Towards the New Criteria of Elderly Housing by the Model of Independent Mobility

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Abstract

The approach of the new criteria starts from the existing knowledge, looks the needs and wishes of the seniors and uses the Models of Independent Living and Mobility as means of organising the design knowledge. The approach of the models is qualitative. The outcome of these concepts is shows in so called the activity cards, while the activity was chosen as a dominant factor from the four angles studied in this project of the elderly habitation: activities, abilities, resources and qualities. Another main variable of the Models is resources, which represents more the housing providers approach to the independent living of elderly. The end-user oriented housing design is looking the habitation from the residents perspective, and even in housing provision the activity based approach to habitation will increase while both market pull and technology push domain the design. The Models emphasise the idea that a starting point can be anywhere in the ball: activities, resources, qualities or abilities – depending on the situation and what kind of point of view is taken.

Keywords: housing, design criteria, senior citizens, independent living, end-user requirements, design criteria, Design-for-all, housing surroundings, Model of Independent Mobility

1. Background

This paper is drawing much from the EU Fifth Framework project Elderathome, The Prerequisites of the Elderly for living at home: Criteria for Dwellings, Surroundings and Facilities (QLK6-CT-2000-00405). The focus of the EU-project Elderathom is to develop criteria for dwellings, equipment, surroundings and services so that elderly people can live longer independently at home. Despite the fact, that large amount of general and detailed information is available about the expert knowledge on housing, surroundings and services of the elderly, this information is non-uniform and in a different level in each European country. Summaries and in depth focus on the basic criteria have been identified necessary. Improving the independent living conditions of the existing housing stock has been targeted. The idea has been to improve functioning, in order to obtain better convenience and usability by the elderly. The project will make an inventory of the state-of-the-art of criteria of products and facilities
necessary for independent living, identify the wishes and needs of the elderly, identify the
criteria for the manageability of housing and suggest new developments in order to contribute
future independent living.

If comparison for finding rights or wrongs, good or bad is not fertile, the identification of
similarities and differences internationally in recommendations, regulations and design
guidelines make it possible to understand national features and to learn from others when
respecting the facts of universal human existence and housing phenomena due to various
climatic conditions and rich housing traditions in Europe.

There are three forms of preventing the difficulties due to the inappropriate housing condition for
the aged residents: renovation and repair of present housing, moving or relying on assistive
services, which substitute the difficulties due to the inappropriate housing condition for the aged
residents. Housing should in the first place satisfy the basic housing needs for shelter and the
surroundings are designed accordingly. Apart from the technical aspects of the surroundings of
the building, also the quality of the wider living environment is considered. In many cases, it is
difficult to make difference between these two approaches to design. The expected better
standard of living of elderly sets new questions. What are the modern targets of the good living
and what is known about the physical and mental health promotion of elderly? How they have
to be taken into account in design of housing, housing surroundings and facilities. Furthermore,
how the housing and service providers as well as facilities management can promote new
lifestyles of elderly?

The willingness of the elderly to renovate and repair their homes counts. The possibilities of
renovating or repair existing housing stock are crucial, while elderly are not very willing to
move although that alternative is not totally excluded either [1]. It is questionable if the use of
assistive services is a good solution although in many cases a necessity. Renovation or repair is
a one-off investment, but services cost repeatedly. The expectation of too high cost effects due
creation of too many recommendations and regulations is a reason for deliberation in actions of
authorities. It is an interested starting point for the project, while both authorities and voluntary
work can benefit from accomplished new knowledge. On the other hand, also such businesses in
this area as housing and service providers and facilities management can use this opportunity to
reach knowledge of if the end-users or the customers are ready to bye their products.

It is very important to understand and to remember that the new criteria have no intentions to
form any kind of minimum or maximum standard not to mention to aim to become a regulation.
It is a checklist covering issues related to elderly housing for understanding and checking the
situation in each case of elderly habitation.

Housing challenges many fields of sciences. It is a combination of social sciences, cultural
history and ethics, economics and housing technology: transport design, town planning or
zoning, landscaping, civil engineering, architecture, interior design, structural engineering, and HVAC, electricity and smart house technology. This challenging holistic approach includes also ecological and environmental psychological aspects. The knowledge of economics can be found out rather seldom from national economics, except from municipal economics and economies of households, but the more often from geographical economics, building economics, life-cycle-cost analyses, and from properties and facilities management.

The United Nations General Assembly adopted the UN Principles for Older People, in the year 1991. These call for action in many areas, among them:

- Independence: Older persons should have access to food, water, shelter, clothing, health care, work and other income-generating opportunities, education, training, and a life in safe environments.
- Participation: Older persons should remain integrated into community life and participate actively in the formulation of policies affecting their well-being.
- Care: Older persons should have access to social and legal services and to health care so that they can maintain an optimum level of physical, mental and emotional well-being. This should include full respect for dignity, beliefs, needs and privacy.
- Self-fulfilment: Older persons should have access to educational, cultural, spiritual and recreational resources and be able to develop their full potential.
- Dignity: Older persons should be able to live in dignity and security, be free of exploitation and physical or mental abuse and be treated fairly regardless of age, gender and racial or ethnic background.

Besides the regulations the Finnish housing designers and planners mainly have used the recommendations of the RT direction cards published by The Building Information Foundation (RTS, http://www.rts.fi/english.htm) and occasionally more detailed directions and recommendations including in the TTS Institute’s Home Economic bulletins. VTT has established a product called VTT Building and Transport ProP® (Requirement Management System). It is a classification, which takes into consideration Finnish and international standards, norms and classifications. It includes all kind of housing and surroundings and is not specified in elderly. Similar classification is: PAYCO in Spain which automatically translates the clients’ (with little or no previous experience) requirements into design specifications.

An electronic database called ARVI¹ (arvi.projekti.com) is under the way to become an addition source of valuable information of housing design criteria concentrating on the criteria which is taking into consideration the housing needs of the elderly and disabled. Also new experimental

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¹A method for design of housing for people with limited abilities in mobility and activity.
databases have been created such as VIRAPS\(^2\) (http://viraps.uiah.fi/), which aims to an automatic system suggesting housing designs for the end-users who enter information of their housing needs into database.

There are two certificates for elderly housing in the Netherlands the Woon Keur Certificate (www.woonkeur.nl) and Seniorenlabel. The Europa House Group is constantly working together with the rules for housing in general, not particularly for elderly, but also taking the needs of special groups carefully into consideration.

A large group of people - people with disabilities, older people, children, tall and short people, people with prams, travellers carrying heavy luggage - can all encounter barriers and obstacles in the built environment. The "European concept for accessibility" states (1996):

"To ensure equal chances of participation in social and economic activities, everyone of any age, with or without any disability must be able to enter and use any part of the built environment as independently as possible."

European Manual for Accessible Built Environment was formulated at the end of 1980’s and the first version of the manual was printed in 1990. The idea to write such a manual was initiated by the Central Co-ordinating Committee for the Promotion of Accessibility (CCPT) and the same organisation produced the manual. The objective was to bring about new initiatives to improve the accessibility of the built environment in the European Community. The manual is also hoped to help in standardisation work.

According to the European Manual for Accessible Built Environment all buildings open to the public must be fully accessible, while working places and dwellings can have a standard of accessibility in accordance with the rules of the individual country. Such buildings can be houses, shops, theatres, restaurants, public telephones, banking services, information kiosks, self-service systems, public transport facilities and places of work. In order to use an information and communication technology terminal or other ICT system, the built environment around it must be accessible.

\(^2\) The Internet-based VIRAPS service brings user-orientation into the housing industry by connecting the databases of the various companies involved in the building process. The VIRAPS service allows customers to search the database for suitable apartments in their preferred areas. Customers planning their apartments with the VIRAPS service can customize them according to their wishes and make changes in their interior design. These decisions are divided into environment, construction and infill levels. The integrated cost-calculator keeps customers informed about how their choices affect the final cost of the apartment. User-orientation of the VIRAPS service benefits both customers and companies: customers can balance their needs and desires with the right price, while the companies can increase their turnover and adapt to the markets faster and more accurately.
2. Models of Independent Living and Mobility

The Models of Independent Living and Mobility of Elderly include four main elements or variables: activities, abilities, resources and qualities (Figure 1., Figure 2.). Models describe the idea of different variables needed to be taken into consideration when promoting wellbeing and supporting independent living at home. The Models represent the holistic approach in which different relevant factors are integrated. The variables ensure for example that making reparations meets the requirements of users.

Figure 1: The variables of models of Independent Living and Mobility

The normative mode (the form) of criteria shown in the activity cards (Table 1. to be published at www.vtt.fi) is telling both of the qualities of phenomenon and the reasons why one should have criteria of that kind formulated in easily opening manner. The expressions are focusing on rather needs and wishes than on solutions.

The Models of Independent Living and Mobility are means of organising the knowledge. The approach of the models is qualitative. The outcomes of these concepts are shown in the activity cards, while the activity was chosen as a dominant factor from the four angles of the Models. Another main variable of the Models is resources, which represents more the housing providers approach to the independent living of elderly. The end-user oriented housing design is looking the habitation from the residents perspective, and even in housing provision the activity based approach to habitation will increase while both market pull and technology push domain the design.

The approach of domestication is starting from the facilitation of activities of everyday living and the approach of the housing provision starts from the general principles of quality requirements of housing, which can be realised by certain business activities. The Models emphasise the idea that a starting point can be anywhere in the Model: activities, resources, qualities or abilities – depending on the situation and what kind of point of view is taken.
Common housing activities are care and keeping fit, eating, personal hygiene and dressing, moving, recreation, communication and self-actualization, sleeping and resting, gardening and maintenance, housework and storage. They were used in the Model of Independent Living. The Model of Independent Mobility is covering the same activities but looks at activities taking place outside home or activities, which connect home outside surroundings and services (Figure 2.). They can be compared with the Activities of Daily Living (ADL)-indicators, which are often used in the geriatric of a functional capacity of elderly. The activities are divided into the Physical Activities of Daily Living (PADL) and the Instrumental Activities of Daily Living (IADL). However, the new criteria look the activities also from the point of view of abilities when the ADL-indicators look them rather from the point of view of disabilities and limitations in everyday living. The criteria of surroundings can be tailored by the needs of accessing services, the activity level of the senior tenants and not only the current physical and psychological health condition but rather the promotion of health and function – even disease prevention in old age.

Figure 2: The Model of Independent Mobility of Elderly.

2.1 Activities
Mobility is a basic activity of all activities, which are related to surroundings of homes, the near neighbourhood and connections by information and communication technology and media from home.

2.2 Resources

The surroundings are defined as the area connecting the inhabitants to the outer world, services, activities and social life. The connections and access to services, transport and relatives, friends and other people are needed. This connection can be a concrete one as a corridor, a courtyard, a path. It can be a more abstract one as a link via communication technology or even as an access by virtual reality. These are the resources.

Apart from the technical aspects of the surroundings of the building, the quality of the wider living environment or neighbourhood has also been considered. From the geographical approach can be found that the housing surroundings does not mean the housing unit scale, but the building site condition and in certain extent the neighbourhood, which during a standard house building processes means the street in front of house(s) and the connections to the public municipal services: electricity, water and sewage pipelines if needed, and possible gas or district heating pipeline, and connections to telephone and other communication networks. Within the Elderathome project the neighbourhood was the space within the walking distance from home and surroundings is the area next to the houses. The walking distance is dependent on the ability to walk, but often it means the distance within around 15 minutes' walk. This is for a healthy person roughly 1 km (or a few hundred meters more).

The area in focus is the connecting channel like staircases, lobbies, terraces, courtyard and possible garden, walkways, parking, back lanes and connections to information and transport systems: private vehicles: (airplanes), cars, boats, motorcycles, cycles, public transport and pedestrian and cycling pathways. Examples of resources can be given as:

- Operable building elements (fence, ports, doors, stairs, ramps, lift, locking with doorbells, door telephones and video monitoring)
- Active structures (automated doors, windows, thresholds, curtains, shadings, etc.)
- Storage rooms near entrance for walkers, bikes, skies, other sport equipment, etc.
- Entrance halls or other space for to move or bring in and out goods (groceries, deliveries, repair equipment or furniture)
- Telecottages (and satellite offices), meeting and banqueting rooms, extra quest rooms, space for welfare service or maintenance providers
- Technical and maintenance spaces
- Shelter (shelter for entrance, terraces, barbeques, separate storage buildings, etc.)
- Yards and gardens
- Seats and rest areas on housing surroundings and in the neighbourhood
- Hobby and recreation areas and facilities (plays, shared equipment, etc.)
- Possible domestic appliances outdoors
- Paths (walking paths, sideways, shortcuts)
- Back lanes and streets
- Neighbouring housing, nature and public buildings
- Personal transportation: access to vehicles and parking places or storages
- Public transport: stations, stops and platforms, information (signs, signals, labels and timetables)
- Surfaces, coverings and pavements
- Location of personal business, services or public transport
- Telecommunication – media connections (e.g. gable television, satellite dishes), telephone and data lines, gables and antennas, personal devices of home health care e.g. wearable devices – pendant alarms, vital signs monitors, alarms for safety and security systems (burglar, fire).

### 2.3 Qualities

There are a good number of qualities, which belong to the general concept of good housing practice or building and maintaining housing. Any of them cannot be left without attention when designing and facilitating built environment. Still, certain ideas of them can be named more important to the criteria of surroundings than those of the dwelling or services (Figure 2.).

For mobility, the accessible design (accessibility) is one of the main considerations. Other important qualities for mobility, physical surroundings and connections are availability, Design-for-All, sustainability, re-thinking of chains, safety and security, user-connectivity, usability, Technology-for-All and transparency. Such qualities as availability, affordability, Design-for-All, user-connectivity, productivity, quality engineering and standards, usability concern all activities and are not mentioned in the activity cards separately. However, some of them are not very well developed in the context of built environment: user-connectivity, usability, Technology-for-All and transparency.

The quality of multi-, inter- and transdisciplinarity is not mentioned in the list while it is everywhere present. For the need of easy access to the activity cards, a hierarchy of the qualities is helpful.

Qualities are essential for good design in any case, and cannot be excluded in criteria, which aim rather to a general checklist than to detailed instructions. In a complex modern world the basis of the design principles can be even forgotten during the sophisticated design work and
there are almost never too many checklists. Most of these qualities are well known in the context of housing and building. Some of them might need some specification in the context of elderly housing.

2.4 Abilities

The Elderathome project is focusing on those, who are in old ages:

- Able to live independently in an improved environment,
- Able to live independently in an improved environment and with services provided at home or
- Willing to live in an environment designed specially for health promotion.

The Elderathome project is not especially interested in those who:

- Are able to live independently in any environment or
- Have health problems needing specialised care permanently.

Not all elderly have severe disabilities, but the prevalence of disability or limitations is the highest amongst this demographic group. In the old ages the physical abilities, senses and cognition tend to weaken. The impaired abilities often lead to a need of outside help or arrangements in the dwelling and they are especially significant when considering independent living at home. The abilities, however, not the disabilities make the independent living possible. However, many elderly can trust their long life experiences and their good psychological and social skills as well as their mentality in the independent living conditions, if something unexpected will happen or despite the impairments of old ages [3], [9]. On the other hand, also these previously mentioned abilities might fail and cause problems. Some elderly are for example too lonely or too scared in order to live alone or independently, although their physical condition would allow them to do so.

The abilities for the Model of Independent Mobility were determined together with Veli Himanen on the basis of the work we have done on human and technological intelligence [4], on CEN/CENELEC Guide 6 [1] and the latest literature on psychology, e.g.[1]. They are as follows:

- Physical (dexterity, movement, manipulation, reach, seizures, strength, voice)
- Psychological (temperament, feelings, behaviour patterns; habits, addiction, motivation)
- Emotion (the consequence of bodily reactions and mental modes due to stimulus, or sensing and feeling)
- Instinct (genetically programmed behaviour)
- Sociability (social relationships, group behaviour, social life and norms)
- Sensory (hearing, sight, taste, smell, touch, balance)
- Cognitive (understanding, integrating and processing of information)
- Intellect (know, comprehend and reason; knowledge management, memory, learning)
- Spiritual (intelligence for creativity or for satisfaction of needs, intuition to reach tacit knowledge and handle instincts with intelligence, mental growth and transcendency).

### 3. Implementation

New criteria is suggesting concepts for lacking existing design criteria and formulating criteria out of them shown by activity cards (Table 1.). A starting for organising the existing design criteria was found from the accessibility strategy of the Ministry of Transport and Communications Finland [10] covering equally all people, feasible for independent living of elderly housing and surroundings especially after the problem of noise and lack of light and awareness were added, classifying problems of environment:

- Differences between levels
- Need of space
- Reaching distance especially when carrying items
- Orientation especially in finding ones way if sight is not good
- Balance in stairs, ramps and vehicles
- Reach of small people and wheel chair users
- Lack of strength in opening doors
- Complexity in use of technology and in understanding information contents
- Safety of infrastructure and maintenance
- Allergy; respiratory in particular
- Inequality caused by environment
- Noise
- Lack of light
- Lack of awareness.
### Table 1: An example of an activity card.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Variable</th>
<th>QUALITY</th>
<th>ABILITY</th>
<th>RESOURCE</th>
</tr>
</thead>
</table>
| **Reaching distance** | It is important to reach certain basic services and being active on daily basis in the surrounding neighbourhood or in local village, while the visits to rural centres and cities are done more occasionally. | Accessibility  
Re-thinking of chains  
Sustainability  
Eco-efficiency  
Flexibility  
Adaptability  
Assortment  
Safety & security  
Functionality  
Comfort & amenities  
Aesthetics | Physical  
Psychological  
Sociability  
Intellect | The routes are short.  
The ramps are not too steep and long.  
There are enough and comfortable resting places available in the housing surroundings and neighbourhood, in the paths and especially on the way to stops and stations.  
Parking places near dwellings are safe and conveniently arranged. Parking garages are social secure and are good to manage.  
The sitting areas; seats and other public furniture are attractive.  
There are shelters in the mobility area.  
Because it is difficult to carry items such as groceries and equipment for activities, there can be lockers for temporary storing along the routes.  
For chaining of various transport modes there are locked shelters for vehicles or moving aids for periodic storing also in the near neighbourhood (e.g. parking of a walker) or in the stations are available walkers and rollers for use during walks.  
The housing complexes are in attractive scale and the opening up is conveniently arranged and recognisable.  
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The sitting areas; seats and other public furniture are attractive.  
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The sitting areas; seats and other public furniture are attractive. |
| **Need of space** | It is easy to use a walker and cycle or bike (or use a preferred means). | Accessibility  
Flexibility  
Adaptability  
Safety & security  
Functionality  
Comfort & amenities  
Aesthetics | Physical  
Psychological  
Sociability  
Spiritual | Sufficient dimensions, finish, design and layout of:  
- Shared spaces and spaces for entering and exiting  
- Courtyard and garden  
- Paths, ramps  
- Parking places, pathway form the parking area to the home entrance  
- Streets, walkways and alleys  
- Stops and stations  
- Plazas |

The end-user interview revealed that senior citizens are not necessarily aware of the possibilities how the housing can aid independent living [1]. The aim of the criteria is to raise awareness of how built environment can help the elderly and other parties involved to plan the possible changes for provision of independent living in their present homes. The new criteria form, in the first place, a framework and a checklist for the occupants, designers and service providers for
common understanding of needed changes of individual senior citizen's habitation. The new
model can be used in two ways:

- As a tool for analysing the existing knowledge and as a tool for formulating the
  comprehension of the habitation of the elderly and formulating a criterion out of them
- It can serve as a planning tool for empirical cases and be a generator of new ideas for
  implementation and criteria.

The thinking behind the existing criteria seems to be based rather on common habitation in
cities and in suburban areas than that in the rural areas or surroundings of private housing.
Living in block of flats or in other types of common housing arrangements are in focus. The
new criteria of surroundings are not – at least purposefully – making this type of discrimination
between the habitation and living styles of elderly. The existing criteria are numerous rather of
limitations than of alternative advices and solutions when facilitating the independent living.
The human disabilities and impairment lead the thinking. The new criteria of surroundings tend
to suggest some advancement of this respect by looking also the abilities of elderly due to e.g.
long and rich life experience and the freedom of selecting alternative living styles and
surroundings. Not always, but in some cases the long life experience stand for better awareness
of ones abilities and their relation to the possibilities in life in general and also of what is
possible due to the surrounding conditions including built environment. The better
understanding of life makes the social relationships and social skills valuable.

4. Conclusions

There are two tasks for the criteria of surroundings. They shall be designed to avoid obstacles
such as:

- Insecurity
- Costly economics of facilities management (high housing costs - affordability)
- Distance
- Uncomfortable design
- Unattractiveness
- Bad weather
- Arguments against bad sociality and too small privacy
- Physical obstacles
- Lack of connections: parking places, public transport, etc.
- Attitudes of housing managers and other tenants,
- Interim obstacles
- Lack of binding regulations that specify precisely the interpretation of the concept of
  housing and surroundings of independent living of elderly,
- Lack of European wide harmonised advisory guidelines
Ignorance and lack of awareness of the effect of built environment for independent living of elderly

Laws and building norms are too weak to facilitate independent living of elderly

Elderly housing has not been regarded as big business

Such examples of the obstacles can be mentioned as public transportation may be inaccessible and unavailable; attendant care services may be inadequate and dehumanizing; income maintenance programs and health care assistance can be inadequate informed; or community facilities and programs may be unresponsive and inaccessible. In addition, individuals may not be able to get out of their homes or get around inside because of architectural barriers. Even in the housing environment there are numerous issues which people confront. Landlords may discriminate against elderly people. Landlords and tenants can be patronizing and create problems for visiting home care attendants. Housing can be unaffordable, especially for people with low to moderate incomes. Large housing projects are often unsafe and may not have adequate accessible neighborhood facilities. Also, many communities do not have emergency housing hostels and facilities which are physically accessible.

On the other hand, they can promote the quality of life and make the every-day life not only easy but also enjoyable. This part is not very fully covered in the existing knowledge of independent living and housing surroundings and neighbourhood.

Some suggestions for bettering the situation can be made:

Inform the market

Coordination between countries in creation of housing norms and specifications (EU Directives)

Close collaboration between politicians, technicians and citizens

The will to co-ordinate all the agents involved and programme the interventions

Including the knowledge of special housing and surroundings concepts as the independent living of elderly in the education of architects and building engineers

Making fully clear who is responsible for applying new concepts

A more accurate analysis of the effects of adaptations of built environment for independent living of elderly

Identifying the areas where common requirements are most important

Facilitating the change in built environment for the independent living of elderly by supporting financing systems (loans, allowances).

Kose [7] has stated good questions about the design criteria of built environment of elderly:

"Safety: To what extent should safety be pursued?"
Health: How healthy\(^3\) an environment can be?
Function: How convenient should a house be? (How does one distinguish convenience from laziness?)
Comfort: How would a stimulus-free environment affect a human being?
Economy: Who will eventually bear the cost?"

The criteria of surroundings is highlighting not only the problems with built environment but the criteria cover also the way of having fun, pleasure, environmentally comfortable. Resources include possible solutions without any prejudice to what is suitable to offer to elderly; it is their own choice and a right of all to choose from what or from the best engineers and architects can offer.

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References


\(^3\) More information of the healthy buildings in deliverable 3 (Himanen et al. 2004, p.13-14).


