregation and increases the inclusion of older people in the society. Universal design of neighbourhoods enhances both sustainable development and Age-Friendly Cities. The challenge is to develop intersectional collaboration within the fields of urban planning, housing design, and traffic planning, as well as services for older people.

## Conclusion

Older residents usually have long-term user knowledge of the quality of their own living environment, but they are seldom involved in the urban development processes. Universal Design of neighbourhoods can be related to accessibility of services, safe walking environment, and inclusive outdoor environment for all age groups. Future urban developments would profit from the participation and involvement of the older population as informants and partners in planning processes.

## References

- [1] Verma, I. 2019. Housing Design for All. The challenge of ageing in urban planning and housing design – The Case Study of Helsinki. Doctoral dissertation, Aalto University, School of Art, Design and Architecture. (publication in August 2019).
- [2] Metz, D. (2000) Mobility of older people and their quality of life. *Transport Policy*, 7(2000), 149–152.
- [3] Richard, L.; Gauvin, L.; Gosselin, C. & Laforest, S. (2009), Staying connected: neighbourhood correlates of social participation among older adults living in an urban environment in Montreal, Quebec. *Health Promotion International*, 24, 46–57
- [4] Kemperman, A. & Timmermans, H. (2014) Green spaces in the direct living environment and social contacts of the aging population. *Landscape and Urban Planning*, 129, 44–54.
- [5] WHO. (2007) *Global age-friendly cities: a guide*. World Health Organization.
- [6] Buffel, T.; De Donder, L.; Phillipson, C.; De Witte, N.; Dury, S. & Verté, S. (2014) Place Attachment Among Older Adults Living in Four Communities in Flanders, Belgium, *Housing Studies*, 29, 800-822.

- [7] Gardner, P. (2011). Natural Neighbourhood Networks – Important social Networks in the lives of older adults aging in place. *Journal of Ageing Studies*, 25, 263-271.
- [8] Smith, S. Rayer, S. & Smith, E. (2008) Aging and Disability. Implications for the Housing Industry and Housing Policy in the United States, *Journal of American Planning Association*, 74, 289–306.
- [9] Vasara, P. (2015) Not ageing in place: Negotiating meanings of residency in age-related housing, *Journal of Aging Studies*, 35, 55-64.
- [10] UN. (2014), *World Urbanization Prospects. Highlights*. United Nations, New York, ST/ESA/SER.A/352.
- [11] UN. (2015) *World Population Ageing*, United Nations Department of Economic and Social Affairs, Population Division. [e-publication:  
[http://www.un.org/en/development/desa/population/publications/pdf/ageing/WPA2015\\_Report.pdf](http://www.un.org/en/development/desa/population/publications/pdf/ageing/WPA2015_Report.pdf);
- [12] Carr, K.; Weir, P.L.; Azar, D. & Azar, N.R. (2013). Universal design: A step toward successful aging, *Journal of aging research*, 324624. [e-journal: <http://doi.org/10.1155/2013/324624>]
- [13] Healy, J. (2004) *The Benefits of an Aging Population*. The Australia Institute. Discussion Paper Number 63.
- [14] Helminen, V.; Vesala, S.; Rehunen, A.; Strandell, A.; Reimi, P. & Priha, A. (2017) *Ikääntyneiden asuinpaikat nyt ja tulevaisuudessa*. Reports of the Finnish Environment Institute 20/2017, Finnish Environment Institute, SYKE.
- [15] Oswald, F.; Wahl, H.W.; Schilling, O.; Nygren, C.; Fänge, A.; Sixsmith, A. & Iwarsson, S. (2007). Relationships between housing and healthy aging in very old age. *The Gerontologist*, 47(2007), 96 -107.
- [16] Gehl, J. (2011) *Life Between Buildings*, Island Press.
- [17] Kajita, M. (2014) *Spatial Dimensions of Accessibility. Inclusive urban dwellings*. The Royal Danish Academy of Fine Arts, Doctoral dissertation.
- [18] Ministry of the Environment (2013) *Housing development programme for older population for 2013–2017*, Government Resolution, 18 April 2013.
- [19] Ministry of Social Affairs and Health (2016) *Improved home care for older persons and enhanced informal care in all age groups*, MSAH, 2016. [webpage: <https://stm.fi/en/improved-home-care-for-older-persons-and-enhanced-support-for-all-aged-informal-carers>]
- [20] Verma, I. (edit.) Kurkela, T.; Sanaksenaho, P.; Suominen, J.; Taegen, J. & Vauramo, E. (2017) *Palvelukortteli, Konseptin kuvaus ja soveltaminen erilaisiin taajamiin*. Ympäristöministeriön raportteja 3/2017. Ministry of the Environment, Helsinki.
- [21] Yin, R. (1994) *Case study research. Design and methods*, Sage publication, 2nd edition, London.
- [22] Barnes, S. (2006) *Space, Choice and Control, and Quality of Life in Care Settings for Older People*. *Environment and behavior*, 38, pp. 589-604.
- [23] Ryhl, C.; Katjita, M. & Sorensen, R. (2016) *Qualitative description of spatial quality in inclusive architecture*, In: H. Petrie (Ed), *Universal Design 2016: Learning from the Past, Designing for the Future*, IOSpress.
- [24] Piechniczek-Buczek, J.; Riordan, M.E. & Volicer, L. (2007) *Family member perception of quality of their visits with relatives with dementia: a pilot study*. *Journal of the American Medical Directors Association*, 8(2007), 166-172.
- [25] Steinfeld, E.; Maisel, J. & Levine, D. (2012) *Universal Design: Creating Inclusive Environments*, John Wiley & Sons, Incorporated, 2012. ProQuest Ebook Central
- [26] Mitchell, L.; Burton, E. & Raman, S. (2004) *Dementia-friendly cities: designing intelligible neighbourhoods for life*, *Journal of Urban Design*, 9:1, 89-101