

CIB W069 SF VERMA and HASU #1 150528

Crs: 29394 words: 5411

## Townhouse for Life

### Subtitle

*Ira Verma<sup>1</sup> and Eija Hasu<sup>2</sup>*

Main Corresponding AUTHOR IRA VERMA
Institution/University Aalto University
00076 AALTO, FINLAND
E-mail: <a href="mailto:ira.verma@aalto.fi">ira.verma@aalto.fi</a>

### Abstract

In order to develop cities in a sustainable manner, new housing typologies that are energy-efficient and affordable are needed. Furthermore, due to the demographic development accessibility is becoming a significant issue. Currently, Helsinki is promoting strongly new housing areas introducing townhouse buildings. This paper describes one aspect of a multidisciplinary research and development project on Energy Efficient Townhouse (EET). According to Finnish Land Use and Building Decree, a residential building and associated spaces shall meet the requirements for accessibility in case of an apartment block. Today, the requirements on accessibility do not apply to a townhouse building as it is regarded as a single-family house.

A Finnish Townhouse is a newly emerging housing typology in Finland. It is regarded as a sustainable urban version of single-family house, aimed mainly for families with children. However, according to the Finnish Dream Home (FDH) survey, also couples and one-person

---

<sup>1</sup>Verma, Ira, Architect, PhD candidate, Department of Architecture, Sotera Institut, Aalto University, [ira.verma@aalto.fi](mailto:ira.verma@aalto.fi)

<sup>2</sup>Hasu, Eija, Landscape Architect, PhD candidate, Department of Architecture, Aalto University, [eija.hasu@aalto.fi](mailto:eija.hasu@aalto.fi)

households in all age groups expressed interest towards the townhouse concept. A townhouse with a small private garden, easily accessible parking solution and access to common green areas, can be developed as a lifetime house promoting wellbeing of seniors, as has been suggested in the workshops as part of the FDH study. Furthermore, possibility to separate the building vertically can enhance multigenerational or communal housing solutions.

In this paper, the study consists of comparative analyses of existing townhouse buildings including building plot, attachment to the street and common green areas. Analyzes of existing townhouse buildings using building codes for accessibility are conducted and reflected with the most current research, Finnish Dream Home survey and the workshops. The aim is to improve the usability and show the potential of future townhouse building. The result of the project will be a guideline for an accessible townhouse. The Energy Efficient Townhouse –project will end to a pilot construction.

**Keywords:** townhouse, lifetime housing, accessibility

## **Background**

In order to develop cities in a sustainable manner, and to densify existing urban settings, new housing typologies are needed. The mixity of land use and a variety of housing affordances promote sustainable development as well as aging in place. In the ongoing multidisciplinary research and development project on Energy Efficient Townhouse (EET) the aim is to develop a model of an energy efficient, accessible and affordable townhouse. Even though a townhouse is a common housing model in central Europe (especially Netherlands and Germany) and in UK, it is a newly emerging housing typology in Finland. It is regarded as a sustainable urban version of single-family house. In Finland, due to demographic change, the aim is that 30 percent of the dwellings, including single-family homes, will be accessible by 2030 (Ministry of the Environment). UN Convention on the Rights of Persons with Disabilities (UN, 2006), which Finland is going to ratify also postulates member nations to promote accessibility and equal rights, including housing options, for all persons.

The equality, inclusion and participation are key concepts to measure the social sustainability. The built environment has influence on the use of the neighborhoods and communities on a daily basis. Being able to walk to various locations and services in the neighborhood enhances social interaction, physical well-being and reduces energy use and CO<sub>2</sub> emissions. Walking

route choices are influenced by the total lengths and connectivity of streets and sidewalks. The walking paths should be continuous and uninterrupted. A dense network of pedestrian and bicycle lanes is needed. In the design of new townhouse areas the walking path connectivity has to be taken into consideration. Residents may walk to local destinations, such as schools, bus stops, or groceries if these services are available in the proximity. According to some studies, a five minute walk is considered the average distance that a pedestrian is willing to walk before choosing to drive (Diyanah & Hafazah 2012.). Some other findings suggest that the walkable neighborhood is geographically contained within a 1-km circle from home. Furthermore, the study came to conclude that 15 percent of all car trips would disappear if all journeys shorter than 1 km were by foot (Solheim & Stangeby 1999).

The second aspect of townhouse planning relates to the neighborhood level. Townhouse areas with private yards opening to common green areas provide safe walking areas for residents. According to Svensson (2009) residential areas where pedestrian and car traffic is completely separated provide the most favorable environment for persons with mobility impairments. However, the separation of car and pedestrian traffic often makes distance to the nearest public transport stop long. User studies in Finland show, that a bus stop within 100 – 150 m from home promotes the use of public transport. Furthermore, the distance to nearest bus stop should not exceed 250m (Sahlsten, 2013). This can also be regarded as recommendation for the independent coping of elderly.



*Fig. 1. The actual walking distance (solid line) can be significantly longer than the measured distance to destination (dotted line). (Takano, A. & Verma, I. 2014)*

The third aspect of townhouse design is about the building itself. In this regard, it is essential to examine potential residential groups. One of these groups is the elderly persons, as explained in next chapter.

### ***Population projections***

Due to population aging the need for accessible housing is expected to grow in near future. The Finnish Ministry of the Environment has launched a target for 1 million accessible dwellings by 2030. That would count 30 percent of Finnish housing stock. The number includes both apartment blocks and single-family homes. In terms of ageing people, many persons over 65 are living in single-family homes. Majority of persons want to remain in their current home for as long as possible. In 2011, 39.1 percent of persons over 75 in Finland lived in single-family homes and 44.5 percent in apartment blocks (Ministry of the Environment 2013). The possibility to live in the familiar environment has positive impact on social relations and wellbeing of the elderly. However, the building codes related to accessibility apply to most extent only to apartment blocks. Many are forced to move because of the problems in accessibility.

Regarding lifetime housing, ageing people also known as baby boomers, are in our focus. Nonetheless, when surveying the baby boomers in Finland, the situation is slightly different from other countries. An equivalent boom did take place in many countries following the World War II, but the Finnish baby boom phase took shorter time, though was more drastic. Nowhere else did the relative size of these birth cohorts differ as much from the prior and succeeding groups as in Finland, where it almost doubled. From this point of view it can be assumed that the Finnish baby boomer generation may have a greater explanatory power than in many other countries. Several studies see baby boomers as a crossroad and bridging generation, which links both the past and the present – maybe even the future: *”By examining boomer life styles, predictions may be made as to how the role of pensioners might change in the future”* (Karisto 2007, 101).

The persons will live longer and healthier than earlier generations. However, the proportion of the oldest will grow fastest and according to recent studies the disability rates of population will grow faster than the general population. The proportion of the population with a long-lasting

condition that limits one or more physical daily activities such as walking, climbing the stairs or carrying groceries, will increase from 8.2 percent in 2000 to 11.6 percent in 2050. Furthermore, the proportion of persons with a condition (six months or more) that makes dressing, bathing, or moving inside the home difficult, will increase from 2.9 percent to 4.6 percent on the same period. (Smith, Rayer & Smith 2008.)

The possibility to live in the familiar environment has positive impact on well-being and participation. Yet many are forced to move because of the problems in accessibility. The major renovations are expensive and all persons can't afford to make necessary modifications.

### ***Housing preferences***

In the Finnish context, despite the need for accessible housing, the housing supply has remained relatively unchanged during the last decades, as have been the housing preferences promoting detached housing as ultimate housing desire. The preference for small-scale living has not been recognized amongst the housing policies or design, since sustainable development and beliefs about ageing resident's needs steer the supply towards compact urban structure and high-rise apartments. In the Finnish planning context, elderly people have been interpreted as one of the most important residential group for apartment living. However, according to The Residents' Barometer Survey, elderly people have not found apartments as desirable as expected (Strandell 2011).

The notion suggests that elderly may have differing housing aspirations and thus, the ageing households are not to be considered as a homogeneous unity. According to the research, also elderly people do divide in various segments, groups of differing values and housing aspirations.

### ***New ways of living for the aging people***

In a modern world, the housing preferences are indeed diversifying. People with similar backgrounds may conclude different housing decisions (Jansen 2012). In this study, our focus group is people over 55 years representing a life-stage group relatively free from many aspects limiting housing decisions. Moreover, at an age of retirement, people are healthier than ever. Long lifetime expectancies combined with considerable amount of wealth and leisure time portray senior citizens as an interesting focus group, with possibilities to fulfil their housing preferences without major limitations.

Nevertheless, the housing market situation prevailing by the time the baby boomers retire is still relatively unknown to us. Baby boomers are considered to be the first significant example of the 20<sup>th</sup> century phenomenon of a “branded generation”: *“They want to reinvent the retirement in the same way they invented the teenage in the sixties”* (Dann 2007, 429-430). If baby boomers are considered a generation of individualism and lifestyle, it is of a utmost importance to identify and to capture the generation’s housing preferences in order to understand the possibilities to meet the generation’s needs and wants. (Dann 2007, 430; Gilleard & Higgs 2007, 16).

Studies of ageing people and housing preferences are contradictory. On the other hand, some of the research assumes that people do not want to change their housing situation by the time of retirement (e.g. Myers & Ryu 2008); on the other hand, housing studies are emphasizing the ageing people becoming unable to cope in everyday life without major difficulties (e.g. Clough et al. 2007) thus urging for a change. Yet many do not alter their housing situation in later life: According to Smith & al. (2008) the length of residence increases dramatically with age, rising from 4.3 years for householders under age 35 to 30.2 for householders aged 85 or older.

According to Clark & Deurloo (2006), there is an over-consumption of housing in the old households compared to young families with children. The older households that have relatively long duration of stay and occupy spacious housing. This can be a challenge for younger families with bigger households who need more space. In Finland, 80 percent of the persons 75+ live in owner-occupied apartments (Ministry of the Environment, 2013) and previous studies show that the elderly tend to use their savings before downsizing their apartment (Clark & Deurloo 2006). Furthermore, since majority of the senior inhabitants remain in the existing housing, the aspects of accessibility should be taken into account in all housing types – including the single family homes.

### ***Visitability and accessibility***

People may be concerned about the aesthetics or affordability of an accessible single family home, believing that accessibility features make a house look unattractive or the building costs will be too high. When the accessibility is included in the early designed process the affordability or the quality of the building are not compromised. The investment in building costs will reduce expenditure on expensive modifications in long term. The private builders also seem to have an optimistic view of their possibilities to live in their current home.

According to a recent study (Kilpelä & al. 2014) the major cost effect of accessibility for apartment building is the dimensioning of the bathroom. The extra costs are mainly related to the additional space needed to fulfill requirements for an accessible bathroom. However, at a later stage the modification of the bathroom would cost 3.5 times more.

The visitability is a movement that aims to the development of accessibility for owner-occupied single-family homes. Few specific features regarding ground floor entrance, door width and toilet helps a person at any age to stay home in case of temporary or permanent mobility impairment. The advantage of a level entrances and wider doorways is to make common tasks such as moving furniture, pushing baby strollers, storing bicycles, and carrying groceries easier. The visitability also refers to raised electrical outlets and lowered light switches, which are easy to be used sitting in a wheel chair. Smith & al. (2008) estimates that at least 25 percent of new houses built today will be occupied during the lifecycle of the house by a resident with severe long-term immobility. Wider doorways and corridors as well as low threshold entrance also increase the safety in the case of fire or emergency.

These aims are of utmost importance also regarding the townhouse concept that is actively promoted by the Helsinki City. In this respect, it is essential to notice that the visitability does not fulfill the need of accessibility. The main target is to create a continuous path from the street level till the apartment. To be able to fully make use of all premises of the townhouse, a vertical platform lift is necessary. Furthermore, when the apartment is provided with a lift, the ground floor plan can be designed more freely without need for wheel chair accessible bathroom or kitchen. The vertical lift can also help to move furniture or carry laundry or groceries. However, we need further understanding on the ways to fulfill diverse housing preferences of ageing people, especially in terms of the townhouse concept. Next, we will study the lifetime housing options from the residential understanding.

## **Methods**

### *User studies*

The townhouse interest was studied using several methods. Residential housing preferences were investigated by a web-based survey, FDH, in 2014. The research setting for the survey was dictated by the need to identify different potential residential groups for townhouses, and to differentiate attitudes towards diverse design solutions. The setting was chosen to provide

information for design purposes, such as accessibility. In order to avoid traditional housing typology based examination, the survey was constructed in such a way that the preference towards townhouses was asked only in the end of the questionnaire; prior to the townhouse interest question, the questionnaire provided a short description of the Finnish townhouse concept.

The web-based questionnaire was designed to be answered in 15 minutes. The questionnaire focused on housing and value-based questions. The respondents were asked to identify their favourite dwelling type, but also to indicate attitudes towards alternative housing types. Aspects of residential environment were asked about in relation to the previous housing experiences. The questionnaire collected 1214 responses from web panelists located in Helsinki Region. The survey was also used to recruit participants for townhouse workshops that were arranged in February-March 2015. The workshops groups were selected according to the age groups and life-stages.

The workshops tackled each a specific theme: the first workshops were about street floor arrangements, including gardens; the following workshops studied housing typology through residential plans; the last two workshops focused on street arrangements and flexibility.

Despite the changes in the focus of each workshop, the workshops followed a specific structure. Following a short introduction, participants divided in groups of 2-4 people, in which participants' current housing situation pros and cons were discussed briefly. Next, the facilitators explained the aim of a specific workshop; additionally, the groups were asked to decide the reference household to whom to design for. In other words, the choice of a reference household offered a frame for decisions. Furthermore, the participants were offered a possibility to explain in what ways their group's plan were in line with one's own preferences, and in what ways an individual would want to change the design or what would be the barriers for choosing a townhouse.

### ***Analyses of existing buildings in Finland***

Townhouse is an emerging typology in Helsinki. The townhouse, by our definition, is a multi-store single-family house that is attached to a similar house by a shared wall. Only a few examples have been accomplished in Helsinki so far. The building regulations concerning accessibility are valid for "a residential building with at least two storeys, consisting of several apartments where facilities in different apartments are one on top of the other" (Building Code, 8(20))



Ministry of Environment). A townhouse consist only of one apartment, therefore, these regulations do not apply. However, in most recent townhouse plans the accessibility has been taken into account. The assessment on existing townhouses was done by examining planning documents and by observation. The parking solution, level entrance and a lift, or space reservation for a lift, were assessed as features enhancing accessibility.

The parking solutions affected also the planning and affordability of the apartments. The townhouse plans with underground parking solution were situated near city center whereas on street parking and parking on plot were used more on suburban townhouse plans.

The entrance and attachment of the plot to street are important for accessibility as well as visitability. A front yard or transit zone before the building enables to manage the differences in height of the street level. Furthermore, the Finnish lifestyle also requires a certain amount of privacy, which can be assured by the front yard. The size of the front yard affects the streetscape and parking solutions (Takano & Verma 2014). Whereas, in the city center underground parking is predominant solution, in suburban areas on street parking, parking place in the front yard or private garage on ground level are more common.

The plot size has also impact on accessibility. Townhouse plots are usually narrow, which makes vertical connections inside the apartment and dimensioning of an accessible bathroom in ground level challenging. In single-family homes it is possible to have a lift outside the building frame. Whereas, in townhouse the façades are needed for openings to get natural light inside the apartment. In some new buildings, however, there is an accessible toilet in entrance floor and a reservation for a vertical lift and.

## **Results**

Table 1 indicates that preferences towards townhouses are similar amongst different household types, suggesting that housing preferences and styles are not life stage or age dependent. Both couples and one-person households show almost parallel interest towards the concept, as do families with children. Furthermore, surprisingly, resident over 55 years old show almost a similar interest towards townhouse-concept as does younger generations.

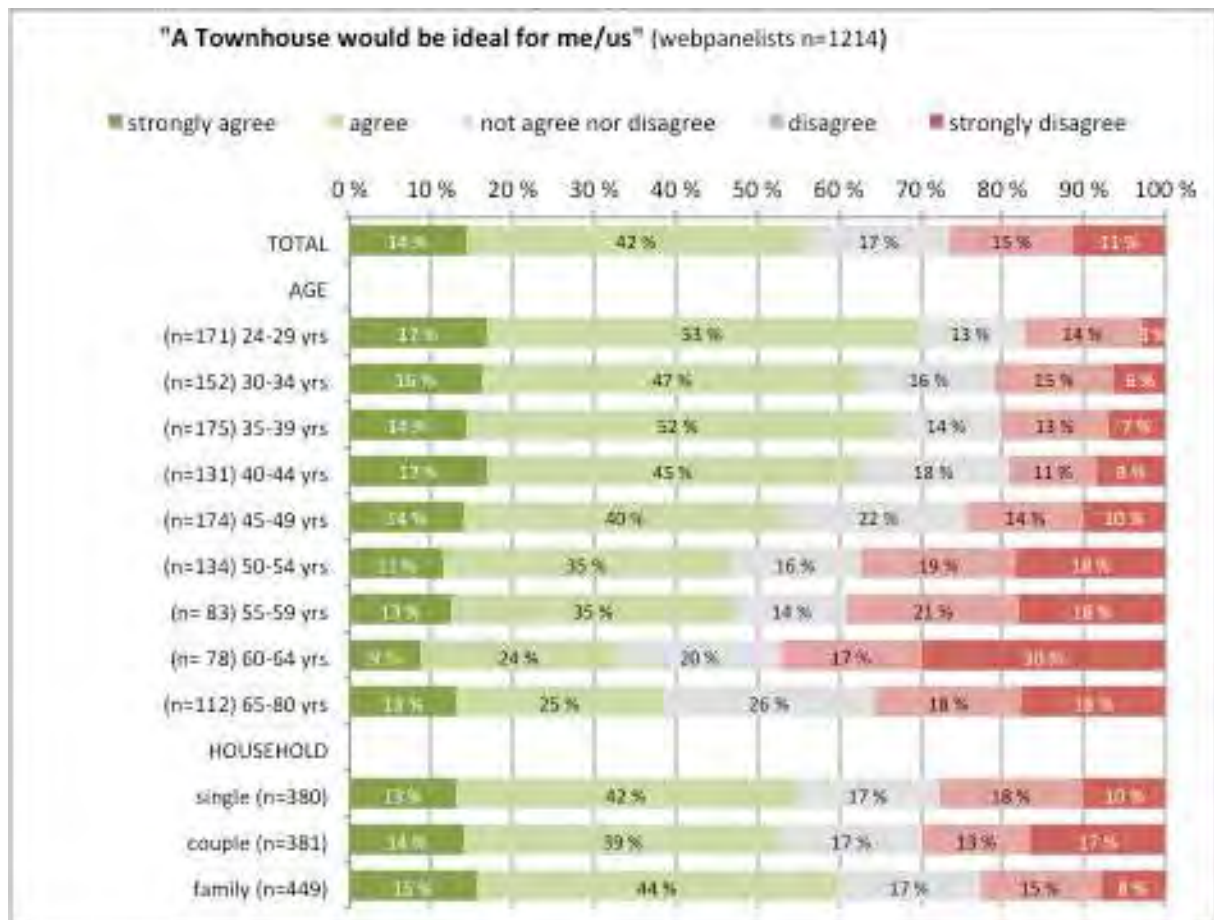
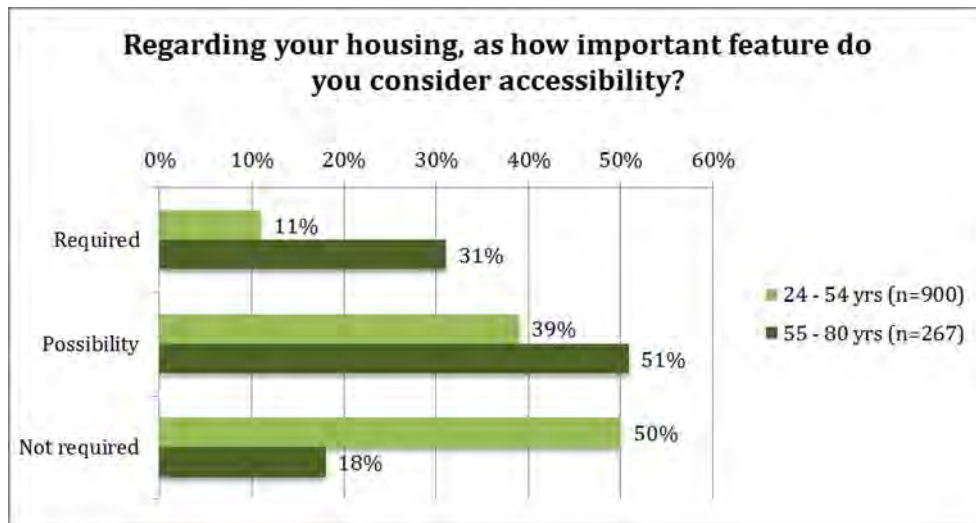


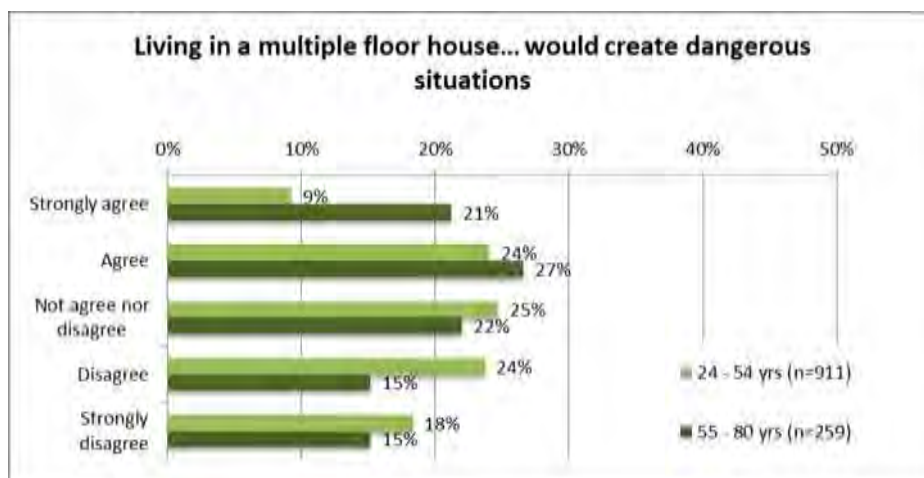
Table 1. Finnish Dream Home survey. Interest in townhouse. Responses to the last question of the survey, chi square test results: age,  $p=0.000$ ; household type,  $p=0.020$

Regarding accessibility as a design solution, people 55+ years define accessibility as a non-compensatory (31%). Respondent under 55 years did not show similar interest towards accessibility (11%).



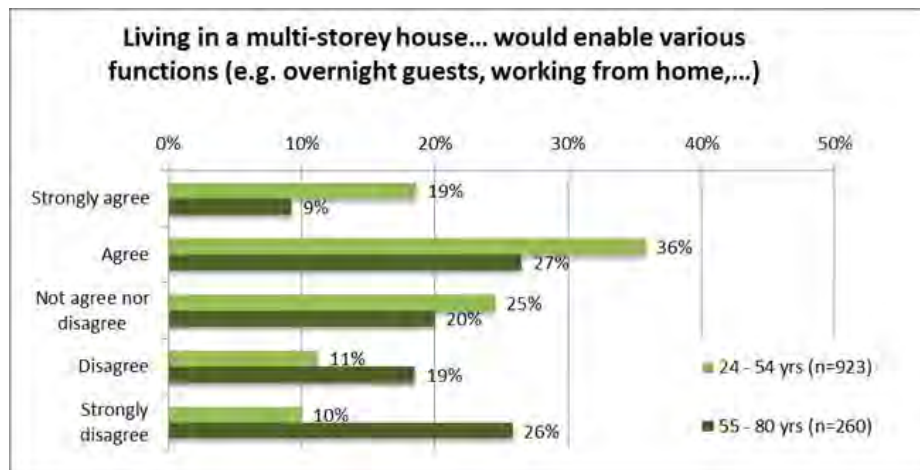
*Table 2. Respondents were asked about accessibility in terms of their housing values – whether the feature is considered as a non-compensational (required), optional (possibility) or not desired at all (not required). Of people 55 years and more, 31% considered accessibility as a requirement.*

FDH survey scrutinized respondents’ attitudes towards multi-storey housing. Respondents were asked to state opinions regarding different statements. One of the statements tackled living in multi-storey apartment and perceived safety. People 55 years and more did find living in a more than one floor house as creating dangerous situations (48% agreed or agreed strongly), but at the same time, 30 percent of the same age group did disagree or disagreed strongly with the statement.



*Table 3. A slight increase amongst the elderly in considering multiple floors causing dangerous situations, 30.2% of persons over 55 years old did not agree with the statement.*

The respondents were asked opinion, whether the living in a multiple floor house would enable more flexible spatial arrangements, including social contacts such as friend staying overnight.



*Table 4. Total 36% of the ageing people considered that living in a more than one floor house would provide more functions to ordinary living.*

Even though the survey explained some aspects of townhouse living pros and cons regarding senior residents, additional methods were needed. In this regard, the townhouse workshops explained the preferences in a more detailed way. The ageing people presented several design options to tackle accessibility and lifetime housing. Two cases are presented next.

#### **CASE 1:**

The first townhouse workshop case was designed by two women, aged 63 and 69 years. They described their reference townhouse inhabitants as follows: Liisa, 70 years and her husband Kalle, 72 years. The couple has three children and six grandchildren. They like to invite kin as well as friends to spend time at their home. However, Liisa and Kalle spend relatively many weeks in their summer cottage, thus they value easy-maintained home.

The townhouse home offers an own car parking space next to the entrance, which makes it easy for Liisa and Kalle to handle the groceries and most importantly, to handle the items needed in their summer cottage. The couple also underlines the importance of the elevator. As a combination, a parking space next to one's entrance and an elevator guarantees accessible housing for elderly people. Furthermore, the quality of life is appreciated. Garden that is designed as an extension to the home offers a place to enjoy outdoor life and time with relatives

and friends. A ground floor with a spacious entrance hall, a kitchen with a flow of natural light and a dining room with an option to have a very long dinner table ensure housing that meets the most important demands people like Liisa and Kalle may have.

## **CASE 2:**

The second townhouse workshop case is designed by two women, aged 62 and 69 years, and one man, aged 64. Reference inhabitants were a family of three generations, based on the participants' own experiences and/or aspirations. Grandparents are named as Maija and Matti, being about 60 to 65 years old. One of them is retired the other one is still in the working life. The grandparents occupied the second floor. The ground floor, as well as the first floor, was inhabited by the family, parents Pirkko and Pekka, aged 35 years and their three children, Topi 2 years, Lauri 12 years and Liisa 15 years. TAI The younger family, parents Pirkko and Pekka, aged 35 years and their three children, Topi 2 years, Lauri 12 years and Liisa 15 years, inhabited the ground floor and the first floor.

The significant aspect of the townhouse design for them was the flexibility of the house. An elevator offered accessibility for all the three generations, yet the privacy was well guarded since the elevator was designed as an outdoor entrance. Only the first two floors occupied by the young family had stairs inside. In terms of outdoor spaces, the grandparents were to enjoy a spacious rooftop terrace. The garden was mainly for the family with young children.

The grandparents were described to enjoy both their privacy and the closeness to the younger generations, at the same time. Furthermore, the workshop designers underlined the flexibility: when the grandparents would move to the eternity, the eldest child could move to the upper floor, or, the family could either rent or sell the third floor apartment.

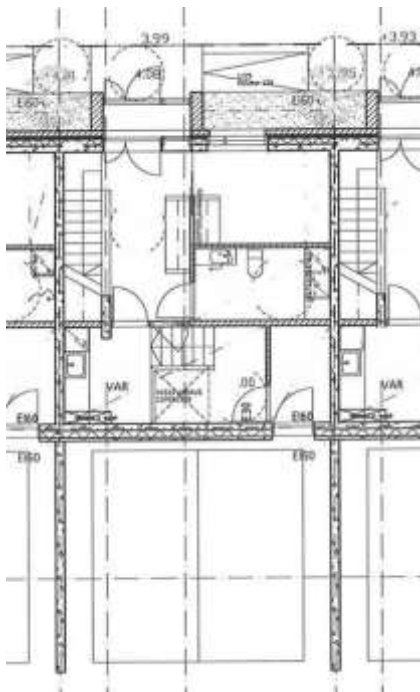
In both cases described the street arrangements were a matter of interest. The ageing people appreciated own garden or a roof terrace, but also the maintenance functions. Townhouse was considered as a housing type that guarantees accessible streetscape. Especially winter conditions were discussed.

### ***Analyses of existing buildings***

Analyses of existing townhouse revealed some differences in design solutions for the building plot in the city center and other parts of the city. The most apparent difference was due to parking solutions. Parking solutions affect the streetscape and the costs of construction. In city

center the underground parking is a prevalent solution. However, it is an expensive solution and not often used in the suburbs. In suburban area on street parking, a parking place in the front yard or a private garage on ground level is the common solution. Parking place in the front yard doesn't execute the need for density of the plan and affects the streetscape. It does enable to manage the difference of height between street level and entrance.

Most townhouse had accessible parking place, which was on the same side of the street as the building entrance. Furthermore, the path to the entrance was short and accessible in most cases. The requirement for an accessible entrance is a level platform of 1500 mm x 1500 mm before the entrance door. The slope to the entrance should not exceed 5 to 8 percent and it should be preferably covered. This was realized if the building was not directly attached to the street. All examples had a wheel chair accessible doorway, which is minimum 850 mm wide. In Nordic countries winter conditions are major challenge for accessibility. The maintenance work and removal of snow is big effort especially for older residents. Therefore, the paths to the entrance should be wide enough for mechanical removal of snow.



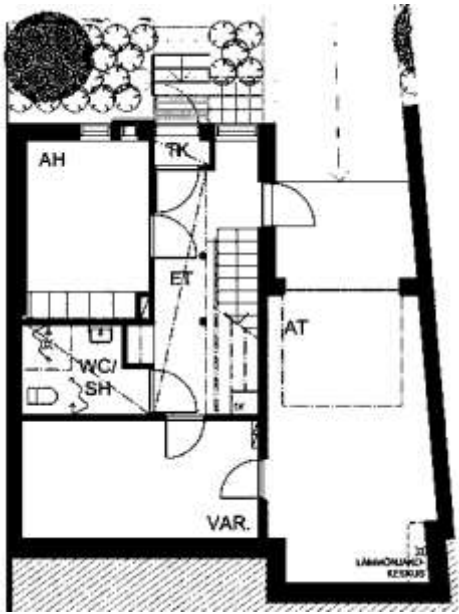
*Fig 2. In the city center, an accessible garage is designed under a garden deck. Accessible entrance from garage can be realized with a walk-through lift (Kalasatama, Anttinen and Oiva Architects)*



*Fig. 3. A narrow front yard ensures privacy and allows construction of an accessible entrance. The platform before entrance is too narrow for wheelchair use or mechanical removal of snow. (Kalasatama, Helsinki).*

Several design solutions were found to secure the privacy of the townhouse. Most realized buildings have both front and back yard. To ensure privacy, in many designs a difference of level between front and back yard is often generated. However, it creates need for stairs in the ground level. A walk-through lift gives access to all levels in the apartment. In some design solutions, the accessibility is assured by a space reservation in the plan for a vertical lift. The smallest vertical lifts available in the market for wheel chair use are approximately 900 mm x 1000 mm (inside measurement). This measurement doesn't enable turning inside the lift, therefore, the landing area in each floor for turning should be 1500 mm x 1500 mm. The doorway of the lift should be 800 mm in minimum.





*Fig. 4. Accessible entrance can be realized through the garage. The back yard is on the first floor level. (Helsingin Huvitus, ATT)*

Garage can be used to realize a level entrance. The slope needed to adjust the difference in height from street level can be longer, however, in case of parking in the front yard or on street. The entrance from garage will be sheltered from snow and rain. The minimum width for an accessible garage is 3600 mm, therefore, a very narrow plot is demanding for building a garage. It also limits the possibilities of the ground floor plan.



*Fig 5. The building fulfills the requirement for visitability, but not accessibility (Helsingin Huvitus, ATT)*



Townhouses that are opening directly to the street are mostly realized with the main floor raised half a storey height above the street level to ensure privacy. This has however a large impact on the usability of the apartment as well as in some cases of the pavement in front of the house (see fig. x). The height differences can be managed inside



or outside the building.

*Fig. 6. The main floor is planned half a storey height above the street level. The difference of level is managed inside the apartment. A space for a possible lift is in the plan. (Jätkäsaari, A-konsultit)*



*Fig.7. Newly built townhouses (2014) directly attached to the street with on street parking. Due to incompatibility of building and street realization the building does not fulfill requirement for accessibility or visitability. (Ormuspelto, Helsinki).*

According to recent studies the main costs for building a visitable or accessible apartment (in apartment block) is due to 1 – 1,5 m<sup>2</sup> extra space needed for an accessible bathroom on the ground floor level (Ministry of the Environment b). However, it has been realized in all previous townhouse examples. The previous examples are from 140 m<sup>2</sup> to 165 m<sup>2</sup>, which is quite large in Finnish standards. This is the main challenge in townhouse for affordability. In the current economic situation in Finland many new large apartments remain unoccupied. Possibility to divide the townhouse horizontally to separate apartments could help in the marketing but it would affect the interpretation of building regulations regarding the accessibility as well as fire safety, however. It would also answer residential needs as revealed in townhouse workshops.

## **Conclusions**

Townhouse has possibilities to be developed as an interesting alternative housing typology. It allows more communal ways of housing for multigenerational families or students, for example, without compromising the privacy. It can be an alternative for lifetime housing if accessibility is taken into account. The accessibility requires integral planning of street, building plot and the apartment as a whole.

As townhouse workshop cases suggested, lifetime housing should take into account the needs of all age groups. Accessible entrance, both inside and outside the building, leaves room for trolleys and walking aids, as well as for the bicycles of all users. Elevator design that takes into account the possibility to divide a multi-storey building for use of different generations enables flexible housing and privacy for the grandparents, for example. Accessibility studies are a way to develop townhouse for younger and older residents, who seek housing for life.

Finally, townhouse is a housing typology that may introduce new approaches not only to townhouse options but to other housing typologies as well since townhouse is closely related to terraced housing and apartment buildings, depending on housing preferences.

### ***List of References***

- Clark, W. & Deurloo, M. (2006). Aging in place and housing over-consumption. *Journal of Housing and Built Environment*, 21. pp 257–270
- Clough, R., Leamy, M., Miller, V. & Bright, L. (2004). *Housing Decisions in Later Life*. Hampshire: Palgrave Macmillan.
- Dann, S. (2007). Branded generations: baby boomers moving into the seniors market, *Journal of Product & Brand Management*, 16(6), pp. 429 – 431
- Diyanah I. A. & Hafazah A.K..(2012). A Comparative Study of Walking Behaviour to Community Facilities in Low-Cost and Medium Cost Housing. *Procedia - Social and Behavioral Sciences* 35, pp. 619 – 628
- Gilleard, C. & Higgs, P. (2007). The Third Age and the baby Boomers. Two Approaches to the Social Structuring of Later Life. *International Journal of Ageing and Later Life*, 2(2), pp. 13-30.
- Jansen, S. J. T. (2012). What is the worth of values in guiding residential preferences and choices? *Journal of Housing and the Built Environment*, 27(3), ss. 273–300.
- Karisto, A. (2007). Finnish Baby Boomers and the Emergence of the Third Age. *International Journal of Ageing and Later Life*, 2(2), pp. 91-108.
- Kilpelä, N.; Hätönen, J.; Palo, A. & och Holopainen, T. (2014). *Accessible apartmentbuilding in an efficient and sustainable way*. Ministry of the Environment, rapport 27/2014.
- Ministry of the Environment. (2013). Housing development programme for older population for 2013 -2017. Government Resolution 18. april 2013.
- Myers, D. & SungHo R. (2008). Aging Baby Boomers and the Generational Housing Bubble. *Journal of the American Planning Association*, 74(1), pp. 17-33.
- Sahlsten, S. (2013) Urban structure promoting public transportation. Case Nurmijärvi (translation of the author). Finnish transport Agency, rapport 14 /2013.
- 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(3), pp.289-306,.
- Solheim, T. & Stangeby, I. (1999). Proportions of short car trips and trips by walking and cycling. WALCYNG Deliverable D6. pp.32 – 40.

CIB W069 Meeting Oct 14th – 17th Chalmers Architecture Göteborg Sweden  
Explorations on Residential Qualities: Situations of Dwelling, Ageing and Healthcaring.  
Inquiries of Transdisciplinary Nature.

[http://safety.fhwa.dot.gov/ped\\_bike/docs/walcyng.pdf](http://safety.fhwa.dot.gov/ped_bike/docs/walcyng.pdf)

Strandell, A. (2011). *Asukasbarometri 2010 – asukaskysely suomalaisista asuinympäristöistä*. Suomen ympäristö 31. Helsinki: Edita Prima.

Svensson, J. (2009). Accessibility in the urban environment for citizens with impairments: Using GIS to map and measure accessibility in Swedish cities. 24<sup>th</sup> International Cartographic Conference 2009.

UN (2006). Convention on the Rights of Persons with Disabilities  
<http://www.un.org/disabilities/convention/conventionfull.shtml>

Takano, A. & Verma, I. (2014). 'Features of Townhouse', in Kuittinen, M. (edit.) *Energy Efficient Townhouse –project yearly report*. Aalto University, pp. 20 - 32.