

Smart Lifetime Neighbourhoods: Literature Review and Research Agenda

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Municipalities in European Union are ageing fast. Consequently, the development and financing of smart social infrastructure to support the growing number of older adults with declining functional capacities to postpone their moving to nursing homes so that they live longer in the community is a major challenge for European municipalities. In this context, social innovations based on the digital transformation of health care and social care delivery systems can support older adults to live autonomously and independently in their own communities and postpone or even prevent entering nursing homes. The innovations will enable a more efficient combination of existing societal resources in the communities for the provision of health care and social needs of the ageing members of society who are dependent on the help of others due to illness or functional decline. On the supply side, new scientific (optimisation of supply networks), organisational (self-managed communities) and technological innovations such as robotics, domotics and CPS – based on the Internet of Things and cloud computing – offer new utilities and create new businesses for the supply of goods and services to older people while also providing new job opportunities for younger residents. The aim of this paper is to consider the development and financing of community smart social infrastructure with a focus on Slovenia.

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1 INTRODUCTION

The ageing of the European population is progressing rapidly, and the proportion of inhabitants aged 65+ will surpass one quarter by the middle of the century. Older adults have different needs regarding safety of their environments, which includes their homes and public spaces. According to the World Health Organisation (WHO), physical and social environments are key determinants of whether people can remain healthy, independent and autonomous long into their old age.

Concept of Age-friendly cities was developed by the World Health Organisation (WHO) (Kalache et al., 2007). Age-friendly urban environment can facilitate health and wellbeing of residents (Fitzgerald and Caro, 2014; Greenfield et al., 2015; Scharlach and Lehning, 2013). Making cities and its neighbourhoods age-friendly is an effective local policy approach for responding to population ageing. The WHO age-friendly cities guide (Kalache, et al., 2008) highlights 8 domains that cities and communities can address to better adapt their structures and services to the needs of older adults: the built environment, transport, housing, social participation, respect and social inclusion, civic participation, employment, communication services, community support and health services. The physical and social environments are key

determinants of whether people can remain healthy, independent and autonomous long into their old age. Different models of “age-friendly community” were presented by (Menec and Nowicki, 2014). Age-friendly communities are characterised by social and physical environments that are mutually reinforcing, participatory and apply collaborative governance models with, most importantly, inclusiveness (Lui et al., 2009). This is supported by research findings that professionally facilitated community development with and by older adults in the neighbourhood and can result in more hospitable and supportive community environments for older people by increasing civic engagement and social capital (Austin et al., 2005; Buffel et al., 2012a). Several recent case studies on age-friendly communities (Buffel et al., 2014; Glicksman et al., 2013; Menec et al., 2014; Neal et al., 2014) as well as an evaluation of European Healthy Cities (Green et al., 2015) have also elucidated policy and governance factors conducive to age-friendly communities.

Falls often cause severe injuries and are one of the costliest health conditions among older adults (Stevens and Lee, 2018). Therefore, understanding risk factors and risk drivers influencing probability and severity of risk of falls is of utmost importance for urban planners designing age-friendly cities and neighbourhoods. Understanding risk, Extrinsic factors, or

those pertaining to environmental hazards, contribute significantly to fall incidents and include obstacles to trip over, poor lighting, slippery surfaces, or inappropriate furniture. Hence, an in-depth understanding of the multitude of neuromuscular, cognitive, sensory, sociological and environmental factors that contribute to balance control are necessary for early diagnosis and treatment of elderly who present significant risks of falls (White et al., 2019). Therefore, in lifetime neighbourhoods' digital technologies should be deployed for fall prevention reducing risk of falls in community and in transition between community and hospital (Goswami, 2017). Thus, accessibility to age-friendly environments that can accommodate functional capacities of residents and the development of housing with care (HwC) are important factors that can enable older adults to live longer in the community. Creating age-friendly urban environments is therefore one of the most effective approaches to respond to demographic change.

Though the housing industry has substantially focussed on senior citizens in the last 20 years, this was often not considered an important component of changing urban structures (Hui et al., 2014). For most people, the idea of independence is closely associated with the idea of home. As residents grow older, they are more likely to spend more time at home, and where older adults live is an important determinant of their well-being. However, it is increasingly being recognised that it is not just homes but also the neighbourhoods where residents live that play a significant role in keeping them well and independent as they grow older (Bevan and Croucher, 2011). According to these authors, the main components that make up a lifetime neighbourhood include the following:

1. Supporting residents to develop lifetime neighbourhoods, especially resident empowerment
2. Access
3. Services and amenities
4. Built and natural environments
5. Social networks/well-being
6. Housing

Additionally, to extend this model and develop smart lifetime neighbourhoods, we should also include the following:

7. Ambient intelligence and assistive technologies to develop ambient-assisted living on neighbourhood level

However, considering the pace of population change, it is necessary to develop new economic and social conditions in urban structures; to this end, new types of smart lifetime neighbourhoods could be an acceptable solution, especially when we wish to support longer ageing in place. Moreover, housing is a potential source of both material and environmental well-being (Costa-Font, 2013; Rossi and Weber, 1996; Rohe et al., 2001). The housing needs of older cohorts have been studied by Demirkan and Olguntuerk (2014). Housing needs of older adults are satisfied if the dwelling is specifically designed to meet their physical, emotional, recreational, medical, and social needs. Further, their needs frequently change for the remainder of their lives. For an older adult, the choice between moving to a nursing home and independent living usually depends on how well

they can manage daily activities without extra assistance. However, the ability of older adults to carry out activities of daily living and adapt and manage their own life decreases due to deterioration of their physical and cognitive condition. Thus, nurses and other health care professionals should support the self-management abilities of older adults in the community to prevent their dependence and increase their ability to adapt and self-manage the consequences of living with chronic conditions. In this context, Bolscher-Niehuys et al. (2016) have provided evidence on the effects of self-management support programmes on activities of daily living of older adults living at home.

Kano et al. (2018) and Rydin et al. (2012) stated in their article that “the key environmental features which make a city healthy through their contribution to disease prevention and health promotion are increasingly well understood”. They listed basic communal infrastructure, adequate housing, accessible public transport, air pollution control and violence prevention, which are elements of a healthy city – also underlined in the reports of WHO and UN-HABITAT (2016). Among sustainable development goals, the listed activities include an important area for creating lasting positive changes, whose results are not systematically measured and evaluated yet. Therefore, models and databases for measurement of the tenure in the community and relocation to nursing home are still sorely lacking. As these authors, as well as Corburn and Cohen (2012) underlined, “Cities are complex systems and urban health outcomes are dependent on many interactions”. This makes the analysis of causal associations between the urban environment and population health very challenging.

2 PROBLEM IDENTIFICATION

Development of lifetime neighbourhood should follow the directions of the European Disability Strategy which provides the framework for empowering people with disabilities to fully participate in society and ensure they can enjoy their fundamental rights. Following these directions lifetime neighbourhoods should facilitate and promote the participation of disabled people in leisure activities, employment, education, health, social services and achieve the transition from institutional to community-based care.

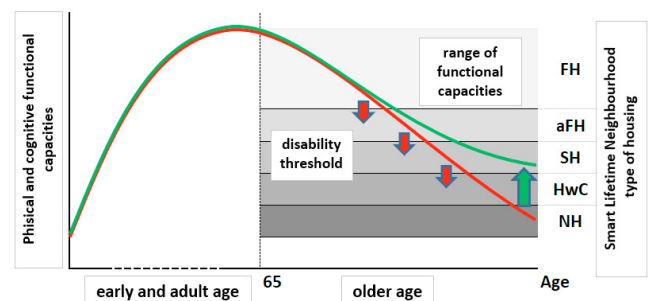


Figure 1: Decline of functional capacities of older adults and support for autonomy and independence that smart lifetime neighbourhoods can provide

Legende: FH – family home, aFH – adapted family home, HwC – housing with care, SH – sheltered houses, NH – nursing home



Figure 4: Digital platform supporting active and healthy ageing in Lifetime Neighbourhoods

Information and communication technologies embedded in digital platform of Lifetime neighbourhood should support active and healthy ageing, providing opportunity for social engagement and health for residents keeping them vital long into their old age and mitigating decline in their abilities and functional capacities, providing opportunities for leisure and culture. It should support risk management, provide safe and secure environment including barrier free buildings and public spaces facilitating physical activity and social inclusion, integrated health and care provision in the community, facilitate mobility of older adults with declining functional capacities, support work of professional and informal carers and support family members providing care

5 CONCLUSION

Therefore, when studying systems that support urban growth in aging societies, the following indicators should be considered in both gravity and competing risk models to simultaneously bring new insight to the supply chain, required community logistics, digital infrastructure, ambient intelligence technologies, assistance centres, health care and long-term care services provided and housing market. Multi-state transition/competing risk models have been developed through the last quarter of the century. The model will facilitate evaluation of better attractors in gravity model as well as improve demographic projection according to age cohorts in smart lifetime neighbourhoods. The model of aging with decrease of functional capacities will have more disability thresholds, wherein thresholds are determined by the different levels of ambient intelligence and assistive technologies' support and housing requirements according to modified (extended) care dependency scale and categorised facilities as presented in figure 1. Nowadays, only institutional care facilities are more diversified according to people's needs and can be categorised as follows: (1) the classical nursing home (NH), orientated towards medical care aspects for care-dependent elderly with a high level of care; (2) sheltered housing (SH), where the elderly still live independently on their own but have specific common facilities and special low-level services that are highly dependent on the available ICT tools; and (3) adapted housing, meaning structural alteration of a care-dependent person's own home to suit their care needs – barrier-free living. Such barrier-free living in smart lifetime neighbourhoods as also in urban space should be divided in

additional sub-categories (different sub-groups according to functional capacities) and integrated with tailor-made digitally supported intermediate care services in combination with day care and short-term care facilities and external supply chains for the elderly. The same care dependency classification should be used in completing risk/multi-state transition model in housing and facility classification and other supply networks destinations.

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